

Version 4 Release 4

*IBM IMS Performance Analyzer for
z/OS
Report Reference*



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z/OS
Report Reference*



Note:

Before using this information and the product it supports, read the "Notices" topic at the end of this information.

Second Edition (December 2018)

This edition applies to Version 4 Release 4 of IBM IMS Performance Analyzer for z/OS (product number 5655-R03) and to all subsequent releases and modifications until otherwise indicated in new editions.

This edition replaces SC19-4366-00.

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Contents

About this information	vii
----------------------------------	-----

Part 1. Introduction 1

Chapter 1. IMS Performance Analyzer overview 3

What's new in IMS Performance Analyzer	3
What does IMS Performance Analyzer do?	8
Complementary IBM products	11
Service updates and support information	16
Product documentation and updates	16
Accessibility features	17

Chapter 2. Overview of the reports. 19

Log reports	19
Message Queue transaction and Full Function database reports	19
Fast Path EMH transaction and Fast Path database reports	23
DBCTL log reports	25
ATF Enhanced Summary reports	25
Monitor reports	26
Region Activity Summary reports	27
Region Activity Analysis reports	27
System Analysis reports	28
Program Analysis reports	28
Resource Usage reports	28
Fast Path Analysis reports	29
Monitor Data Analysis report	29
Batch Program reports	29
DBCTL monitor reports	30
IMS Connect reports	30
Form-based Transaction Transit reports	31
OMEGAMON TRF reports	32
OMEGAMON ATF reports	33

Chapter 3. Processing extract data sets 35

Part 2. Log reporting. 37

Chapter 4. Analyzing Log reports and extracts 39

Log report reference tables	39
Log report categories	44
DBCTL log reports	46
Transaction (MSGQ) Transit reports	47
Uses of the Transaction Transit reports	48
Transaction Transit Analysis report	49
Transaction Transit Statistics report	56
Transaction Transit Log report	58
Transaction Transit Graphic Summary report	62
Transaction Transit Extract by Interval	63
Transaction Exception report and extract.	70

Transaction History File	81
Transaction Transit reports (Form-based).	85
Form-based Transaction Transit List reports.	85
Form-based Transaction Transit Summary reports	94
IMS Program Switch reporting in IMS PA	111
Program Switch examples	113
IMS Transaction Index	115
Uses of the IMS Transaction Index	115
IMS Transaction Index record format and contents	116
Displaying IMS Transaction Index record contents	117
Creating an IMS Transaction Index	119
Using the index for performance reporting	122
Resource Usage and Availability reports	123
Dashboard report	123
Management Exception report.	127
Transaction Resource Usage report	135
Resource Availability report	145
CPU Usage report and extract	152
Internal Resource Usage reports	158
MSC Link Statistics report	193
Message Queue Utilization report	196
Database Update Activity report and extract	200
Region Histogram report	207
OSAM Sequential Buffering report	211
Deadlock report	215
System Checkpoint report	225
BMP Checkpoint report	232
Log Gap Analysis report	236
Cold Start Analysis report	237
Fast Path Transit reports.	239
Understanding Fast Path Transit Time	239
Uses of the Fast Path Transit reports.	241
Fast Path Transit Analysis report	242
Fast Path Transit Log report	246
Fast Path Transit Extract by Interval.	248
Fast Path Transaction Exception report and extract.	249
Fast Path Resource Usage reports.	260
Fast Path Resource Usage and Contention report	260
Fast Path Buffer Usage report	264
Fast Path Database Call Statistics report	266
IFP Region Occupancy report	268
EMH Message Statistics report	270
DEDB Update Activity report	271
VSO Statistics report	273
ATF Enhanced Summary reports	277
ATF Enhanced Summary Extract	277
ATF Enhanced Summary Transaction Analysis report	279
ATF Enhanced Summary DLI Call Analysis report	283
ATF Enhanced Summary DB2 Call Analysis report	286

ATF Enhanced Summary MQ Call Analysis report	289
Trace reports	291
DC Queue Manager Trace report	291
Database Trace report	296
DEDB Update Trace report	300
ESAF Trace report	302
User-written reports	303
IPIPU1xx: DL/I Call Statistics report	304
IPIPPGM2: Transaction Statistics report	304
IPIPU9xx: Checkpointed IMS Resource Definitions report	306
IPIERA30: Deadlock report	309
Log Information report	310
Report options	311
Report content	311

Chapter 5. Understanding IMS log data 315

Transit time concepts for Message Queue transactions	315
Transit time versus response time	315
Transaction sets	315
Transit times	316
Comparing DFSILTA0 to IMS PA Transit reports	317
Shared Queues in an IMS sysplex	318
Restrictions for Log reporting	319
Comparing IMS PA with other IBM programs	319
Comparing DFSILTA0	320
Comparing DFSISTS0	320
Comparing DBFULTA0	320

Part 3. Monitor reporting 323

Chapter 6. Analyzing Monitor reports 325

Terminology	325
Monitor report reference tables	326
Monitor report categories	331
Batch program reports	335
DBCTL monitor reports	336
Guidelines for using Monitor reports	337
Performance management	337
Performance monitoring and analysis	338
Performance threshold values	338
Program design standards and documentation	339
Choosing Monitor reports	339
Monitor data collection	340
BMP program reports	340
ESAF Integration	341
Terminology	342
Report reference table	342
Alternate Sequencing	343
Report reference tables	345
Sequencing resource reference table	347
Report descriptions	347
Region Activity Summary reports	348
Schedule/Transaction Summary report	348
Region Summary report	350
Program Summary report	364
Database IWAIT Summary report	374

Transactions by Time Period report	378
Region Activity Analysis reports	380
Region Analysis report	380
Application Detail report	388
Database IWAIT Analysis report	393
DDgroup report	396
Performance Exception reports	399
Enqueue/Dequeue Trace report	407
Region Histogram report	409
System Analysis reports	412
Total System IWAIT Summary report	413
Total System IWAIT Detail report	418
Program Analysis reports	423
Program Activity Detail reports	423
Program Trace report	441
Batch VSAM Statistics report	447
Resource Usage reports	452
Buffer Pool and Latch Statistics reports	452
Communication reports	457
MSC reports	466
ESAF report	471
Synchronous Callout report	474
Fast Path Analysis reports	475
DEDB Resource Contention report	475
Fast Path Buffer Statistics report	480
BALG/Shared EMHQ Analysis report	484
OThread Analysis report	487
VSO Summary report	490
Monitor Data Analysis report	497
Monitor Record Trace report	497

Chapter 7. Understanding Monitor data 501

Operation of the Monitors	501
IMS SLOG macro	501
Monitor /TRACE and IMS TM STIMER options	501
Monitor record patterns	502
Essential terminology for Monitor reporting	502
ESAF Integration	502
Schedule	502
Schedule start	503
Transaction	503
Dependent region activity in progress	503
WFI and IFP region activity	503
CPU time	504
IWAIT time	504
Elapsed time	504
Region elapsed time	504
Trace interval	504
Schedule to first DL/I call	504
PCB feedback area	505
Overflow values (***)	505
Comparing IMS PA with other IBM programs	505
Comparing DFSUTR20	505
Comparing DFSUTR30	508

Part 4. IMS Connect reporting . . . 509

Chapter 8. Analyzing IMS Connect reports and extracts 511

IMS Connect Extensions event collection	511
IMS Connect report categories.	513
IMS Connect report reference table	514
Connect Transaction Transit reports	515
Connect Transit Analysis report	515
Connect Transit Log report	522
Connect Transit extract	527
Connect and Combined Transit reports (Form-based)	533
Sample Report Forms	533
Form-based Transit List report.	534
Form-based Transit Summary report.	537
IMS Connect Transaction Index	541
Connect Resource Usage reports	546
Connect Port Usage Report.	546
Connect Resume Tpipe report	549
Connect ACK/NAK report	554
Connect Exception Events report	557
Connect Gap Analysis report	561
Connect Trace reports	563
Connect Transit Event Trace report	563

Part 5. OMEGAMON TRF reporting 571

Chapter 9. Analyzing OMEGAMON TRF reports and extracts 573

OMEGAMON TRF data	573
TRF report categories.	573
TRF report reference table	574
TRF Database Usage reports	575
DLI Call List report	575
DLI Call Summary report	578
DB2 Call List report	581
DB2 Call Summary report	583
TRF Message Queue reports (Form-based).	584
Form-based Message Queue List report.	584
Form-based Message Queue Summary report	586
TRF Trace reports	588
TRF Record Trace report.	588

Part 6. OMEGAMON ATF reporting 593

Chapter 10. Analyzing OMEGAMON ATF reports and extracts 595

OMEGAMON ATF data	595
-----------------------------	-----

ATF report categories.	595
ATF report reference table	596
ATF Transaction Transit reports	597
ATF Transit List report	597
ATF Transit Summary report	598
ATF Trace reports	599
ATF Record Trace report.	599
ATF extracts.	605
ATF Exception Transaction extract	605

Part 7. Reference 609

Chapter 11. IMS Log records 611

Chapter 12. Monitor records 613

Chapter 13. IMS Connect records. . . 615

Event records recorded by IMS Connect Extensions	615
Connect status event records	615
Workload-related event records	616
Recorder trace records	619
IMS Connect trace records	619
User data logging record	620
Event types	620
Collection levels	620
Required event records for IMS PA reports	621
OTMA NAK sense codes	622
Typical event flow with Sync Level NONE	623
Typical event flow with Sync Level CONFIRM	623

Chapter 14. OMEGAMON TRF records 625

Chapter 15. OMEGAMON ATF records 627

Chapter 16. Glossary of Report Form field names 629

Part 8. Appendixes 675

Notices 677

Index 681

About this information

IBM® IMS Performance Analyzer for z/OS® (also referred to as IMS Performance Analyzer) is a performance analysis and tuning aid for Information Management System Database (IMS DB) and Transaction Manager (IMS TM) systems.

IBM IMS Performance Analyzer for z/OS (also referred to as IMS Performance Analyzer, or by the abbreviation IMS PA) is a performance analysis and tuning aid for Information Management System Database (IMS DB) and Transaction Manager (IMS TM) systems.

These topics describe all IMS Performance Analyzer reports and extracts in detail, what they contain, and how to use them. The IMS Log, Monitor, IMS Connect, and OMEGAMON® Transaction Reporting Facility (TRF) and Application Trace Facility (ATF) data that is processed by IMS Performance Analyzer are also described.

Related reading: For information about how to generate the reports using the dialog or batch commands, and a detailed description of the report options, see the *IBM IMS Performance Analyzer for z/OS User's Guide, SC19-4365*.

These topics are designed for managers, database administrators, system programmers, application programmers, and system operators responsible for monitoring and improving the performance of IMS systems.

To use these topics, you should have an understanding of basic IMS concepts and your installation's IMS systems, and a working knowledge of:

- The z/OS operating system
- ISPF
- IMS Database and Transaction Monitor systems
- IMS Connect and IMS Connect Extensions, if applicable

IMS Performance Analyzer is designed to support IMS Versions 12, 13, 14, and 15. Where IMS Performance Analyzer functionality is IMS release-dependent, the following abbreviations may be used:

IMS V12

(IMS Version 12)

IMS V13

(IMS Version 13)

IMS V14

(IMS Version 14)

IMS V15

(IMS Version 15)

Always check the IMS Tools Product Documentation page for the most current version of this information:

<http://www.ibm.com/software/data/db2imstools/imstools-library.html>

Part 1. Introduction

IBM IMS Performance Analyzer for z/OS (also referred to as IMS Performance Analyzer, or by the abbreviation IMS PA) is a performance analysis and tuning aid for DB and TM systems for IMS.

The topics in this section provide you with an overview of IMS Performance Analyzer concepts, the reports and extracts that can be generated from Report Sets, and the data that is used to produce them.

Chapter 1. IMS Performance Analyzer overview

IBM IMS Performance Analyzer for z/OS (also referred to as IMS Performance Analyzer, or by the abbreviation IMS PA) is a performance analysis and tuning aid for DB and TM systems for IMS versions 12, 13, 14, and 15.

Related reading: There are several IMS Redbooks® that provide additional performance and tuning information for your IMS systems. The *IBM IMS Version 7 Performance Monitoring and Tuning Update* (SG24-6404) is recommended because it contains additional information on how to interpret many of the IMS Performance Analyzer reports to help you make tuning decisions. This information, although not exhaustive, is generally applicable to later releases of IMS. Supplementary information is provided in *IBM IMS Performance and Tuning Guide* (SG24-7324).

What's new in IMS Performance Analyzer

This topic summarizes the technical changes in this edition.

New and changed information is indicated by a vertical bar (|) to the left of a change. Editorial changes that have no technical significance are not noted.

IBM IMS Performance Analyzer for z/OS Version 4 Release 4, Second edition

This edition SC19-4366-01 includes the following new and changed features:

IMS Version 15 support

Support for IMS Versions 12, 13, 14, and 15.

Additional Internal Resource Usage reports

The Internal Resource Usage reports now include information about Individual TCB Statistics and 64-bit Storage Statistics.

ATF Enhanced Summary reports

In a Log report set, you can now define and run reports on the OMEGAMON ATF Summary record, including analysis of transactions, DLI calls, DB2® calls, MQ calls, and you can also create an extract.

New sample forms

The following sample forms have been added: SWITLIST, SWITSUMM, TRANRES1, TRANRES2, OLRLIST and OLRSUMM.

Resume tpipe extended report

You can now produce the resume tpipe report in extended format, which supports all of the different resume tpipe types and options, and the IMS V14 parallel resume tpipe option.

OTMA NAK sense codes

Some new OTMA NAK sense codes are now supported.

Logger Statistics new fields

In the Report Reference, more documentation has been added for the Logger Statistics report so that its fields are now documented more completely.

IBM IMS Performance Analyzer for z/OS Version 4 Release 4

This edition SC19-4366-01 includes the following new and changed features:

IMS Version 12, 13, and 14 support

Support for IMS Versions 12, 13, and 14.

Inflight transaction support for IMS Log reports

When the inflight option is used, IMS Performance Analyzer does not report incomplete transactions in the IMS log. Instead it writes their details to a holding data set called an outflight data set. This data set is then input into the next IMS Performance Analyzer job as the list of transactions pending completion. Transaction information that was previously incomplete due to a log switch is now complete.

The following reports are affected by this change:

- “Transaction (MSGQ) Transit reports” on page 47
- “Transaction Transit reports (Form-based)” on page 85
- “IMS Transaction Index” on page 115
- “Internal Resource Usage reports” on page 158

Refer to *IBM IMS Performance Analyzer for z/OS User's Guide* for further detail.

Region PST increased from 3 to 4 bytes

The Region PST field size has increased from 3 to 4 bytes due to an increase in the maximum partition specification table (MAXPST) limit to 4095. This change increases the LRECL by 1 byte on multiple reports:

- Log reports
 - LIST: Form-based Transaction Transit List report and extract using PSTID
 - SUMMARY: Form-based Transaction Transit Summary report and extract using PSTID
 - FPLOG: Fast Path (EMH) Transaction Transit Log report
 - FPTRNEX: Fast Path Transaction Exception extracts
 - DCTRACE: DC Queue Manager Trace report
 - TRANEXC: Transaction Exception extracts
 - FPDBTRC: DEDB Update Trace report.
- Monitor reports
 - ESAF: External Subsystem report
- Connect reports
 - LIST: Form-based Transaction Transit List report and extract using PSTID
 - SUMMARY: Form-based Transaction Transit Summary report and extract using PSTID

For other reports that include Region PST, the value has been accommodated within the existing column and there is no change to the LRECL of the report.

IMS Performance Analyzer automatically allocates new extract data sets with the correct record length. If appending to an existing data set, a CSV or for DB2, you will first need to redefine the DCB attributes to increase the LRECL by 1 byte and reload the data set.

For Log and IMS Connect form-based log reports when loading the extract data into an existing DB2 table with PSTID column of CHAR(3), the table definition must first be modified to support a PSTID of CHAR(4) and the field POSITION statements adjusted before reloading the table. For an example, see the “COMBLIST: Combined IMS and Connect List report” on page 535 sample form. For additional help contact your DB2 Administrator.

Form-based reporting enhancements

BMP treatment option

New option to report each BMP syncpoint interval as a single transaction, allowing you to analyze BMP activity in greater detail. Refer to the *IBM IMS Performance Analyzer for z/OS User's Guide* for further detail.

Shared queues option

New option to only report transactions that were processed on subsystems who logs were input. Refer to the *IBM IMS Performance Analyzer for z/OS User's Guide* for further detail.

Program switches option

New option to either report all transactions independently, or to group transactions associated with a program switch sequence. Refer to the *IBM IMS Performance Analyzer for z/OS User's Guide* for further detail.

Additional reporting of CPU time as service units

The service unit normalizes the reporting of CPU time to allow for performance comparisons between, for example, an older processor and a newer processor in terms of CPU effort. Refer to “CPUSU” on page 634 for further detail.

New value in QTYPE form field

The form-field “QTYPE” on page 661 has a new value, LOCALF, to indicate that the shared queue transaction was processed ‘local-first’.

New region occupancy form field

The new region occupancy form field “REGOCCUP” on page 662 reports the elapsed time that the transaction occupies in a message region, which can sometimes be longer than the usual application processing time due to an external system problem.

Log report enhancements

FORMAT2 option for Database Update Activity reports

Database Update Activity (DBUA) reports can be generated with the more concise FORMAT2 option. Refer to “Report content (FORMAT2)” on page 204 for further detail.

LOGINFO operand for IMSPALOG command

Log Information reports can now be generated using the IMSPALOG LOGINFO batch command without running a report set. Refer to “Log Information report” on page 310 for further detail.

IMS Processing ID option

New option to use the input log files to source the **IMS Processing ID**. Refer to the *IBM IMS Performance Analyzer for z/OS User's Guide* for further detail.

Ignore x'6D' surveillance records option in Log Gap Analysis report

The Log Gap Analysis report has a new option to ignore type x'6D’

surveillance records that can mask periods of system inactivity. Refer to the *IBM IMS Performance Analyzer for z/OS User's Guide* for further detail.

Fast Path (IFP) Region Occupancy report enhancement

The "IFP Region Occupancy report" on page 268 exploits the new type x'5904' record to provide a clearer breakdown of occupied versus idle time.

Internal Resource Usage report (IRUR) enhancements

The Internal Resource Usage report (IRUR) is enhanced to support the new statistics provided by IMS versions 12, 13 and 14:

- x'4502' Queue Pool statistics provides high water marks for buffer usage.
- x'4507' Logger statistics provides WADS and OLDS I/O time.

Documentation update for IRUR Logger Statistics report

Additional information for the Internal Resource Usage Report - Logger Statistics report. Refer to "Logger Statistics" on page 178 for further detail.

Message Queue Utilization report enhancements

New option to report on record lengths instead of message lengths. Refer to the *IBM IMS Performance Analyzer for z/OS User's Guide* for further detail.

Monitor report enhancement

The Monitor report ALTSCHED global option is improved to count actual schedules only, disregarding wait-for-input events. This provides a more accurate picture of the transactions per schedule ratio in pseudo-WFI environments.

IMS Connect Gap Analysis report

The Gap Analysis report contains information on periods of time where log records are not being cut, potentially highlighting an external system event that may have caused IMS Connect to slow down. Refer to "Connect Gap Analysis report" on page 561 for further detail.

MONITOR report option enhancements for OMEGAMON ATF Trace reports

OMEGAMON ATF Trace reports using the MONITOR option report additional transaction identification and performance characteristics, columns, and reporting detail for DB2 SQL and IBM MQ events. Refer to "ATF Record Trace report" on page 599 for further detail.

IMS Performance Analyzer Version 4 Release 3

The previous edition included the following changes. They are not marked in the body of the book.

IMS Version 10, 11 and 12 support

Exploits all the new features and instrumentation in the IMS log and monitor:

- IMS Version 10: Type 56FA transaction accounting record provides accurate transaction CPU time, DLI call, database I/O, and ESAF usage
- IMS Version 11: Synchronous call-out (ICAL) and Open Database
- IMS Version 12: Improved MSC statistics

In addition:

- Sysplex reporting supports changes in IMS version across log files, allowing you to seamlessly continue IMS PA reporting when migrating to a new version of IMS.
- The impact of synchronous call-out (ICAL) requests on overall transaction performance can be measured.

OMEGAMON for IMS Application Trace Facility (ATF)

Collects detailed information about every application call made by IMS and DBCTL transactions. DLI and DB2 call results are recorded in the ATF journal, including function code, SSA, KFBA and IO area. This provides the most in-depth analysis of transaction behavior available.

IMS Performance Analyzer provides management and reporting of ATF, including:

- Archival of the online ATF journals to offline data sets for post-analysis. Filtering criteria allows you to archive problem transactions only, significantly reducing the volume of data kept and time to resolution.
- Three levels of reporting: from summarization of transaction activity and high level transaction detail, to in-depth traces that report every detail about each application DLI call.
- Statistics collection enhancements provided by APAR OA36278: Interim Feature 3 (IF3).

Improved CICS®-DBCTL reporting

The CICS transaction id and task number are now reported in DBCTL form-based reports. This allows you to match the CICS transaction as reported by CICS Performance Analyzer with the IMS thread reported by IMS Performance Analyzer to better understand the impact of IMS on CICS transaction performance.

In addition, form-based reporting provides a more granular breakdown of syncpoint processing including phase 1, phase 2 and OTHREAD elapsed times.

New specialized reporting: LOGINFO

The Log Information report provides a synopsis of the log record types in the IMS log, including record count, lengths, rate per second, and volume. Selected record types are broken down further to provide additional information about transaction arrival and processing rates.

Transaction Index

The index is improved to append diagnostic information from the IMS log when available, for example the deadlock diagnostic record. In addition, you can specify exception criteria to record problem transactions only.

Form-based reporting

Form-based reporting provides flexible user-customizable transaction performance analysis. Further enhancements provide improved specialized analysis:

- CICS-DBCTL, including scheduling delays
- Syncpoint time breakdown, including phases 1 and 2
- OTHREAD – how long did the (asynchronous) OTHREAD process take to update the Fast Path areas?
- Program switch sequences can be better tracked and summarized
- BMP syncpoint/checkpoint activity
- Individual database update activity: Which transactions update which databases?

- External subsystem activity: Which transactions use DB2, and for update or read-only?
- Column headings changed for the following fields:
 - ESAFCCON: Cmt Cont Complete is now ESAF CC End
 - ESAFCOMT: Commit Time is now ESAF SP Time
 - ESAFNAME: External Sub-Sys is now ESAF Name
 - ESAFPRE: Cmt Prep Start is now ESAF CP Start
 - EXITNAME: Readexit Name is now Connect Exit

IMS Connect Transaction Index

Contains a record for each IMS Connect transaction recorded in the IBM IMS Connect Extensions for z/OS journal, and includes all the cumulative information from the journal about that transaction.

IBM IMS Problem Investigator for z/OS uses the IMS Connect Transaction Index, either on its own or merged with the associated IMS Connect Extensions journals and IMS log files, to provide improved levels of problem detection. By tracking against the index record for a transaction, you can see all the associated Connect events.

Application Groups

Allow you to group transactions that belong to the same business or application unit for reporting purposes, allowing you to analyze performance based on business unit rather than individual transaction code.

Internal resource usage enhancements

The Internal Resource Usage report (IRUR) is enhanced to support the new statistics provided by IMS Version 12:

- Logical Logger
- 4517 User Exit Statistics

IMS Tools Knowledge Base

IMS log reporting can now write reports directly to the IMS Tools Knowledge Base repository for historical collection and viewing from the IMS Tools KB dialog. IMS Tools Knowledge Base is a component of IBM Tools Base for z/OS, V1.5 (5655-V93).

Non-message driven BMP changes

A non-message driven BMP is now reported as a single transaction, and statistics for each syncpoint are accumulated and reported at BMP end, or end of IMS log. Prior to IMS Performance Analyzer V4.3, every BMP syncpoint was treated as a single transaction. As a result of this change, transaction counts contained within “Transaction Transit reports (Form-based)” on page 85 may increase, and other values are recalculated accordingly. Select a Transaction Mix of 5 (batch: TRANMIX(5)) to exclude BMPs (including JBPs) from reporting if you do not want batch jobs to distort performance-related statistical analysis of online transactions.

See also “Log Information report” on page 310.

What does IMS Performance Analyzer do?

IMS Performance Analyzer provides a comprehensive suite of reports to help you manage the performance and resource utilization of your IMS systems.

IMS Performance Analyzer processes IMS Log, Monitor, IMS Connect event data, and OMEGAMON TRF and ATF data to provide comprehensive reports for use by IMS specialists to tune their IMS systems, and managers to verify service levels and predict trends.

IMS Performance Analyzer provides an ISPF-based dialog for you to use to create and maintain your report and extract requests, and generate the JCL to run them using your specified systems and data files. The IMS PA Control Data Sets are used to store your report and extract requests.

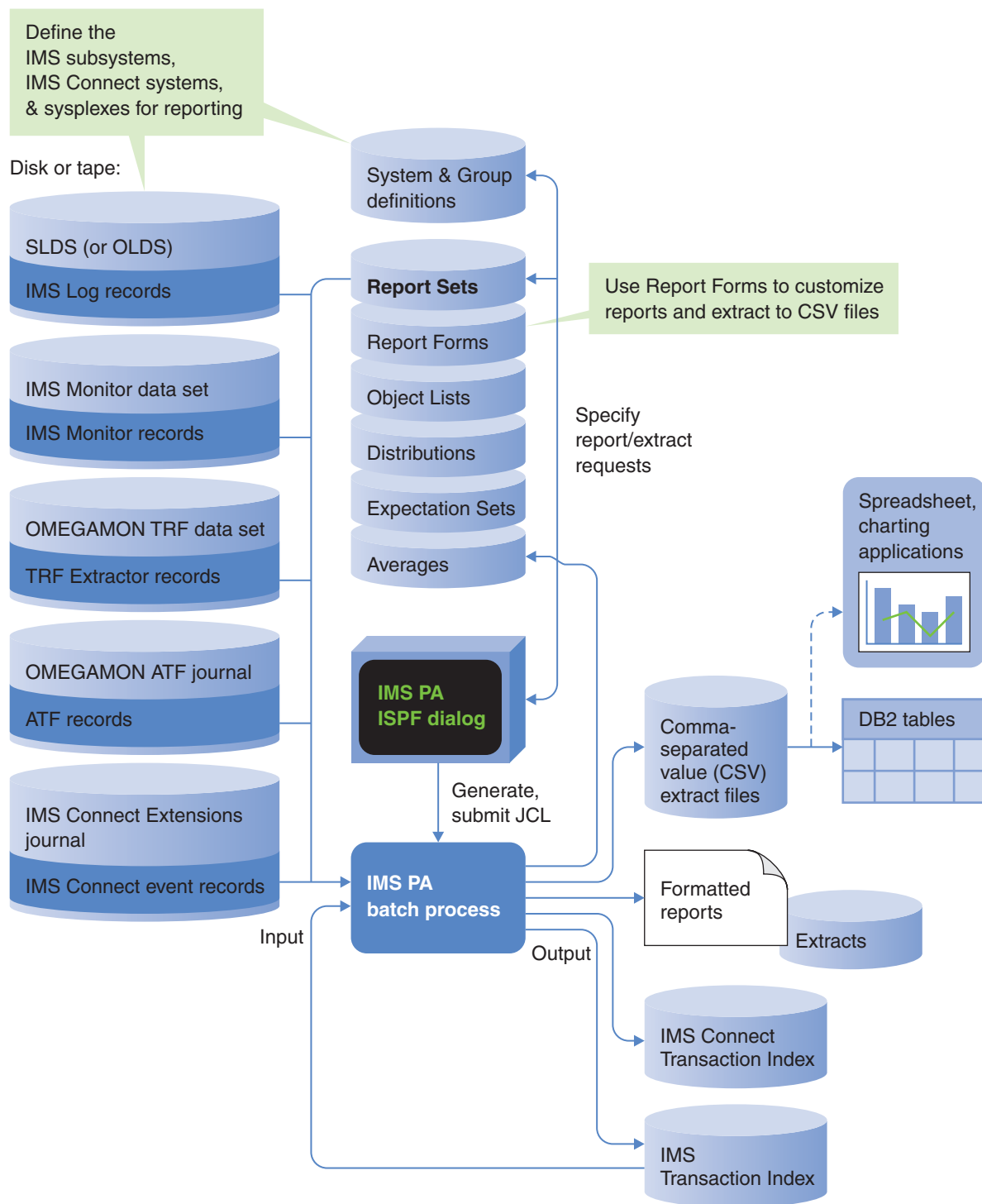


Figure 1. Overview of IMS PA operation

From IMS Log data, IMS PA provides comprehensive information about transit times (actual system performance time), and IMS resource usage and availability. IMS PA can process logs from a single IMS system, or from multiple IMS subsystems running in a sysplex and using shared queues. You can specify log files explicitly or let IMS PA use DBRC Log Selection and the IMS RECONs data sets to automatically locate the files for your required reporting interval. User-defined

performance thresholds allow you to set goals and report exceptions. A history of transaction performance can be maintained in Transaction History Files.

Extracts of transit time by time interval data can be created from log files then graphed or exported (with transfer to PC) using IMS PA facilities. Extracts of total transaction traffic or exception transactions (MSGQ or Fast Path), CPU usage and database update activity can also be created for direct import by external programs such as DB2 or PC-based reporting tools.

Report Forms can be used to tailor transit summary and list reports to include only the data fields of interest. Form-based extracts can be created then directly loaded into DB2 tables.

From Monitor¹ data, IMS PA creates summary and analysis reports for regions, resources, programs, transactions, databases, and the total system, to analyze your IMS system environment. IMS PA provides comprehensive reporting for the IMS Fast Path Monitor, including DEDB, BALG/EMH, FP Buffer, OTHREAD and VSO. External Subsystem call activity can be incorporated in applicable reports. Alternative sequencing of reports by Occupancy, Calls or Delay can be requested to highlight bad performance.

IMS PA provides comprehensive reporting from the IMS Connect performance and accounting data collected by IBM IMS Connect Extensions for z/OS (5655-S56). You can specify Connect data sets explicitly or let IMS PA use Connect Journal File Selection and the IMS Connect Extensions Definitions Data Set to locate the Journal data sets for your required reporting interval. Summary and detailed reports analyze IMS Connect transaction internal and external transit times and latencies, highlighting critical events for message processing. They also provide information about significant processing events with the potential to impact performance, including resource availability and session errors.

You can obtain a complete end-to-end picture of transaction transit performance by using Form-based reporting and combined IMS and Connect data.

IMS PA provides comprehensive reporting of IMS transaction performance and resource utilization statistics collected by the Transaction Reporting Facility (TRF) for OMEGAMON XE for IMS (5698-A34). The TRF data includes transaction response time breakdown, CPU time, and other resource usage statistics, Full Function and Fast Path database DL/I call count and elapsed time, and DB2 database call count and elapsed time.

OMEGAMON XE for IMS Application Trace Facility (ATF) complements TRF reporting.

Complementary IBM products

IMS Performance Analyzer complements the following IBM products in the investigation of transaction performance related problems.

IBM Transaction Analysis Workbench for z/OS

Transaction Analysis Workbench is a tool for analyzing problems with the performance or behavior of z/OS-based transactions. Transaction Analysis

1. In this book, the term *monitor* applies to both the IMS Monitor used in the IMS TM (formerly DC) environment and the IMS DB Monitor used in the IMS DB environment. In cases where information applies to only one of the monitors, the term *IMS Monitor* or *DB Monitor* is used.

Workbench provides a platform for investigating logs and other historical data collected during transaction processing and system operations. Transaction processing is often complex. Modern applications frequently interact with external subsystems and use system services. Pinpointing the cause of a problem can be difficult. Transaction Analysis Workbench extends the scope of traditional transaction analysis techniques, enabling you to more easily identify problems caused by external events. You can use Transaction Analysis Workbench with the following IBM tools:

- IMS Performance Analyzer - to look outside of IMS for the cause of problems, in particular DB2 and IBM MQ
- CICS Performance Analyzer - to bridge the gap between CICS and IMS for CICS-DBCTL

IBM Tivoli® OMEGAMON XE for IMS on z/OS (5698-A34)

IMS Performance Analyzer provides reporting on transaction activity data collected by the following components of OMEGAMON XE for IMS:

- OMEGAMON Transaction Reporting Facility (TRF) collects performance and resource utilization data for every IMS transaction. The TRF transaction accounting statistics are written to the IMS log and later extracted by the TRF Extractor utility. IMS Performance Analyzer provides a suite of reports in **TRF Report Sets** to interpret and summarize the transaction accounting statistics in specified TRF Extractor output data sets. TRF data includes CPU time, virtual storage usage, and response time of a transaction.
- OMEGAMON Application Trace Facility (ATF) collects data on external subsystem events (DB2, IBM MQ), BMP and MPP scheduling and termination events, the region where a transaction is executed, occurrence of DLI DB, IMS TM, and message queue calls. The ATF application-level accounting statistics are written to the active ATF journal (VSAM KSDS). IMS Performance Analyzer provides a suite of reports and extracts in **ATF Report Sets**.

IBM IMS Connect Extensions for z/OS (5655-S56)

IMS Connect Extensions provides instrumentation for IMS Connect. The tool continuously records IMS Connect events, which you can analyze with IMS Performance Analyzer using the suite of reports provided in **CEX Report Sets**. The input data for reporting is provided by explicitly specifying IMS Connect Extensions journal data sets, or by requesting the IMS Performance Analyzer automated file selection utility to automatically select the journal data sets for your specified systems and report period.

IBM IMS Problem Investigator for z/OS (5655-R02)

IMS Problem Investigator (IMS PI) allows you to interactively investigate IMS and related logs. It helps you pinpoint the cause of problems highlighted by IMS Performance Analyzer. Transaction tracking is facilitated by using the IMS Transaction Index (X'CA01' record) and IMS Connect Transaction Index (X'CA20' record) created by IMS Performance Analyzer. To make the two products easier to use together, they share definitions for systems and groups: you only need to maintain the definitions in one of the tools.

The following diagram illustrates the cooperation between IMS Performance Analyzer, IMS Problem Investigator, and IMS Connect Extensions. When IMS Connect event details in IMS Connect Extensions journals are merged with IMS (and related) logs, IMS Performance Analyzer and IMS Problem Investigator can

provide a comprehensive insight into the lifecycle of IMS transactions.

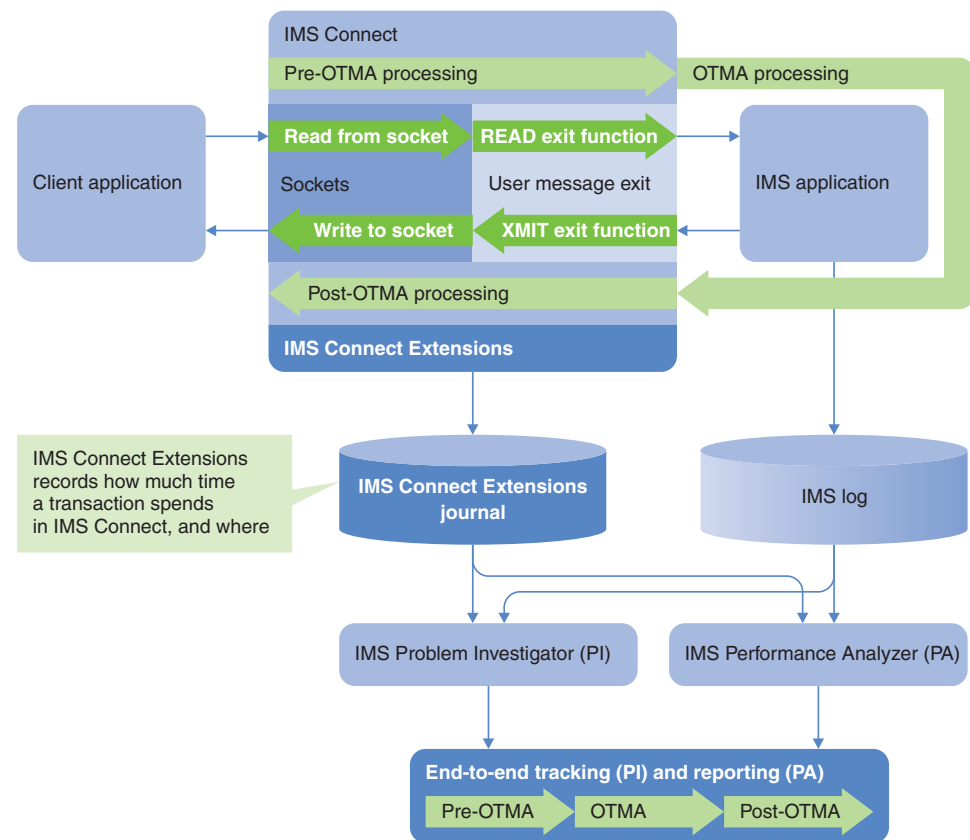


Figure 2. IMS PI, IMS PA, and IMS Connect Extensions cooperation

IMS Problem Investigator provides interactive facilities for the presentation, navigation and interrogation of log data of different types and across systems. IMS Problem Investigator knows about log records and their contents, and allows you to drill down from file to record to field to determine the essence of a problem.

1 Select a record to view all of its fields

Forwards / Backwards . . 00.00.00.000100 Time of Day . . 01.10.30.000000
 Code Description Date 2014-03-14 Friday Time (Local)

01 Input Message 01.10.56.574109
 UTC=17.10.56.568088 TranCode=ATMWDRAW Userid=NEWYORK LTerm=NEWYORK
 Terminal=NYATM001 OrgUOWID=I9DE/BE8300F4C92D4A23

08 Application Start 01.10.56.574110
 UTC=17.10.56.574100 TranCode=ATMWDRAW Region=0002
 RecToken=I9DF/0000000300000000 RegTyp=MPP TClass=01 TPty=08

31 DLI Form ==> + Format ==> FORM
 UTC= ***** Top of data *****
 OrgU +0004 Code... 01 Input Message
 +0166 STCK... BE8300EDBF897D01 LSN...
 5616 Star Date... 2014-03-14 Friday Time...
 Regi

03 Outp +0000 MSGLRLL... 0176 MSGLRZZ... 0000 MSGLCODE 01
 +0005 MSGFLAGS... C1 MSGDFLG2... 81 MSGFPADL... 94
 UTC= +0008 MSGMDRRN... 08000009 MSGRDRRN... 08000009 MSGPRFL... 0166
 OrgU +0012 MSGCSW on MSGDFLG3... 02

Field Zoom

+0007 MSGFPADL... 94 Prefix Additional Info Flag A754C703
 A754C703

On MSGFPRSP... 80 Response Mode
 Off MSGSACMD... 40 Scheduled APPL issued ©CMD©
 Off MSGAOIUE... 20 Message generated by AOI user exit
 On MSGSYSEG... 10 System Segment exists Item ID = 81
 Off MSGSSPND... 08 Message is on SMB Suspend queue MSGCFLG1... 00
 On MSGFPINR... 04 Input message is non-recoverable MSGCQSF1... 00

MSGDRBN... 00000000

2 Zoom on a field to view a detailed description of its value

Figure 3. IMS Problem Investigator: Drill down from file to record to field

IMS Performance Analyzer can highlight problem transactions which can then be investigated in detail using IMS Problem Investigator.

1 Enter TX line action next to a log record

	Code	Description	Time (Local)
/			
TX	01	Input Message TranCode=ATMWDDR Source=Connect	01.31.09.598962
___	35	Input Message Enqueue TranCode=ATMWDDR	01.31.09.598970
___	01	Input Message TranCode=EFTWDDRSource=Connect	01.31.09.598989
___	35	Input Message Enqueue TranCode=EFTWDDR	01.31.09.598994
___	03	Output Message Response LTerm=ATMT Source=Connect	01.31.09.599008
___	07	Application Terminate TranCode=EFTWDDR Region=005E	01.31.09.599015
___	08	Application Start TranCode=EFTWDDR Region=005E	01.31.09.599017
___	5607	Start of UOR Program=EFPROGA Region=005E	01.31.09.599017
___	31	DLI GU TranCode=DSFFPS2B Region=007E	01.31.09.599022
___	31	DLI GU TranCode=EFTWDDR Region=005E	01.31.09.599026
___	33	Free Message	
___	5610	Start Phase 1 Syncpoint Region=0012	
___	37	Syncpoint Region=0012	
___	33	Free Message	
___	5612	End of Phase 2 Syncpoint Program=ATMPROG	
___	5612	End of Phase 2 Syncpoint Region=0012	
___	07	Application Terminate TranCode=ATMWDDR Region=0012	
___	08	Application Start TranCode=ATMWDDR Region=0012	
___	5607	Start of UOR Program=ATMPROG Region=0012	
___	31	DLI GU TranCode=ATMWDDR Region=0012	
___	5607	Start of UOR Program=ATMPROG Region=0012	
___	31	DLI GU TranCode=ATMWDDR Region=0012	
___	01	Input Message TranCode=ATMWDDR Source=Connect	
___	35	Input Message Enqueue TranCode=ATMWDDR	
___	01	Input Message TranCode=EFTWDDRSource=Connect	
___	35	Input Message Enqueue TranCode=EFTWDDR	
___	03	Output Message Response LTerm=ATMT Source=Connect	
___	31	DLI GU TranCode=DSFFPS2B Region=007E	
___	31	DLI GU TranCode=EFTWDDR Region=005E	
___	33	Free Message	
___	5610	Start Phase 1 Syncpoint Region=0012	
___	37	Syncpoint Region=0012	
___	33	Free Message	
___	5612	End of Phase 2 Syncpoint Program=ATMPROG	
___	07	Application Terminate TranCode=ATMWDDR Region=0012	
***** Bottom of Data *****			

2 View records from the same transaction

Figure 4. IMS Problem Investigator: Track records in the same transaction

Because IMS processes large workloads, records from the same transaction can be separated by thousands of records from other transactions, making it difficult to trace the flow of only one of those transactions. Moreover, different record types have different fields that relate them to a transaction, making them inaccessible using conventional filtering and searching techniques. With the IMS Problem Investigator tracking facility, you can find a record from the relevant transaction, and then display just the records from that transaction. IMS Problem Investigator tracks all transaction records, finding the related IMS log and monitor, CQS, IMS Connect, OMEGAMON TRF, ATF, DB2, IBM MQ, and SMF records, hiding others that are not part of the transaction.

Service updates and support information

Service updates and support information for this product, including software fix packs, PTFs, frequently asked questions (FAQs), technical notes, troubleshooting information, and downloads, are available from the web.

To find service updates and support information, see the following website:

http://www.ibm.com/support/entry/portal/Overview/Software/Information_Management/IMS_Tools

Product documentation and updates

IMS Tools information is available at multiple places on the web. You can receive updates to IMS Tools information automatically by registering with the IBM My Notifications service.

Information on the web

The IMS Tools Product Documentation web page provides current product documentation that you can view, print, and download. To locate publications with the most up-to-date information, refer to the following web page:

<http://www.ibm.com/software/data/db2imstools/imstools-library.html>

You can also access documentation for many IMS Tools from IBM Knowledge Center:

<http://www.ibm.com/support/knowledgecenter>

IBM Redbooks publications that cover IMS Tools are available from the following web page:

<http://www.redbooks.ibm.com>

The Data Management Tools Solutions website shows how IBM solutions can help IT organizations maximize their investment in IMS databases while staying ahead of today's top data management challenges:

<http://www.ibm.com/software/data/db2imstools/solutions/index.html>

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2. Enter your IBM ID and password, or create one by clicking **register now**.
3. When the My Notifications page is displayed, click **Subscribe** to select those products that you want to receive information updates about. The IMS Tools option is located under **Software > Information Management**.

4. Click **Continue** to specify the types of updates that you want to receive.
5. Click **Submit** to save your profile.

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- Use the online reader comment form, which is located at <http://www.ibm.com/software/data/rcf/>.
- Send your comments by email to comments@us.ibm.com. Include the name of the book, the part number of the book, the version of the product that you are using, and, if applicable, the specific location of the text you are commenting on, for example, a page number or table number.

Accessibility features

Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use a software product successfully.

The major accessibility features in this product enable users to perform the following activities:

- Use assistive technologies such as screen readers and screen magnifier software. Consult the assistive technology documentation for specific information when using it to access z/OS interfaces.
- Customize display attributes such as color, contrast, and font size.
- Operate specific or equivalent features by using only the keyboard. See the following publications for information about accessing ISPF interfaces:
 - *z/OS ISPF User's Guide, Volume 1*
 - *z/OS TSO/E Primer*
 - *z/OS TSO/E User's Guide*

These guides describe how to use the ISPF interface, including the use of keyboard shortcuts or function keys (PF keys), include the default settings for the PF keys, and explain how to modify their functions.

Chapter 2. Overview of the reports

IMS Performance Analyzer provides a comprehensive suite of reports to help you to manage transaction performance and to monitor resource utilization in IMS TM and DB systems.

Reports and extracts can be produced from IMS Logs, Monitor files, IMS Connect Extensions journals, and OMEGAMON TRF files and ATF journals. Standard reports are available, or you can request tailored Form-based reports.

Log reports

Log reports process IMS Log data. IMS PA has a variety of log reports available on request. The many reports are intended for people with different interests in IMS system performance monitoring and tuning.

Log reports can be categorized in a number of ways. Here, the reports are categorized by the type of log data they process:

However, elsewhere in this documentation, the reports are described according to the IMS PA dialog, which presents the reports in functional categories.

Message Queue transaction and Full Function database reports

The MSGQ transaction and Full Function database reports are grouped by intended audience into Management reports, Analysis reports, and Detail reports.

Form-based Transaction Transit reports can be constructed to suit many purposes.

Management reports

Management reports let managers know whether IMS is working within expected limits. The management reports are:

Dashboard

The “Dashboard report” on page 123 provides a quick overview of critical system performance indicators, including transaction throughput and IMS system resources. It can highlight potential performance problems quickly, providing a springboard to other reports that provide more detailed information.

Management Exception

The “Management Exception report” on page 127 shows whether critical values are within specified limits, and it gives summary values of certain indicative information. Typically, you will look at this report first to see if any of the values are an exception to what you expected or what is typical. When there is a problem, you can go to other IMS PA reports for additional, more detailed information.

Transaction Transit Graphic Summary

The “Transaction Transit Graphic Summary report” on page 62 consists of four graphs, summarizing daily transaction processing for:

- Mean transit time

- User-specified percentile transit time
- Transaction response count
- Responses per second

The graphs can help you determine at a glance whether abnormal transit times exist and whether the input queue, processing, output queue, or program switching is a likely bottleneck.

Transaction Transit Extract by Interval and Graphs

The “Transaction Transit Extract by Interval” on page 63 allows creation of extract files of transaction transit time by time interval data. You can then use this data to get pictures of system performance using IMS PA graphing facilities, or by exporting for manipulation by external programs or downloading to a PC.

Transaction Exception

The “Transaction Exception report and extract” on page 70 shows transaction performance information that affects response time. The report can be ordered by Transaction Code, User ID, Message Class, or Time of Input, optionally with a breakdown by transaction code. Optionally, two extract files can be produced containing detail records of all transaction activity, or exception transactions only.

Analysis reports

Analysis reports are intended for administrators and analysts who want operating information in easy-to-read, summary format. The analysis reports are:

Transaction Transit Analysis

The “Transaction Transit Analysis report” on page 49 shows the times for the components of transaction transit time:

- Input queue time (local or CQS)
- Processing time
- Output queue time
- Output shared queue (CQS) time
- Output local queue time
- Program switch time

This report can be ordered by:

- Transaction code
- LTERM
- Transaction code within LTERM
- Message Class
- Line or VTAM® node
- Time of day

The display of transit time by time period helps you identify periods of poor response.

Transaction Transit Statistics

The “Transaction Transit Statistics report” on page 56 consists of statistical distribution graphs of the transit time components listed in the preceding report.

Transaction Resource Usage

The “Transaction Resource Usage report” on page 135 provides a comprehensive overview of transaction resource usage, including:

- Scheduling statistics, including WFI
- CPU usage
- DL/I call statistics

- Enqueue statistics
- DBCTL DB and I/O usage

Resource Availability

The “Resource Availability report” on page 145 provides a breakdown of active, idle and unavailable time for regions, lines, programs, transactions, and databases. The time that WFI and pseudo-WFI regions spent waiting for input is also shown.

CPU Usage

The “CPU Usage report and extract” on page 152 give statistics on CPU time and elapsed time for:

- Regions
- Transactions
- Programs

This report can help you determine such things as who is using too much CPU time or, conversely, what programs or transactions, in which regions, are in a wait state for too long.

Internal Resource Usage

The “Internal Resource Usage reports” on page 158 provides statistics on the use of various IMS resources and pools. The statistics help you determine how resources and pools are being used and where inefficiencies exist.

MSC Link Statistics

The “MSC Link Statistics report” on page 193 provides summary information on the overall usage of MSC links and a detailed breakdown of Send and Receive data for each MSC link.

Message Queue Utilization

The “Message Queue Utilization report” on page 196 contains information on the use of message queues. This information can help you:

- Balance the I/O between long and short message data sets
- Adjust record and buffer sizes for the most efficient use of these two data sets

Thus this report helps you reduce storage and minimize I/O.

Database Update Activity

The “Database Update Activity report and extract” on page 200 can help you determine the cost of database calls. They show the number of blocks updated and how many updates of each type were made for each database.

OSAM Sequential Buffering

The “OSAM Sequential Buffering report” on page 211 provides detailed I/O and buffer-usage statistics that allow you to assess the benefit of OSAM sequential buffering.

Deadlock

The “Deadlock report” on page 215 provides a comprehensive analysis of deadlock events. The report provides a list of all deadlock events in the log, similar to DFSERA30. In addition the report summarizes deadlock activity to show at a glance:

- the frequency of each losing transaction/database combination
- the associated winning transaction/database combinations

The information provided is a useful aid for tuning applications and adjusting scheduling parameters to avoid this expensive overhead. Deadlocks involving DB2 are also reported.

System Checkpoint

The “System Checkpoint report” on page 225 provides a detailed analysis of IMS internal checkpoint activity. The report provides details of your IMS resources, including:

- Databases, with system definition information
- Transactions, with system definition information and basic usage indicators
- Terminals, with system definition information and basic usage indicators

The report also provides a summary of checkpoint activity, including:

- Breakdown of checkpoint records by type
- Frequency and overhead of internal checkpoint processing

BMP Checkpoint

The “BMP Checkpoint report” on page 232 provides an analysis of BMP checkpoint frequency that can affect online performance and system restartability. The detailed List report provides a breakdown of individual BMP checkpoint activity. The Summary report provides an overview of each BMP program.

Log Gap Analysis

The “Log Gap Analysis report” on page 236 shows periods of time where log records are not being cut, potentially highlighting an external system event that may have caused IMS to slow down.

Cold Start Analysis

The “Cold Start Analysis report” on page 237 provide a snapshot of in-train activity in the event of a cold start to determine what transactions were lost from the IMS message queue, what were the incomplete units of work, what database changes were made and not backed-out, and what external subsystem activity was left in doubt.

ESAF Trace

The “ESAF Trace report” on page 302 lists each connect and disconnect of an external subsystem.

Detail reports

Detail reports help analysts and programmers solve problems. The detail reports are:

Transaction Transit Log

The “Transaction Transit Log report” on page 58 shows the transit activity of each message originating from a logical terminal or program switch. It can help you diagnose problem areas. This report is similar to the one produced by DFSILTA0, but provides shared queue reporting for multiple IMS subsystems.

Region Histogram

The “Region Histogram report” on page 207 is a graphic display of region activity. It shows the times a region is active or idle, and the patterns of transaction scheduling in each region.

DC Queue Manager Trace

The “DC Queue Manager Trace report” on page 291 shows a time-sequenced list of each TM event, such as input, message enqueue, get

unique, output, and free DRRN (disk relative record number). This report also shows the content of each input message. You can request the DC UOW Tracker report. This enables you to trace transaction message flow using the IMS Tracking UOW.

Database Trace

The “Database Trace report” on page 296 shows the *before* and *after* versions of each changed segment and, for each change, identifies the application program, transaction, region, and time.

Transaction History File

The “Transaction History File” on page 81 is used to collect historical performance data, useful for long-term trend analysis and capacity planning. Information is summarized for each transaction code over a short time interval, including transaction transit, response and CPU times, as well as DLI call statistics. Data is provided in a format suitable for loading directly into DB2, from where you can run queries or produce reports.

Fast Path EMH transaction and Fast Path database reports

The Fast Path EMH transaction and Fast Path database reports are grouped by intended audience into Management reports, Analysis reports, and Detail reports.

Management reports

Management reports let managers know whether IMS is working within expected limits. The management reports are:

Fast Path Transit Extract by Interval and Graphs

The “Fast Path Transit Extract by Interval” on page 248 allows creation of extract files of Fast Path transit data by time interval. You can then use this data to get pictures of system performance using IMS PA graphing facilities, or by exporting for manipulation by external programs or downloading to a PC.

Analysis reports

Analysis reports are intended for administrators and analysts who want operating information in easy-to-read, summary format. The analysis reports are:

Fast Path Transit Analysis

The “Fast Path Transit Analysis report” on page 242 shows the times for the components of transaction transit time:

- Input queue time
- Processing Time
- Output queue time
- Global input and output queue times

This report can be ordered by:

- Transaction Code
- Routing Code
- User ID
- Time of day

The display of transit time by time period is useful in isolating periods of high response time during the day.

Fast Path Resource Usage and Contention

The “Fast Path Resource Usage and Contention report” on page 260 provides statistics on the use of various Fast Path resources, including:

- DEDB databases and areas
- VSO
- Buffers
- Locks
- Logging
- Transaction throughput

Fast Path Database Call Statistics

The “Fast Path Database Call Statistics report” on page 266 shows DEDB and MSDB DL/I call statistics, broken down by transaction code.

IFP Region Occupancy

The “IFP Region Occupancy report” on page 268 provides approximate region occupancy rates for IFP regions.

EMH Message Statistics

The “EMH Message Statistics report” on page 270 contains information on the number and length of EMH messages that are processed by balancing groups and shared EMH queues.

DEDB Update Activity

The “DEDB Update Activity report” on page 271 provides information on the update activity against your DEDB databases.

VSO Statistics

The “VSO Statistics report” on page 273 provides detailed statistics on VSO resource usage, including:

- SHARELVL 0/1 Data spaces
- SHARELVL 2/3 Coupling Facility structures
- SHARELVL 2/3 Lookaside buffers
- DEDB Area data set I/O

Detail reports

Detail reports help analysts and programmers solve problems. The detail reports are:

Fast Path Transit Log

The “Fast Path Transit Log report” on page 246 shows the transit activity of each EMH transaction processed by an IFP region. It can help you isolate and diagnose problem transactions.

Fast Path Transaction Exception

The “Fast Path Transaction Exception report and extract” on page 249 series of reports provide detailed and summary information about IFP transactions, as well as message queue transactions that use Fast Path databases. Optionally, two extract files can be produced containing detail records of all IFP transaction activity, or exception transactions only. The content of these reports and extracts is similar to that produced by the Fast Path Log Analysis Utility DBFULTA0.

DEDB Update Trace

The “DEDB Update Trace report” on page 300 provides a record of all DEDB changes, identifying application program, user ID, region and time.

DBCTL log reports

DBCTL has neither transactions nor terminal end users in the traditional IMS sense. It does, however, work on behalf of transactions entered by CCTL terminal users. DBCTL generates log data when a CCTL transaction schedules a program to access DBCTL databases.

The log reports that apply to DBCTL are:

- “Transaction Resource Usage report” on page 135
- “Resource Availability report” on page 145
- “CPU Usage report and extract” on page 152
- “Internal Resource Usage reports” on page 158
- “Database Update Activity report and extract” on page 200
- “Fast Path Resource Usage and Contention report” on page 260
- “Fast Path Database Call Statistics report” on page 266
- “DEDB Update Activity report” on page 271
- “VSO Statistics report” on page 273
- “Database Trace report” on page 296 (Full Function)
- “DEDB Update Trace report” on page 300
- Form-based Transit reports using, for example, the following sample report forms:
 - **“DBCTLIST: DBCTL List report” on page 88**
List of DBCTL Transactions
 - **“DBCTSUMM: DBCTL Summary report” on page 102**
Summary of DBCTL Transactions

ATF Enhanced Summary reports

The ATF Enhanced Summary reports contain detail and statistics from the OMEGAMON ATF Enhanced Summary record that are written to the IMS log.

Analysis extracts and reports

Analysis reports are intended for administrators and analysts who want operating information in easy-to-read, summary format. The analysis reports are:

Extract

The ATF Enhanced Summary Extract creates CSV extracts of the ATF Enhanced Summary record fixed part of the record, and optionally, up to six repeating sections. The HEADER section is always included; the six sections are as follows:

- DATABASE
- DLI DB
- DLI TM
- DB2
- MQ
- OTHER

Transaction Analysis

The ATF Enhanced Summary Transaction Analysis report, when run as a list report, shows you the elapsed and CPU times of individual transactions. You can also run this as a summary report to see a higher level overview.

DLI Call Analysis

The ATF Enhanced DLI Call Analysis report is useful for showing database activity within transactions. You can produce a list report that breaks down database activity within each transaction by call type, or a summary report.

DB2 Call Analysis

The ATF Enhanced DB2 Call Analysis report is useful for showing DB2 SQL call activity within transactions. You can produce a list report that breaks down DB2 activity within each transaction by call type, or a summary report.

MQ Call Analysis

The ATF Enhanced MQ Analysis report is useful for showing MQ activity within transactions. You can produce a list report that breaks down MQ activity within each transaction by call type, or a summary report.

Monitor reports

The IMS PA monitor reports are organized by level of detail and area of analysis into categories.

The categories are:

- Region Activity Summary
- Region Activity Analysis
- System Analysis
- Resource Usage
- Fast Path Analysis
- Monitor Data Analysis

All reports are optional and can be selected as required to satisfy the various analysis requirements of management, analysts, and programmers.

Reporting options let you tailor reports to your needs. They include:

- ESAF Integration. External Subsystem calls are integrated into all Region and Program/Trancode reports. When activated, ESAF call statistics are reported for each subsystem and contribute to the total call and IWAIT counts for regions and program/trancodes.
- Alternate Sequencing. Summarized monitor reports can be ordered in an alternate sequence. By default, the reports are ordered by name, such as Region ID, Program name, Transaction Code and Database name. Alternatively, you can request that the reports be ordered (in descending sequence) by any one of the following:
 - Occupancy. The elapsed time that the resource is scheduled or in use. For example, the busiest regions or programs.
 - Calls. The time spent by the resource performing DL/I or other types of calls. For example, transactions with the most DL/I call activity.
 - Delay. The time spent by the resource waiting for IWAIT events to complete. For example, the databases which had to wait the longest for I/O to complete.

When Alternate Sequencing is requested, a limit can also be specified to restrict the number of resources reported. You can specify a fixed number, for example the 10 worst performing databases, or you can specify a percentage, for example the top 10% busiest regions.

- Report Interval. Time ranges let you select a specific part of the monitor trace data. You can specify a time range which applies globally to all IMS PA monitor reports, and to restrict this time period further, you can specify a time range individually for the Transaction by Time Period, Region Histogram, and Program Trace reports.

- Time Interval. Reports can be printed for each *nn* minutes of trace, for each trace, or for the cumulative activity of multiple traces.
- Reporting of VSAM IWAITs. VSAM IWAITs with an elapsed time that is less than a specified value are not reported as I/O IWAIT activity. This lets you exclude VSAM IWAITs that do not result in actual I/O activity.
- Distributions. Optionally, distribution graphs can be produced by applicable reports. Distribution titles and intervals can be modified as required.
- Application and DDgroup Selection. Sets of PSB names can be reported separately as application groups. Likewise, sets of DDnames can be reported as DDgroups; for example, DDnames could be grouped by data set type (VSAM or OSAM) or data set placement (VOLSER), or application.
- Program and I/O Performance Thresholds. Thresholds can be set for monitoring three important program and I/O performance indicators: number of IWAITs per call, DL/I call elapsed time, and I/O IWAIT elapsed time. An Exception Listing report is printed each time a threshold value is exceeded.
- Defaults are provided to satisfy typical reporting requirements.

Region Activity Summary reports

The Region Activity Summary reports summarize and correlate region, program, transaction, and database activity for the IMS system.

These reports provide an overview of system activity and a means of identifying problem areas for further investigation with system and program level reports. Use of these reports for trend analysis and day-to-day monitoring of the system is facilitated because reporting is in terms of rates, ratios, percentages, and elapsed times per event.

The Region Activity Summary reports are:

- “Schedule/Transaction Summary report” on page 348
- “Region Summary report” on page 350
- “Program Summary report” on page 364
- “Database IWAIT Summary report” on page 374
- “Transactions by Time Period report” on page 378

Region Activity Analysis reports

Detail reports analyze program activity for each active MPP, IFP, or BMP region and for specified application and data set groups. A Database IWAIT Analysis report gives details of program related IWAIT activity. Exception Listing report entries are provided when certain performance monitoring thresholds are exceeded. An Enqueue/Dequeue Trace report identifies program isolation bottlenecks. The Region Histogram report graphically presents the interrelationship of region activity.

Optionally, distributions are used extensively throughout the reports.

The Region Activity Analysis reports are:

- “Region Analysis report” on page 380 (with Region Detail)
- “Application Detail report” on page 388
- “Database IWAIT Analysis report” on page 393
- “DDgroup report” on page 396
- “Performance Exception reports” on page 399 (with Exception Listing)

- “Enqueue/Dequeue Trace report” on page 407
- “Region Histogram report” on page 409

System Analysis reports

The System Analysis (Total System IWAIT) reports provide a summary and detailed account of the IWAIT activity of the entire IMS system.

These IWAIT events include the following:

- System data sets
- Databases (Full Function and Fast Path)
- ACBLIB Block loading
- Message Format services
- Scheduler
- Checkpoints
- Line/VTAM node
- Storage Pools
- MSC

The System Analysis reports are:

- “Total System IWAIT Summary report” on page 413
- “Total System IWAIT Detail report” on page 418

Program Analysis reports

The Program Analysis reports provide detailed information on all aspects of application processing.

- Detailed analysis and documentation of the database activity of each MPP, IFP, or BMP, and the program activity against each database and data set
- Detailed trace of specified program schedules
- Detailed breakdown of VSAM activity for IMS batch jobs

The Program Analysis reports are:

- “Program Activity Detail reports” on page 423
- “Program Trace report” on page 441
- “Batch VSAM Statistics report” on page 447

Resource Usage reports

The options for Resource Usage reports are described here.

The Resource Usage reports provide a detailed analysis of the usage of IMS resources, including the following:

- Buffer Pools; including Message Queue, OSAM, VSAM, and Message Formatting
- Latches
- Communication
- Multiple Systems Coupling
- External Subsystems
- Synchronous Callouts

The Resource Usage reports are:

- “Buffer Pool and Latch Statistics reports” on page 452
- “Communication reports” on page 457
- “MSC reports” on page 466
- “ESAF report” on page 471

- “Synchronous Callout report” on page 474

Fast Path Analysis reports

The Fast Path analysis reports provide an analysis of all Fast Path resources and functions, including Fast Path buffers, BALG and shared EMHQ, OTHREADS, DEDB IWAITs, DEDB resource contention, and VSO. The reports are not available from DB Monitor data.

The Fast Path analysis reports are:

- “DEDB Resource Contention report” on page 475
- “Fast Path Buffer Statistics report” on page 480
- “BALG/Shared EMHQ Analysis report” on page 484
- “OThread Analysis report” on page 487
- “VSO Summary report” on page 490

Monitor Data Analysis report

The Monitor Data Analysis report contains the Monitor Record Trace report.

The “Monitor Record Trace report” on page 497 formats the records from the monitor input file into a chronological listing.

Batch Program reports

Although the entire collection of IMS PA monitor reports could conceivably be obtained from processing a DB Monitor trace, only a subset of the reports are meaningful for DB analysis. The rest of the reports are TM related and would provide little or no relevant information about DB.

Of the preceding reports, the following subset is available for analysis of DB Monitor data:

Region Summary and Detail (Region 1)

Statistics and distributions for database calls and IWAITs. Most of this information is also available with the Program Activity Detail reports, however Calls/sec and IWTs/sec are unique values in this report.

Database IWAIT Summary (Region 1)

A summary of IWAIT activity for each data set and specified DDgroup.

Database IWAIT Analysis with distributions

A report of IWAIT activity by DDname. This report can be used in place of, or in addition to, the Total System IWAIT reports.

DDgroup with distributions

A report of IWAIT activity by DDname for each user-defined DDgroup.

Exception Listing

A listing of performance threshold violations. The other reports included in the suite of Performance Exception reports are applicable only to TM.

Total System IWAIT Summary and Detail with distributions

A complete accounting of IWAIT activity by data set type (OSAM, VSAM, DEDB, MSDB) and DDname.

Program Activity Detail

A comprehensive collection of reports for database call analysis, plus a detailed trace of batch program IWAIT and CALL events for analysis of program design problems.

Program Trace

A detailed trace of the events associated with a program schedule.

Batch VSAM Statistics

A detailed breakdown of VSAM activity for IMS batch jobs.

Buffer Pool and Latch Statistics

A report on the access status of IMS buffers and the contents of the IMS latch counters.

ESAF A summary of the external subsystem activity of IMS programs.

Monitor Record Trace

The monitor input records are formatted and reported chronologically.

You should decide which reports best suit your requirements. The following reports are often the most useful:

- Database IWAIT Analysis and distributions.
- DDgroup Detail and distributions.
- Program Analysis reports (either PSB Details or PSB-Transaction Code Analysis provide the same information). Note that CPU time is not collected for DB Monitor so CPU shows as 0.000 (zero) in Program Analysis reports.
- If a program or database problem requires more detail, you can do a separate run to obtain the Program Trace report. Use the From and To date and time report options to control the duration of the Program Trace.

DBCTL monitor reports

DBCTL has neither transactions nor terminal end users in the traditional IMS sense. It does, however, work on behalf of transactions entered by CCTL terminal users. DBCTL monitoring provides data about the processing that occurs when a CCTL transaction accesses DBCTL databases.

The Monitor reports that apply to DBCTL are:

- “Region Activity Summary reports” on page 27
- “Region Activity Analysis reports” on page 27
- “Total System IWAIT Summary report” on page 413
- “Total System IWAIT Detail report” on page 418
- “Program Activity Detail reports” on page 423
- “Program Trace report” on page 441
- “Buffer Pool and Latch Statistics reports” on page 452
- “Fast Path Analysis reports” on page 29
- “Monitor Record Trace report” on page 497

IMS Connect reports

The IMS PA reports that analyze IMS Connect event data are organized by level of detail and area of analysis into categories.

The categories are:

- Transaction Transit
- Transaction Transit (Form-based)
- Resource Usage
- Trace

Form-based Transaction Transit reports can be constructed to suit many purposes.

All reports are optional and can be selected as required to satisfy the various analysis requirements of managers, analysts, and programmers.

Reporting options let you tailor reports to your needs. They include:

- Time Interval. Some reports can be summarized by time interval.
- Selection Criteria. You can filter the data based on field values thereby focusing your reports on the information that you are interested in.
- Report Interval. Time ranges let you select a specific part of the IMS Connect data. At run-time, you can specify a time range which applies to all the IMS Connect reports.
- Defaults are provided to satisfy typical reporting requirements.

Transaction Transit reports

These reports provide performance statistics to measure the performance of your IMS Connect transactions. Transaction Transit (response) time is broken down into its components; Input, Processing (by OTMA), Acknowledgement from the client and Output. They can help identify any bottlenecks in transaction flow, and are used for monitoring system performance, gathering diagnostic information, and tuning IMS.

The IMS Connect transaction transit reports are:

- “Connect Transit Analysis report” on page 515
- “Connect Transit Log report” on page 522
- “Connect Transit extract” on page 527

Resource Usage reports

These reports contain detailed and summary information on the use and availability of various IMS Connect resources including TCP/IP Ports and Tpipes.

The IMS Connect resource usage reports are:

- “Connect Port Usage Report” on page 546
- “Connect Resume Tpipe report” on page 549
- “Connect ACK/NAK report” on page 554
- “Connect Exception Events report” on page 557
- “Connect Gap Analysis report” on page 561

Trace report

These reports provide detailed analyses of individual IMS Connect transit event records. Trace reports are typically used to investigate point in time performance problems because they provide all available information. To focus on the desired problem area or to minimize the size of the report, narrow the report interval and/or specify Selection Criteria.

The IMS Connect Trace reports are:

- “Connect Transit Event Trace report” on page 563

Form-based Transaction Transit reports

Report Forms allow you to personalize the format and content of Transaction Transit reports and extracts to include only the information that interests you.

Report Form features include:

- You can select fields from all the IMS and Connect fields available to IMS Performance Analyzer. For a list of IMS Performance Analyzer field names used in Form-based reporting, see Chapter 16, “Glossary of Report Form field names,” on page 629.
- List and Summary Form-based reporting is available from both Log and Connect Report Sets.
- Sample report forms are supplied with IMS Performance Analyzer to provide a broad selection of functional reports.
- You can use IMS Performance Analyzer to load Form-based extracts into DB2 tables.
- Combined IMS and Connect reporting is available from Connect Report Sets using Report Forms that specify both IMS and Connect fields. By reporting against a Group of IMS and Connect systems, you can get a complete end-to-end transit picture of IMS Connect transactions.

OMEGAMON TRF reports

Transaction performance and resource utilization statistics are collected by OMEGAMON subsystems with the Transaction Reporting Facility (TRF) Trace running. TRF data can be written to an SMF data set or the IMS Log. IMS Performance Analyzer processes TRF records extracted from the IMS Log by the TRF post-processor.

IMS Performance Analyzer provides a set of reports in the TRF Report Set to process the TRF Extractor records. The dialog presents the TRF reports grouped by functional category to allow you to request reports individually or by category. The categories are:

- Database Usage reports
- Message Queue reports
- Trace reports

Database Usage reports

These reports provide performance statistics to measure IMS and DB2 database activity.

- “DLI Call List report” on page 575
- “DLI Call Summary report” on page 578
- “DB2 Call List report” on page 581
- “DB2 Call Summary report” on page 583

Message Queue reports (Form-based)

Form-based reports give you flexibility in message queue reporting. By using Report Forms, you can tailor the format and content of your reports. You can request just the fields of interest, and control the presentation order and format. You can create Form-based extracts and load them into DB2 tables.

The Message Queue reports provide performance detail about every transaction traced by OMEGAMON TRF.

- “Form-based Message Queue List report” on page 584
- “Form-based Message Queue Summary report” on page 586

Trace reports

The Record Trace reports format the TRF Extractor records for ease of analysis. The trace provides a list of transactions, each with detailed information about every event in the life of that transaction. At a glance, you can see when a transaction starts, followed by all the events associated with the transaction in the order they occurred.

- “TRF Record Trace report” on page 588

OMEGAMON ATF reports

OMEGAMON Application Trace Facility (ATF) provides application-level accounting statistics of DLI, DB2, and MQ calls, call times, and CPU utilization.

The analysis of the data collected by ATF can be used to:

- Identify transaction response-time components
- Fine-tune applications
- Understand how application programs operate

IMS Performance Analyzer provides a set of reports in the ATF Report Set to process ATF journals. The dialog presents the reports grouped by functional category. You can request reports individually or by category. The categories are:

- Transaction Transit reports
- Trace reports
- Extracts

Transaction Transit reports

These reports provide application-level accounting.

- “ATF Transit List report” on page 597
- “ATF Transit Summary report” on page 598

Trace reports

The Record Trace reports provide three levels of detail for application-level analysis of DLI and external subsystem (DB2 SQL and MQ adapter) calls.

- “ATF Record Trace report” on page 599

Exception Transaction Extract

The “ATF Exception Transaction extract” on page 605 is an ATF data reduction process creating a data set of transactions that generated an exception (ABEND or long response time).

There are two types of data set. You can choose to extract to either or both types:

- ATF Journal, a pre-allocated KSDS
- REPRO file, a sequential data set for archival purposes which you can later load into an empty ATF journal for reporting

Chapter 3. Processing extract data sets

IMS PA can create various types of extract data set for further processing and analysis by applications.

IMS PA reports can create four types of extract data sets:

Extract data sets

Delimited text files that can be created by the following reports for input to external programs such as DB2 or PC spreadsheet tools such as IBM Lotus® Symphony® Spreadsheets or Microsoft Excel:

Log extracts

- Transaction Exception (MSGQ)
- Fast Path Transaction Exception
- CPU Usage
- Database Update Activity
- Form-based Transit List and Summary
- ATF Enhanced Summary record

Connect (CEX) extracts

- Connect Transit – for export to DB2
- Form-based Transit List and Summary

TRF extracts

- Form-based Message Queue List and Summary

ATF extracts

- Exception Transaction

For information on how to directly load form-based extracts into DB2 tables or import into a PC spreadsheet and charting application, see “Processing form-based extracts” in the *IMS Performance Analyzer for z/OS: User’s Guide*.

IMS Log extract by interval data sets

Proprietary format for input to option 8 **Graphing & Export** of the IMS PA primary option menu can be created by the following reports in Log Report Sets:

- Transit Extract by Interval (MSGQ)
- Fast Path Transit Extract by Interval

Transaction index data sets

The IMS Transaction Index contains an X'CA01' record for each transaction in the IMS log, accumulating all the information in the log about the transaction. The index is used to improve reporting efficiency in IMS Performance Analyzer and to streamline problem diagnosis in IMS Problem Investigator and Transaction Analysis Workbench. For further details, see “IMS Transaction Index” on page 115.

The IMS Connect Transaction Index contains an X'CA20' record for each transaction in an IMS Connect Extensions journal, accumulating all the information in the journal about the transaction. The index is not used by IMS Performance Analyzer but in IMS Problem Investigator; by merging the index and journal, you can track against the index and see all the Connect events for that transaction.

ATF Exception Transaction extracts

Created in either of two formats: a VSAM KSDS journal or a sequential data set for later IDCAMS REPRO into a journal data set. The extract journal can be processed subsequently by IMS PA in a similar but more efficient way to the original ATF journals.

Part 2. Log reporting

The first topic in this section provides a detailed description of each of the IMS PA Log reports and extracts, their content and sample output. The reports and extracts are discussed in the order in which they are presented in the Log Report Set edit panel in the dialog. This is followed by a topic describing the Log data that provides the input to the IMS PA Log reports and extracts.

Chapter 4. Analyzing Log reports and extracts

In this section, the reports are grouped and described by function.

The reason for this emphasis is that the reports dealing with transit times are a logical unit. The Transaction (MSGQ) Transit reports are all derived from the same analysis routines and are described with a single section on how to use them. Likewise, the Fast Path Transit reports. However, the Resource Usage and Availability, Fast Path Resource Usage, ATF Enhanced Summary, and Trace reports are processed independently and described individually.

In contrast, the introductory report descriptions categorized them into:

- Message Queue transaction and Full Function database reports
- Fast Path EMH transaction and Fast Path database reports

Within these two categories, they were grouped by intended audience into management reports, analysis reports, and detail reports.

Most of the discussion assumes the reports are specified using the dialog which is the primary mechanism for specifying reports. Alternatively, you can request reports using batch commands. The dialog can generate the JCL and batch commands for you, or you can code them independently of the dialog. See “Log report reference tables” for a list of the log report commands. For a description and examples of using the batch commands, refer to “Log batch interface” in the *IMS Performance Analyzer for z/OS: User’s Guide*.

Log report reference tables

The reference tables list the IMS PA log reports and commands with cross-references to the descriptions, sample reports and extracts, expectation sets, averages data sets, distributions, and object lists.

Table 1. Log reports: Batch commands and output examples

Report	IMSPALOG command	Examples
Transaction Transit reports		
“Transaction Transit Analysis report” on page 49	ANALYSIS	Figure 7 on page 55
“Transaction Transit Statistics report” on page 56	STATS	Figure 8 on page 57
“Transaction Transit Log report” on page 58	LOG	Figure 10 on page 61
“Transaction Transit Graphic Summary report” on page 62	GRAPH	Figure 11 on page 63
“Transaction Transit Extract by Interval” on page 63	EXTRACT	Figure 12 on page 65 Figure 13 on page 67
“Transaction Exception report and extract” on page 70	TRANEXC	Figure 17 on page 75 Figure 16 on page 72
“Transaction History File” on page 81 (extract)	TRANHIST	Figure 20 on page 83

Table 1. Log reports: Batch commands and output examples (continued)

Report	IMSPALOG command	Examples
"Form-based Transaction Transit List reports" on page 85	LIST	"TRANLIST: Transaction Transit Log report" on page 93
"Form-based Transaction Transit Summary reports" on page 94	SUMMARY	"TRANTCOD: Transit Analysis by Trancode report" on page 111
"IMS Transaction Index" on page 115	INDEX	"IMS Transaction Index record format and contents" on page 116
Resource Usage and Availability reports		
"Dashboard report" on page 123	DASHBOARD	Figure 68 on page 124
		Figure 71 on page 126
"Management Exception report" on page 127	MGREX	Figure 72 on page 130
"Transaction Resource Usage report" on page 135	TRANRESU	"Report content: List" on page 136
"Resource Availability report" on page 145	AVAIL	Figure 80 on page 148
"CPU Usage report and extract" on page 152	CPUR	Figure 84 on page 157
		Figure 82 on page 154
"Internal Resource Usage reports" on page 158	IRUR	Figure 85 on page 160
"MSC Link Statistics report" on page 193	MSCLSTAT	Figure 114 on page 195
"Message Queue Utilization report" on page 196	MSGQ	Figure 115 on page 199
"Database Update Activity report and extract" on page 200	DBUPDATE	Figure 121 on page 207
		Figure 116 on page 202
		Figure 119 on page 205
		Figure 120 on page 206
"Region Histogram report" on page 207	HISTGRAM	Figure 122 on page 209
"OSAM Sequential Buffering report" on page 211	SB	Figure 124 on page 212
"Deadlock report" on page 215	DEADLOCK	"Report content: IMS Deadlock List" on page 216
		"Report content: IMS Deadlock Summary" on page 224
"System Checkpoint report" on page 225	CHECKPOINT	"Report content: Database Definitions" on page 227
"BMP Checkpoint report" on page 232	BMPCHKP	Figure 139 on page 233
		Figure 140 on page 235
"Log Gap Analysis report" on page 236	GAP	Figure 141 on page 237
"Cold Start Analysis report" on page 237	COLDSTART	Figure 142 on page 239
Fast Path Transit reports		
"Fast Path Transit Analysis report" on page 242	FPANALYSIS	Figure 144 on page 244

Table 1. Log reports: Batch commands and output examples (continued)

Report	IMSPALOG command	Examples
"Fast Path Transit Log report" on page 246	FPLOG	Figure 145 on page 247
"Fast Path Transit Extract by Interval" on page 248	FPEXTRACT	Figure 146 on page 249 Figure 13 on page 67
"Fast Path Transaction Exception report and extract" on page 249	FPTRNEX	Figure 148 on page 253 Figure 147 on page 251
Fast Path Resource Usage reports		
"Fast Path Resource Usage and Contention report" on page 260	FPIRUC(RESUSAGE,...)	Figure 152 on page 262
"Fast Path Buffer Usage report" on page 264	FPIRUC(BUFFER,...)	Figure 153 on page 265
"Fast Path Database Call Statistics report" on page 266	FPDBCALL	Figure 154 on page 267
"IFP Region Occupancy report" on page 268	FPRGNO	"Report content" on page 268
"EMH Message Statistics report" on page 270	FPEMHQ	Figure 157 on page 271
"DEDB Update Activity report" on page 271	FPDBUPD	Figure 158 on page 272
"VSO Statistics report" on page 273	FPVSO	Figure 159 on page 275
ATF Enhanced Summary reports		
Extract	ATFEXTR	"Extract content" on page 278
Transaction Analysis	ATFANALYSIS	"Report content" on page 280
DLI Call Analysis	ATFDLICALL	"Report content" on page 283
DB2 Call	ATFDB2CALL	"Report content" on page 287
MQ Call	ATFMQCALL	"Report content" on page 289
Trace reports		
"DC Queue Manager Trace report" on page 291	DCTRACE	Figure 172 on page 293
"Database Trace report" on page 296	DBTRACE	Figure 174 on page 299
"DEDB Update Trace report" on page 300	FPDBTRC	Figure 175 on page 301
"ESAF Trace report" on page 302	ESAF	Figure 176 on page 303
User-Written reports		
"IPIPU1xx: DL/I Call Statistics report" on page 304	USERPGM(IPIPU1xx)	Figure 177 on page 304
"IPIPPGM2: Transaction Statistics report" on page 304	USERPGM(IPIPPGM2)	Figure 178 on page 306
"IPIPU9xx: Checkpointed IMS Resource Definitions report" on page 306	USERPGM(IPIPU9xx)	Figure 179 on page 307
"IPIERA30: Deadlock report" on page 309	USERPGM(IPIERA30)	Figure 180 on page 310
Log Information reports		
"Log Information report" on page 310	LOGINFO	Figure 181 on page 312

1. Extract data sets (delimited text files) for input to external programs such as DB2 or PC spreadsheet tools. These can be created by the following reports:
 - Transaction Exception (MSGQ)
 - Fast Path Transaction Exception
 - CPU Usage
 - Database Update Activity
 - Transaction History File
 - Form-based reports: List and Summary
 - ATF Enhanced Summary
2. Extract data sets (proprietary format) for input to **Graphing & Export** (option 8 **Graphing & Export** on the IMS PA Primary Option Menu). These can be created by the following reports:
 - Transit Extract by Interval (MSGQ)
 - Fast Path Transit Extract by Interval

The IMS Transaction Index and IMS Connect Transaction Index are additional, special purpose extracts.

Note that there are two types of extract data sets created by IMS PA log report processing.

This table shows which of the IMS PA log reports use Expectation Sets, Averages Data Sets and Distributions. It also shows the applicable sample Distributions.

Table 2. Log reports: Expectation Sets, Averages and Distributions

Report	Expectation Sets	Averages Data Sets	Sample Distributions
Transaction Transit Statistics			LOGIN
Transaction Exception	Yes		
Management Exception	Yes	Yes	
CPU Usage			\$IPDIST1, \$IPDIST2
System Checkpoint			SYSCKPT
Fast Path Transaction Exception	Yes		

The following table shows which IMS PA log reports support filtering of log records using Selection Criteria. It also shows the applicable Object List types.

Report	Object List type																			
	AP GRP	BLK AREA	ID	CLASS	DB	DD	DD GRP	ESS ID	IMS ID	KEY	LINE	LN/ PT	MSG LTERM	ID	NODE	PROG	REC CD	RG JOB	RG PST	RT CDE
	USR	DEF																		
Options																				
Log Global	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transaction (MSGQ) Transit reports																				
Transit Options	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y
Analysis	-	-	-	Y	-	-	-	-	-	-	Y	-	Y	-	Y	-	-	-	-	Y ¹
Statistics	-	-	-	Y	-	-	-	-	-	-	Y	-	Y	-	Y	-	-	-	-	Y ¹
Log	-	-	-	-	-	-	-	-	-	-	-	-	Y	-	-	-	-	-	-	Y ¹
Graphic Summary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Extract by Interval	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y ¹
Transaction Exception	-	-	-	Y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y ¹
Transaction History File	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y
Transaction Transit (Form-based) reports																				
Transit Options	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
List	-	-	-	Y	-	-	-	-	-	-	Y	-	Y	-	Y	-	-	-	-	Y
Summary	-	-	-	Y	-	-	-	-	-	-	Y	-	Y	-	Y	-	-	-	-	Y
Transaction Index	-	-	-	Y	-	-	-	-	-	-	Y	-	Y	-	Y	-	-	-	-	Y
Resource Usage and Availability reports																				
Dashboard	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Management Exception	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y
Transaction Resource Usage	-	-	-	-	-	-	-	-	Y	-	-	-	-	-	Y	-	Y	Y	-	Y
Resource Availability	-	-	-	-	Y	-	-	-	Y	-	Y	-	-	Y	Y	-	Y	Y	-	Y
CPU Usage	-	-	-	-	-	-	-	-	Y	-	-	-	-	-	Y	-	Y	Y	-	Y
Internal Resource Usage	-	-	-	-	-	-	-	-	Y	-	-	-	-	-	-	-	-	-	-	-
MSC Link Statistics	-	-	-	-	-	-	-	-	Y	-	-	-	-	-	-	-	-	-	-	-
Message Queue Utilization	-	-	-	-	-	-	-	-	Y	-	-	-	-	-	-	-	-	-	-	-
Database Update Activity	-	-	-	-	Y	-	-	-	Y	-	-	-	-	-	-	-	-	-	-	-
Region Histogram	-	-	-	-	-	-	-	-	Y	-	-	-	-	-	-	-	-	Y	Y	-
OSAM Sequential Buffering	-	-	-	-	Y	-	-	-	Y	-	-	-	-	-	Y	-	-	-	-	-
Deadlock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
System Checkpoint	-	-	-	-	Y	-	-	-	Y	-	-	Y	Y	-	Y	-	-	-	-	Y
BMP Checkpoint	-	-	-	-	-	-	-	-	Y	-	-	-	-	-	Y	-	-	-	-	Y
Gap Analysis	-	-	-	-	-	-	-	-	Y	-	-	-	-	-	-	-	-	-	-	-
Cold Start Analysis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fast Path (EMH) Transit reports																				
Transit Options	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y
Analysis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y ²
Log	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y ²
Extract by Interval	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y ²
Transaction Exception	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y ³
Fast Path Resource Usage reports																				
Resource Usage and Contention	-	-	-	-	-	-	-	-	Y	-	-	-	-	-	-	-	-	-	-	Y
Database Call Statistics	-	-	-	-	-	-	-	-	Y	-	-	-	-	-	-	-	-	-	-	Y
IFP Region Occupancy	-	-	-	-	-	-	-	-	Y	-	-	-	-	-	Y	-	-	-	-	-
EMH Message Statistics	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y
DEDB Update Activity	-	Y	-	-	Y	-	-	-	Y	-	-	-	-	-	-	-	-	-	-	-
VSO Statistics	-	Y	-	-	Y	-	-	-	Y	-	-	-	-	-	-	-	-	-	-	-
ATF Enhanced Summary reports																				
Transit Options	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Extract	-	-	-	-	Y	-	-	-	Y	-	-	-	-	-	Y	-	-	-	-	Y
Transaction Analysis	-	-	-	-	Y	-	-	-	Y	-	-	-	-	-	Y	-	-	-	-	Y
DLI Call Analysis	-	-	-	-	Y	-	-	-	Y	-	-	-	-	-	Y	-	-	-	-	Y
DB2 Call Analysis	-	-	-	-	-	-	-	-	Y	-	-	-	-	-	Y	-	-	-	-	Y
MQ Call Analysis	-	-	-	-	-	-	-	-	Y	-	-	-	-	-	Y	-	-	-	-	Y
Trace reports																				
DC Queue Manager Trace	-	-	-	-	-	-	-	-	Y	-	-	Y	Y	Y	Y	-	Y	-	-	Y
Database Trace (Full Function)	-	-	Y	-	Y	-	-	-	Y	Y	-	-	-	-	Y	-	-	-	-	Y
DEDB Update Trace	-	Y	-	-	Y	-	-	-	Y	-	-	-	-	-	Y	-	-	Y	-	Y
ESAF Trace	-	-	-	-	-	-	-	-	Y	Y	-	-	-	-	-	-	-	-	-	-
User-Written reports																				
IPIPPGM1: DL/I Call Statistics	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(Y)	-	-	-	Y
IPIPPGM2: Transaction Statistics	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(Y)	Y	Y	-	Y
IPIPPGM9: Checkpoint	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(Y)	-	-	-	-
IPIERA30: Deadlock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(Y)	-	-	-	-

Comments:

1. Records can be filtered on Transaction Code, firstly by the Transit Options Selection Criteria, then secondly by the report.
2. Records can be filtered on Transaction Code, firstly by the Fast Path Transit Options Selection Criteria, secondly by the report.
3. Records can be filtered on Transaction Code by the Fast Path Transit Options Selection Criteria. There is no additional filtering.

Figure 5. Log reports: Selection Criteria (Object Lists).

This table shows which IMS PA log reports support filtering of log records using Selection Criteria. It also shows the applicable Object List types.

Log report categories

The IMS PA dialog presents the menu of IMS Log reports and extracts in a tree structure which groups them by functional category. This allows you to request reports and extracts individually or by category.

The categories are:

- Transaction (MSGQ) Transit reports (Fixed-format)
- Transaction Transit reports (Form-based)
- Resource Usage and Availability reports
- Fast Path Transit reports
- Fast Path Resource Usage reports
- ATF Enhanced Summary reports
- Trace reports
- User-Written reports

There is also a category containing Log Global Options. This is where you can specify options that apply to all or many reports and extracts in the Report Set.

Transaction (MSGQ) Transit reports

These reports contain detail and statistics on transaction response times. They can help identify any bottlenecks in transaction flow, and are used for monitoring system performance, gathering diagnostic information, and tuning IMS.

- Transaction Transit Analysis
- Transaction Transit Statistics
- Transaction Transit Log
- Transaction Transit Graphic Summary
- Transaction Transit Extract by Interval (for graphing and export)
- Transaction Exception (with extracts)
- Transaction History File

There is also a subcategory containing Transaction Transit Options. This is where you can specify options that apply to all Transaction Transit reports.

Transaction Transit reports (Form-based)

Form-based reports provide flexibility in transaction transit reporting. By using Report Forms, you can tailor the format and content of your reports. You can request just the fields of interest, and control the presentation order and format. You can create Form-based extracts and load them into DB2. Like the fixed-format Transaction (MSGQ) Transit reports, the Form-based reports produce detail and statistics on transaction response times, and help you to identify bottlenecks in transaction flow, monitor system performance, gather diagnostic information, and tune IMS.

- Transit List
- Transit Summary
- Transaction Index

There is also a subcategory containing Transaction Transit Options. This is where you can specify options that apply to all Form-based Transaction Transit reports and all Transaction (MSGQ) Transit reports.

Resource Usage and Availability reports

These reports contain detailed and summary information on the use of various IMS resources (such as regions, transactions, programs (PSBs), lines, message queues, databases, and buffer pools) and on the availability of regions, transactions, programs, lines, VTAM nodes, and databases.

- Dashboard
- Management Exception
- Transaction Resource Usage
- Resource Availability
- CPU Usage (with extract)
- Internal Resource Usage
- MSC Link Statistics
- Message Queue Utilization
- Database Update Activity (with extract)
- Region Histogram
- OSAM Sequential Buffering
- Deadlock (similar to DFSERA30)
- System Checkpoint
- BMP Checkpoint
- Gap Analysis
- Cold Start Analysis

Fast Path (EMH) Transit reports

These reports contain detail and statistics on Fast Path transaction response time. They can help identify any bottlenecks in IFP transaction flow, and are used for monitoring system performance, gathering diagnostic information, and tuning IMS.

- Fast Path Transit Analysis
- Fast Path Transit Log
- Fast Path Transit Extract by Interval (for graphing and export)
- Fast Path Transaction Exception (with extracts, similar to DBFULTA0)

Fast Path Resource Usage reports

These reports contain detailed and summary information on the use of various Fast Path resources, such as regions, transactions, programs (PSBs), DEDB databases, and VSO.

- FP Resource Usage and Contention
- FP Database Call Statistics
- IFP Region Occupancy
- EMH Message Statistics
- DEDB Update Activity
- VSO Statistics

ATF Enhanced Summary reports

These reports contain detail and statistics from the OMEGAMON ATF Enhanced Summary record.

- Extract
- Transaction Analysis
- DLI Call Analysis
- DB2 Call Analysis
- MQ Call Analysis

Trace reports

These reports provide chronological listings of selected log records:

- DC Queue Manager Trace
- Database Trace (Full Function)
- DEDB Update Trace
- ESAF Trace

User-written record processors

These are user-written programs which use log data input and can be included under IMS PA. With these programs you can produce customized log reports, or perform other site-specific processing not necessarily producing reports. IMS PA handles both types in a similar manner to the supplied reports. The following user programs are provided:

- IIPU1xx: DL/I Call Statistics
- IIPPGM2: Transaction Statistics
- IIPU9xx: Checkpointed IMS Resource Definitions
- IPIERA30: Deadlock

Note: These user programs have been superseded by the Transaction Resource Usage, Deadlock, and System Checkpoint reports which can be requested directly from Report Sets (option 3 on the IMS PA Primary Option Menu). Now with the introduction of Form-based reporting, the user programs are further deprecated. See “Form-based Transaction Transit List reports” on page 85 and “Form-based Transaction Transit Summary reports” on page 94.

DBCTL log reports

DBCTL events are collected by the IMS log.

DBCTL has neither transactions nor terminal end users. It does, however, work on behalf of transactions entered by CCTL terminal users. DBCTL generates log data when a CCTL transaction schedules a program to access DBCTL databases. For a more detailed description of the IMS resource usage by DBCTL, see “DBCTL monitor reports” on page 336.

The log reports applicable to DBCTL users are:

- “Form-based Transaction Transit List reports” on page 85 (see sample report form “DBCTLIST: DBCTL List report” on page 88)
- “Form-based Transaction Transit Summary reports” on page 94 (see sample report form “DBCTSUMM: DBCTL Summary report” on page 102)
- “Transaction Resource Usage report” on page 135
- “Resource Availability report” on page 145
- “CPU Usage report and extract” on page 152
- “Internal Resource Usage reports” on page 158
- “Database Update Activity report and extract” on page 200
- “Fast Path Resource Usage and Contention report” on page 260
- “Fast Path Database Call Statistics report” on page 266
- “DEDB Update Activity report” on page 271
- “VSO Statistics report” on page 273
- “Database Trace report” on page 296
- “DEDB Update Trace report” on page 300

Transaction (MSGQ) Transit reports

IMS PA breaks down transit time into its components, reporting these times for the average transaction and for a peak load situation, as defined by you.

The transaction transit time components are:

- Input queue time, which can be one of the following:
 - Input shared message queue time
 - Input local message queue time
- Processing time
- Output queue time
- Output shared message queue time
- Output local message queue time
- Program switching queue time (where appropriate)

Your analysis of these components can indicate whether corrective action is appropriate for transit time problems. For example, long input queue times might indicate a scheduling problem or a lack of MPP regions to process transactions; long processing times might indicate delays due to resource constraints.

Transaction transit reports, by default, do not include BMP transactions or message switches, which could bias transit times. However, BMP transactions or message switches or both can be included in all reports in the Transaction Transit group by selecting the corresponding options on the Transaction Transit Options (MSGQ) panel.

Note: If BMP transactions or message switches or both are included, they override the settings for **Input Queue Time (INMAX)** and **Output Queue Time (OUTMAX)** specified on the Transaction Transit Options (MSGQ) panel, so that all transactions, regardless of INMAX or OUTMAX, are included in the report.

Transaction transit reports, by default, do not include MSC transactions originating on a remote system and processed by the local system because their messaging log records are recorded only on the originating system. To include MSC transactions in all Transaction Transit reports, select the corresponding option on the Transaction Transit Options (MSGQ) panel. Note that queue times on the remote system are not included.

Transaction transit reports, by default, do not include APPC and OTMA transactions. By selecting the corresponding option on the Transaction Transit Options (MSGQ) panel, APPC/OTMA transactions are reported.

You can also choose to include all transactions regardless of whether there was a response to the originating LTERM. By selecting the corresponding option on the Transaction Transit Options (MSGQ) panel, you can report on all transactions. For further details, see “Transaction Transit Options” in the *IMS Performance Analyzer for z/OS: User’s Guide*.

For shared queue reporting, IMS PA produces composite transit time reports by merging the data from the log input of the multiple IMS subsystems in the sysplex. For efficient batch report processing, it is advisable to specify a global **Start** and **Stop** time period that intersects the log input from all IMS subsystems in the sysplex. For further details, see “Specifying the time period for Transit reports” in the *IMS Performance Analyzer for z/OS: User’s Guide*.

Uses of the Transaction Transit reports

IMS PA Transaction Transit reports are used for monitoring system performance, gathering diagnostic information, and tuning IMS.

Monitoring system performance

On a daily basis, you probably want to know whether anything happened in the system that significantly affected transaction response time. You'd like to determine this at a quick glance, rather than having to study pages of tabulated listings. The Transaction Transit reports are designed for this purpose.

You'll probably want to look first at the Transaction Transit Graphic Summary report and then at the Transaction Transit Analysis report (by transaction code and by LTERM). Each of these reports is normally no longer than two to four pages. The Graphic Summary report shows any spikes in transit time and whether the overall pattern differs from the normal pattern. If there is a spike or deviation, then you may be directed to the Transit Analysis reports. You may also want to rerun IMS PA to produce other reports for the spike periods, to get more detailed perspectives or different views of the data. For example, the Transaction Transit Statistics report presents graphic distributions of the same information and is especially useful for comparing patterns with those obtained on previous days.

Some examples of how this process might occur follow.

Example 1: Suppose a transaction stays in a region for an unusually long time. The Mean Response Time graph shows a spike for the time period in which the transaction is completed, and the spike indicates lengthy processing time. Further, the graph probably shows unusually long input queue times for the time periods that follow; this is because transactions must wait for the region to be free. By looking at the Transaction Transit Analysis report (by transaction code), you should easily spot the problem transaction.

You can get the Transaction Transit Log to determine which occurrences of the problem transaction caused the problem. Perhaps you will find that the problem occurrences all came from a particular terminal.

If necessary, you can consult the IMS PA detail reports to help determine the cause of the problem. For example, the Database Update Activity report shows update activity on the databases used by the problem transaction. The Database Trace report shows all database activity for each transaction. The CPU Usage report shows if CPU time required by the transaction was large compared with elapsed time. The Region Histogram report shows the status of region availability.

Example 2: If the graphic summaries indicate only long input queue times, this could mean your system is overloaded or that too few regions are available. The Transaction Transit Log, DC Queue Manager Trace report, and Region Histogram report should help you analyze this symptom. If the graphic summaries show long output queue times, this could mean:

- The lines are overutilized by various transaction responses
- Messages are longer than designed
- There is excessive MFS (Message Format Services) activity

After using the Transaction Transit reports to pinpoint the problem transaction, the DC Queue Manager Trace report may help you determine the cause of the problem.

Tuning IMS and gathering diagnostic information

The other way in which IMS PA Transaction Transit reports are used is as a source of system tuning and diagnostic information. The reports help you determine whether a line, terminal, transaction code, or a certain time of day contributes to poor transit time. The activity reports help you specifically identify problem areas.

Transaction Transit Analysis report

The Transaction Transit Analysis report can show response time performance by transaction code, logical terminal or user ID, transaction code or user ID within logical terminal, message class, line or VTAM node, and time of input. For multi-subsystem log input, IMS PA assumes a sysplex environment with shared queues and produces composite reports interrelating the data from the multiple subsystems.

Each of the reports that can be produced is designed to give a system analyst insight into a different facet of response tuning:

- The transaction code and message class reports show areas in application design and scheduling that may require attention.
- Logical terminal and user ID reports show whether the distribution of service among system users is adequate.
- Line or VTAM node reports highlight imbalances due to overcommitted communication facilities.
- The time of input report notes performance problems caused by momentary surges of transaction input. The display of transit time by time period is useful in isolating time periods of high response.

The reports are structured so that for a system with good performance, a daily glance at the reports is all that's needed; more detailed scrutiny can be done if a problem is noticed.

The Transit Analysis report only reports transactions that are directly involved in end-to-end response. IMS PA tracks the flow of each transaction, across its program switches to the point where it responds back to the originating Lterm. Only then is the transaction considered for reporting. As a consequence, the Transit Time Analysis report may not show all transaction activity. Use the Transaction Exception and Management Exception reports to analyze all transaction activity.

Log records: This report is derived from IMS log records: 01, 03, 06, 07, 08, 0A, 31, 32, 33, 34, 35, 38, 40, and 72.

Report options

To specify the report options, select the Transaction Transit **Analysis** report in a Log Report Set.

Several reporting sequences are available for this report. It can be ordered by:

- Transaction Code
- Logical Terminal (LTERM) or User ID
- Transaction Code within Logical Terminal (LTERM-TRANCODE) or User ID within Logical Terminal (User ID-TRANCODE)
- Line or VTAM Node
- Message Class
- Time of Input

Selection Criteria can be specified for one or more of the following and are applied after filtering by the Transaction Code Selection Criteria specified on the Transaction Transit Options (MSGQ) panel:

- Transaction Code
- Logical Terminal (LTERM)
- Line
- VTAM Node
- Message Class
- User ID

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output is written to the data set specified by the Report Output DDname on the Log Global Options panel.

On the Transaction Transit Options (MSGQ) panel, the following options are applicable:

- The percentile transit time
- options to include MSC, BMP, APPC and OTMA transactions, Message Switches, and to report all transactions
- The time increments
- Whether the time intervals begin with the first value encountered, or are adjusted to align on the hour
- The name of a Transaction Substitution Exit to change the Transaction Code name that is reported

Report content (standard)

This example shows a Transaction Transit Analysis report applicable to log data without shared queues.

The report applicable to shared queue data has a similar format; for a description of the differences, see “Report content (shared queues)” on page 54.

IMS Performance Analyzer																	
Transit Time Analysis										By Transaction Code							
Log 10Jun2018										6.25.07.10							
										Report	10.13	11Jun2018	Page	1			
Transact Code	PSB	Number of Responses	Minimum Transit Time	** Average Transit Time (msec) **	Input Queue	Switch Queue	Progrm Exec	Output Queue	Total	** 90% Peak Transit Time (msec) **	Input Queue	Switch Queue	Progrm Exec	Output Queue	Total	Maximum Transit Time	Average CPU Time (msec)
TMENU	PMENU	70	100	105	0	0	318	0	424	358	0	0	576	0	740	2,600	24
	PLOGIN	1	200	0	0	0	200	0	200	0	0	0	200	0	200	200	17
	PTIME	18	200	0	6,394	288	0	6,683	0	26,666	394	0	26,896	58,300	24	24	24
	PSTART	8	100	0	0	262	0	262	0	0	0	414	0	414	500	17	17
TMENU	*TOTAL*	70	100	105	1,644	425	0	2,175	483	11,615	893	0	12,192	58,900	33	33	33
TSTOCK	PSTOCK	5	200	0	40	280	0	320	0	126	360	0	445	500	21	21	21
	PORDER	1	300	0	0	300	0	300	0	0	300	0	300	300	17	17	17
	PINVENT	28	300	3,217	0	407	0	3,625	14,389	0	578	0	14,787	42,000	23	23	23
	PSHIP	19	300	0	142	389	0	531	0	924	562	0	1,473	3,600	20	20	20
	PCOST	1	300	0	0	300	0	300	0	0	300	0	300	300	17	17	17
TSTOCK	*TOTAL*	28	500	3,217	103	742	0	4,064	13,888	718	1,042	0	14,953	42,300	41	41	41
. . .																	
System Totals		382	0	596	457	1,094	0	2,148	4,446	3,924	2,119	0	7,622	64,700	144	144	144
Transit Time Analysis										By LTERM							
Log 10Jun2018										6.25.07.10							
										Report	10.13	11Jun2018	Page	2			
Source LTERM	Transact Code	Number of Responses	Minimum Transit Time	** Average Transit Time (msec) **	Input Queue	Switch Queue	Progrm Exec	Output Queue	Total	** 90% Peak Transit Time (msec) **	Input Queue	Switch Queue	Progrm Exec	Output Queue	Total	Maximum Transit Time	Average CPU Time (msec)
LTRM0001	TMENU	20	300	1,310	1,755	1,715	0	4,780	4,777	8,212	3,317	0	12,222	35,400	329	329	329
LTRM0002	TSTOCK	30	400	3	0	1,110	0	1,113	26	0	2,288	0	2,305	4,600	108	108	108
LTRM0003	TORDER	43	200	1,595	2,100	769	0	4,465	7,507	10,280	1,459	0	14,420	58,900	79	79	79
. . .																	
System Totals		382	0	596	457	1,094	0	2,148	4,446	3,924	2,119	0	7,622	64,700	144	144	144
Transit Time Analysis										By Tran Code in LTERM							
Log 10Jun2018										6.25.07.10							
										Report	10.13	11Jun2018	Page	3			
Source LTERM	Transact Code	Number of Responses	Minimum Transit Time	** Average Transit Time (msec) **	Input Queue	Switch Queue	Progrm Exec	Output Queue	Total	** 90% Peak Transit Time (msec) **	Input Queue	Switch Queue	Progrm Exec	Output Queue	Total	Maximum Transit Time	Average CPU Time (msec)
LTRM0001	TMENU	2	600	0	17,450	550	0	18,000	0	48,906	640	0	49,366	35,400	35	35	35
LTRM0001	TSTOCK	15	300	0	0	1,660	0	1,660	0	0	3,937	0	3,937	5,700	346	346	346
LTRM0001	TORDER	3	900	8,733	66	2,766	0	11,566	19,010	209	6,753	0	25,425	23,300	440	440	440
LTRM0001	*TOTAL*	20	300	1,310	1,755	1,715	0	4,780	4,777	8,212	3,317	0	12,222	35,400	329	329	329
. . .																	
System Totals		382	0	596	457	1,094	0	2,148	4,446	3,924	2,119	0	7,622	64,700	144	144	144
Transit Time Analysis										By Line							
Log 10Jun2018										6.25.07.10							
										Report	10.13	11Jun2018	Page	4			
Line	Transact Code	Number of Responses	Minimum Transit Time	** Average Transit Time (msec) **	Input Queue	Switch Queue	Progrm Exec	Output Queue	Total	** 90% Peak Transit Time (msec) **	Input Queue	Switch Queue	Progrm Exec	Output Queue	Total	Maximum Transit Time	Average CPU Time (msec)
NODE0001	TMENU	20	300	1,310	1,755	1,715	0	4,780	4,777	8,212	3,317	0	12,222	35,400	329	329	329
NODE0002	TSTOCK	30	400	3	0	1,110	0	1,113	26	0	2,288	0	2,305	4,600	108	108	108
NODE0003	TORDER	43	200	1,595	2,100	769	0	4,465	7,507	10,280	1,459	0	14,420	58,900	79	79	79
. . .																	
System Totals		382	0	596	457	1,094	0	2,148	4,446	3,924	2,119	0	7,622	64,700	144	144	144

Figure 6. Transaction Transit Analysis report (standard)

IMS Performance Analyzer														
Transit Time Analysis								By Message Class						
Log 10Jun2018								6.25.07.10						
Report 10.13 11Jun2018 Page 5														
Message Class	Number of Responses	Minimum Transit Time	** Average Queue	Transit Input Queue	Time Switch Queue	(msec) Exec	** Total	** 90% Peak Queue	Transit Input Queue	Time Switch Queue	(msec) Exec	* Total	Maximum Transit Time	Average CPU Time (msec)
1	116	100	63	1,347	465	0	1,876	364	10,026	859	0	10,587	58,900	32
2	223	300	987	82	1,363	0	2,434	7,161	1,145	2,637	0	9,307	64,700	201
3	41	400	0	0	1,465	0	1,465	0	0	3,917	0	3,917	10,500	155
. . .														
System Totals		382	0	596	457	1,094	0	2,148	4,446	3,924	2,119	0	7,622	144

IMS Performance Analyzer														
Transit Time Analysis								By Time of Input						
Log 10Jun2018								6.25.07.10						
Report 10.13 11Jun2018 Page 6														
Begin of Time Interval	Number of Responses	Minimum Transit Time	** Average Queue	Transit Input Queue	Time Switch Queue	(msec) Exec	** Total	** 90% Peak Queue	Transit Input Queue	Time Switch Queue	(msec) Exec	* Total	Maximum Transit Time	Average CPU Time (msec)
7.00.00	58	100	3,803	3,012	936	0	7,751	13,564	11,897	2,034	0	21,063	64,700	118
7.15.00	61	200	42	0	1,191	0	1,234	362	0	2,286	0	2,338	5,700	158
7.30.00	13	600	0	0	1,207	0	1,207	0	0	2,477	0	2,477	3,900	156
7.45.00	47	200	21	0	851	0	872	116	0	1,612	0	1,611	3,200	103
. . .														
System Totals		382	0	596	457	1,094	0	2,148	4,446	3,924	2,119	0	7,622	144

The first one or two columns in the report are ordering columns according to your selection. For example:

- If you select Transaction Code within Logical Terminal as the ordering operands, the first two column headers are **Source LTERM** and **Transact Code**.
- If you select Transaction Code within User ID as the ordering operands, the first two column headers are **User ID** and **Transact Code**.
- If you select Transaction Code as the ordering operand, the first two column headers are **Transact Code** and **PSB**. Each PSB within the transaction (not the PSB associated with the transaction) identifies a program that executed underneath the transaction, usually as a message switch. If there are program switches, the PSBs are ordered within the transaction codes and a total line follows. The value in the ***TOTAL*** line is the actual number of times the specified transaction was executed and responded back to the original terminal. For transactions with program switches, only the value for responses on the ***TOTAL*** line are accumulated in the **System Totals**. For example, in the Transaction Transit Analysis by Transaction Code report in Figure 7 on page 55, 45 TIMMIDBM transactions executed program PIMMIDBP which responded to the original terminal. In the process, on 2 occasions, program PIMMIDBP performed a message switch which executed program PIM3INQA. This message switch is part of the transit time for the original transaction TIMMIDBM.
- If you request the report ordered by Line, there will be one ordering column with **Line** as its heading. VTAM node names (instead of line number) are reported in the Line column for VTAM terminals. The VTAM Node Object List, if specified, is used in this case. If there is no VTAM node, the line number is reported.

Specifying a Transaction Substitution Exit enables an alternate Transaction Code name to be substituted for the real one. Where Transaction Code and Program (PSB) Name are reported together as the report ordering sequence, then IMS PA changes the Program name to ***USERXIT**. This ensures that transactions with substituted names are grouped and reported in a single report line.

The date and time following the word **Log** in the report heading is from the first time stamp in the log being reported on, or the Start date and time specified on the Log Global Options panel, whichever is later. The date and time following the word **Report** is the date and time the report was generated.

The following fields appear in the report after the two ordering fields:

Number of Responses

The number of transaction sets completed during the time period being examined. See “Transaction sets” on page 315 for a discussion of transaction sets.

Minimum Transit Time

The shortest time (in milliseconds) required by any one transaction in the specified category.

Average Transit Time (msec)

The average (mean) time, in milliseconds, required to process the transaction in the category being reported. These transit times are broken down into their component parts:

- Input queue time
- Program switch time
- Program execution time
- Output queue time
- Total time

If large output queue times are distorting your end-user response time statistics, you can remove that influence by setting the transit global option OUTMAX to either:

88888 For all transactions, report output queue time as zero

77777 For all transactions, except MSC transactions, report output queue time as zero

***nnn%* Peak Transit Time (msec)**

A statistical estimate, based on a normal distribution, that *nnn%* (between 50% and 100% as specified by you) of all transactions in the category being reported will have transit times less than the times shown. Times are in milliseconds. The estimated transit times are broken down into their component parts:

- Input queue time
- Program switch time
- Program execution time
- Output queue time
- Total time

The total time is a statistical estimate itself, rather than the sum of the component estimates.

The peak values are a statistical estimate only, so care should be taken when interpreting the values if the transaction volume is low.

Maximum Transit Time

The longest time (in milliseconds) required by any one transaction in the specified category.

Average CPU Time (msec)

The average CPU time, in milliseconds, required by the transactions in the specified category.

Report content (shared queues)

This example shows a Transaction Transit Analysis report applicable to shared queue log data. IMS PA merges the log data from the multiple subsystems in the sysplex to produce a composite report of interrelated data.

The content of this report is similar to that described previously in “Report content (standard)” on page 50, except note the following:

Output Queue

The portion of the transit time from when the program execution completes to the time the message is sent to the terminal. Output Queue time is calculated independently of the CQS and Local queue times.

Output CQS

The time from when the output message was put onto the shared message queue to the time it was read from the shared message queue by any IMS subsystem in the sysplex.

Output Local

The time from when the message was put (enqueued) onto the local IMS message queue (from the shared message queue, if CQS is active) to the time the message is sent to the terminal.

IMS Performance Analyzer																	
Transit Time Analysis By Transaction Code										Report 17.24 08Jun2018 Page 1							
Log 04Jun2018 16.10.15.93																	
Transact	PSB	Resp	Min	*****	Average	Transit	Time (msec)	*****	*****	90%	Peak	Transit	Time (msec)	*****	Max	Avg	
Code		Count	Tran	Input	Swit	Pgm	-----	Output	-----	Total	Input	Swit	Pgm	-----	Output	-----	Total
			Time	Queue	Queue	Exec	Queue	CQS	Local		Queue	Queue	Exec	Queue	CQS	Local	
TIMIDB	PIMMIDBP	41	90	218	0	394	0	36	4	612	870	0	1061	0	67	18	1513
TIM3MUUP	PIM3UTLP	1	993	692	0	300	0	24	0	993	692	0	300	0	24	0	993
TIM3UUUP	PIM3UTLP	2	143	14	0	722	0	24	0	737	16	0	1787	0	34	0	1803
TIMMIDBM	PIMMIDBP	45	40	225	0	116	0	28	0	341	1108	0	503	0	43	1	1293
	PIM3INQA	2	217	0	0	507	0	40	0	507	0	0	1013	0	60	0	1013
TIMMIDBM	*TOTAL*	45	40	225	0	139	0	30	0	364	1100	0	536	0	44	1	1309
TIMMSELM	PIMMSELP	25	40	22	0	43	0	31	1	66	44	0	57	0	43	1	93
TIM3IDOP	PIM3AINA	16	90	319	0	3465	0	34	0	3785	1642	0	12140	0	56	0	12416
TIM3IDOP	*TOTAL*	14	90	365	0	3960	0	39	0	4326	1778	0	13408	0	56	0	13701
TIM3IPOP	PIM3INQA	14	89	292	0	1578	0	28	0	1871	1240	0	4397	0	45	0	4731
TIM3IPOP	*TOTAL*	12	95	341	0	1842	0	33	0	2183	1422	0	6095	0	47	0	6462
System Totals		485	40	327	35	1969	0	36	1	2332	1485	453	9665	0	70	11	10334
Transit Time Analysis By LTERM										Report 17.24 08Jun2018 Page 1							
Log 04Jun2018 16.10.15.93																	
Source		Resp	Min	*****	Average	Transit	Time (msec)	*****	*****	90%	Peak	Transit	Time (msec)	*****	Max	Avg	
LTERM		Count	Tran	Input	Swit	Pgm	-----	Output	-----	Total	Input	Swit	Pgm	-----	Output	-----	Total
			Time	Queue	Queue	Exec	Queue	CQS	Local		Queue	Queue	Exec	Queue	CQS	Local	
TP0003AA		31	50	191	83	923	0	33	0	1198	695	374	3430	0	48	2	3787
TP0004AA		28	90	383	2	660	0	33	0	1047	1109	13	1550	0	51	0	2097
TP0005AA		28	53	113	25	709	0	36	3	848	391	108	2331	0	65	10	2636
		20	67	161	7	873	0	28	0	1042	730	38	2279	0	42	1	2533
System Totals		485	40	327	35	1969	0	36	1	2332	1485	453	9665	0	70	11	10334
Transit Time Analysis By Tran Code in LTERM										Report 17.24 08Jun2018 Page 1							
Log 04Jun2018 16.10.15.93																	
Source	Transact	Resp	Min	*****	Average	Transit	Time (msec)	*****	*****	90%	Peak	Transit	Time (msec)	*****	Max	Avg	
LTERM	Code	Count	Tran	Input	Swit	Pgm	-----	Output	-----	Total	Input	Swit	Pgm	-----	Output	-----	Total
			Time	Queue	Queue	Exec	Queue	CQS	Local		Queue	Queue	Exec	Queue	CQS	Local	
TP0003AA	TIMIDB	1	743	36	0	706	0	69	0	743	36	0	706	0	69	0	743
	TIMMIDBM	1	50	9	0	41	0	21	0	50	9	0	41	0	21	0	50
	TIMLIXOP	7	61	15	0	145	0	28	0	161	23	0	244	0	43	0	256
	TIMLUXOP	8	115	399	0	1915	0	36	2	2315	1344	0	7087	0	47	1	7443
	TIMMENUM	14	361	184	184	823	0	32	0	1192	510	579	1750	0	47	1	2417
TP0003AA	*TOTAL*	31	50	191	83	923	0	33	0	1198	695	374	3430	0	48	2	3787
		1	4069	73	0	3996	0	43	0	4069	73	0	3996	0	43	0	4069
System Totals		485	40	327	35	1969	0	36	1	2332	1485	453	9665	0	70	11	10334
Transit Time Analysis By Line										Report 17.24 08Jun2018 Page 1							
Log 04Jun2018 16.10.15.93																	
Line		Resp	Min	*****	Average	Transit	Time (msec)	*****	*****	90%	Peak	Transit	Time (msec)	*****	Max	Avg	
		Count	Tran	Input	Swit	Pgm	-----	Output	-----	Total	Input	Swit	Pgm	-----	Output	-----	Total
			Time	Queue	Queue	Exec	Queue	CQS	Local		Queue	Queue	Exec	Queue	CQS	Local	
NE9N01ZA		31	50	191	83	923	0	33	0	1198	695	374	3430	0	48	2	3787
NE9N02ZA		28	90	383	2	660	0	33	0	1047	1109	13	1550	0	51	0	2097
NE9N03ZA		28	53	113	25	709	0	36	3	848	391	108	2331	0	65	10	2636
NE9N04ZA		20	67	161	7	873	0	28	0	1042	730	38	2279	0	42	1	2533
		2	48	10	0	74	0	26	0	84	11	0	124	0	39	0	132
System Totals		485	40	327	35	1969	0	36	1	2332	1485	453	9665	0	70	11	10334

Figure 7. Transaction Transit Analysis report (shared queues)

IMS Performance Analyzer																			
Transit Time Analysis										By Message Class									
Log 04Jun2018 16.10.15.93										Report 17.24 08Jun2018 Page 1									
Message Class	Resp Count	Min Tran Time	***** Input Queue	Average Swit Queue	Transit Pgm Exec	Time Queue	(msec) CQS	***** Local	Total	***** Input Queue	90% Swit Queue	Peak Pgm Exec	Transit Time Queue	(msec) CQS	***** Local	Total	***** Tran Time	Max CPU	Avg Time
6	111	40	177	0	211	0	33	1	389	837	0	706	0	55	12	1200	4793	20	
7	49	48	365	240	3237	0	47	1	3843	1550	1428	9811	0	103	13	11149	44640	219	
8	5	363	636	62	32849	0	100	21	33548	2275	231	85427	0	274	27	85546	82087	215	
10	3	143	240	0	581	0	24	0	822	536	0	1066	0	28	0	1284	1331	42	
.	.	.	1	7321	6554	0	767	0	56	0	7321	6554	0	767	0	56	0	7321	33
System Totals		485	40	327	35	1969	0	36	1	2332	1485	453	9665	0	70	11	10334	82087	73

IMS Performance Analyzer																			
Transit Time Analysis										By Time of Input									
Log 04Jun2018 16.10.15.93										Report 17.24 08Jun2018 Page 1									
Begin of Time Interval	Resp Count	Min Tran Time	***** Input Queue	Average Swit Queue	Transit Pgm Exec	Time Queue	(msec) CQS	***** Local	Total	***** Input Queue	90% Swit Queue	Peak Pgm Exec	Transit Time Queue	(msec) CQS	***** Local	Total	***** Tran Time	Max CPU	Avg Time
16.10.00	20	43	71	81	1236	0	28	0	1389	300	475	3432	0	43	0	3917	7840	47	
16.11.00	62	50	431	81	2934	0	32	1	3446	1656	621	11363	0	56	8	12497	44640	66	
16.12.00	114	40	125	2	1089	0	35	1	1217	581	22	4233	0	62	11	4393	16927	57	
16.13.00	157	41	265	8	2864	0	40	1	3139	1453	61	15068	0	92	16	15665	82087	111	
16.14.00	132	40	565	67	1323	0	35	1	1956	1926	665	5451	0	54	5	6444	27018	50	
System Totals		485	40	327	35	1969	0	36	1	2332	1485	453	9665	0	70	11	10334	82087	73

Transaction Transit Statistics report

The Transaction Transit Statistics report is a graphical representation of the information in the Transaction Transit Analysis report. To request the Statistics report, specify ordering categories using methods similar to those used for the Analysis report.

You can produce graphic representations of transit time statistics based on any combination of:

- Transaction Code
- Logical Terminal (LTERM) or User ID
- Transaction Code within Logical Terminal (LTERM-TRANCODE) or Transaction Code within User ID (User ID-TRANCODE)
- Line or VTAM Node
- Message Class
- Time of Input

Log records: This report is derived from IMS log records 01, 03, 06, 07, 08, 0A, 31, 32, 33, 34, 35, 38, 40, 72.

Report options

To specify the report options, select the Transaction Transit **Statistics** report in a Log Report Set.

This report has the same choice of options as the Transaction Transit Analysis report (see "Report options" on page 49) plus an additional option. You can specify a Distribution to control the attributes of the distribution graphs. A sample Distribution LOGIN is provided. If not specified, the following defaults are applied:

Ranges (Limits) = **2,4,6,8,10,15,20,30,60**

Title = **Sc Mil** for seconds and milliseconds

Multiplier = **1**

Edit Mask = **ZZZ,ZZZ.ZZ9**

Report content

This example shows a Transaction Transit Statistics report. For reporting on shared queue log data, IMS PA merges the log data from the multiple subsystems in the sysplex to produce a composite report of interrelated data.

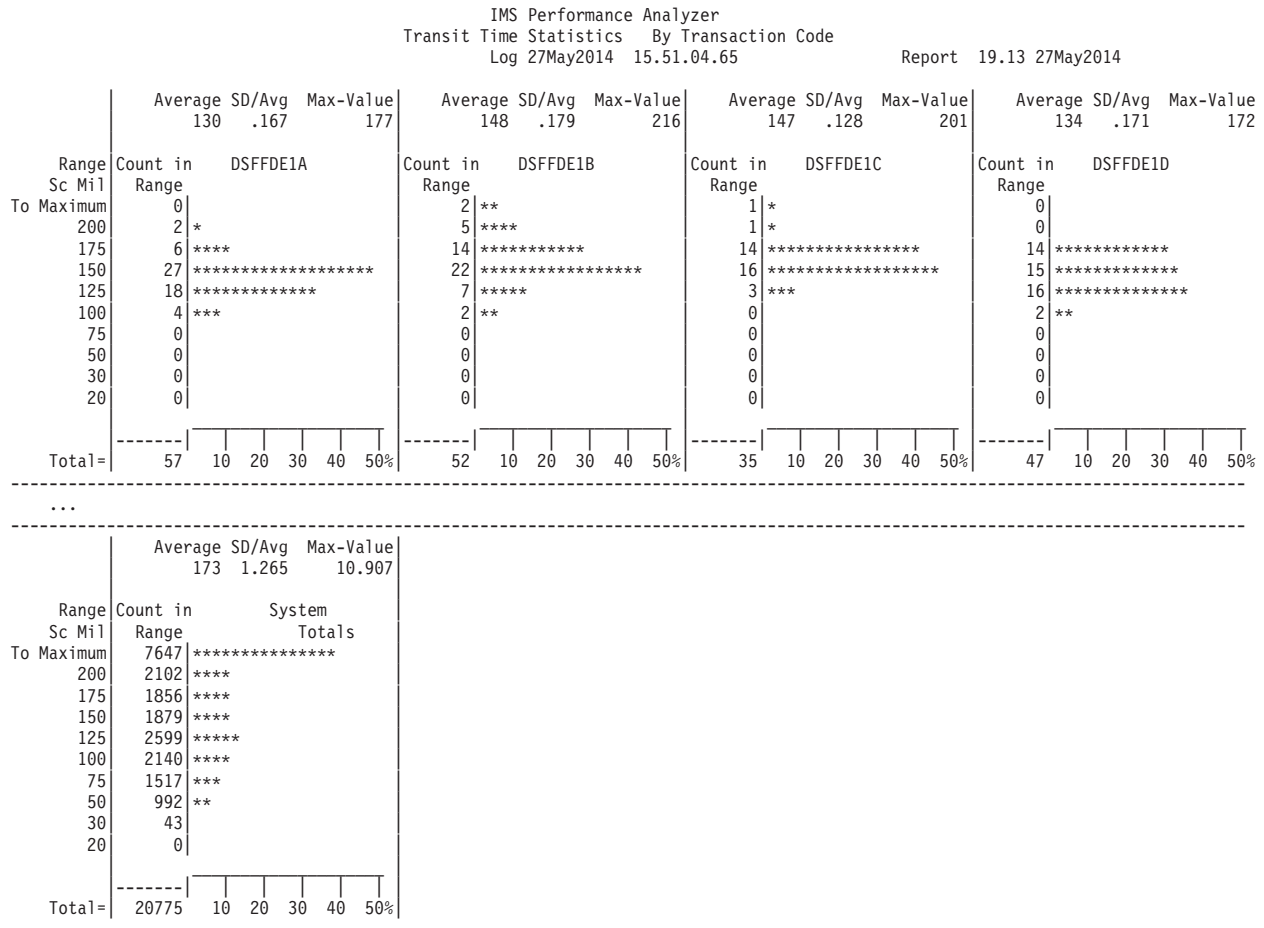


Figure 8. Transaction Transit Statistics report

Up to four distribution graphs with summary statistics can be printed on each horizontal row of the report. For a normal 60-line page, there are two rows of graphs per page. A graph of system totals appears on the last row of the report.

The sample report shows distributions of transit time by transaction code. For transaction code DSFFDE1A, the summary statistics show that the average transit time is 130 milliseconds with a normalized standard deviation of 0.167 milliseconds. The maximum transit time is 177 milliseconds. Graphically you can see that 4 transactions required more than 75 but not more than 100 milliseconds to complete, 18 transactions required more than 100 but not more than 125 milliseconds, 27 required 125–150, 6 required 150–175, and 2 transactions required more than 175 but not more than 200 (in fact, 177) milliseconds. The numbers at the bottom of the graph along the x-axis (10 20 30 40 50) are percentages of total

transactions. Thus you can see at a glance that almost 50% of the transactions required 125–150 milliseconds to complete.

IMS PA calculates a normalized standard deviation (**SD/Avg**) equal to the standard deviation divided by the mean.

Transaction Transit Log report

The Transaction Transit Log can help you diagnose problem areas. The report shows the transit activity of each message originating from a logical terminal. It also shows any program-to-program switches caused by the input message and all output messages resulting from the input. Optionally, the report can include APPC transactions for CPI-C driven application programs.

For multi-subsystem log input, IMS PA assumes shared queue processing and produces a composite report by merging data from all subsystems in the sysplex.

Log records: This report is derived from IMS log records 01, 03, 06, 07, 08, 0A, 31, 32, 33, 34, 35, 38, 40, 72.

Report options

To specify the report options, select the Transaction Transit **Log** report in a Log Report Set.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output data set is controlled by specifying a Report Output DDname.

Selection Criteria can be specified for one or more of the following and apply after the Transaction Code filtering specified on the Transaction Transit Options (MSGQ) panel:

- Transaction Code
- Logical Terminal (LTERM)
- User ID

Limits on the messages to include in the report are controlled by specifying Input Queue Time (INMAX) and Output Queue Time (OUTMAX) on the Transaction Transit Options (MSGQ) panel. You can select to include all messages in the report, to include only those messages with queue times *less* than those specified for INMAX/OUTMAX, or to include only those messages with queue times *greater* than INMAX/OUTMAX. If, on the Transaction Transit Options (MSGQ) panel, you select to include BMP transactions or message switches or both, the settings for Input Queue Time (INMAX) and Output Queue Time (OUTMAX) are ignored, so that all messages, regardless of queue time, are included in the report. If messages with queue times *greater* than INMAX/OUTMAX are included in the report, any transactions with times greater than those specified for INMAX/OUTMAX are flagged with the character M. To deactivate the M suffix, specify INMAX/OUTMAX values of zero.

APPC and OTMA transactions can be reported if you select to include APPC/OTMA transactions on the Transaction Transit Options (MSGQ) panel.

Report content (standard)

This example shows a Transaction Transit Log applicable to log data (without shared queues).

For a description of the report applicable to shared queue data, see “Report content (shared queues)” on page 61.

IMS Performance Analyzer Transaction Transit Log Log 27May2018 15.51.04.65															Report 19.56 27May2018 Page 1				
Source LTERM	Source Transact Code	PSB	Region	Cls	Pr	Approx No DB Calls	Input Transact Arrival	CPU Time (msec)	Userid	Output LTERM	*****Elapsed Time (msec)*****	Input Queue	Progrm Exec	Output Queue	Total Time	Transit Time			
DSW00811	DSFFOE1F	DFSFOE1F	39	6	1	6	15.51.09.329	21	DSW00811	DSW01811		7	113	0	119	119			
DSW00005	DSFFOE2A	DFSFOE2A	32	1	1	4	15.51.09.326	16	DSW00005	DSW01005		8	76	0	84	84			
DSW00845	DSFFSC6C	DFSFC6C	51	3	1	4	15.51.09.072	16	DSW00845	DSW01845		261	114	0	375	375			
DSW00073	DSFFOE1D	DFSFOE1D	37	4	1	6	15.51.09.319	20	DSW00073	DSW01073		1	166	0	167	167			
DSW00589	DSFFOE1J	DFSFOE1J	27	16	1	6	15.51.09.359	20	DSW00589	DSW01589		52	87	0	139	139			
DSW00921	DSFFSC6M	DFSFC6M	29	25	1	4	15.51.09.394	16	DSW00921	DSW01921		5	92	0	96	96			
DSW00449	DSFFOE2M	DFSFOE2M	61	25	1	4	15.51.09.365	15	DSW00449	DSW01449		7	80	0	86	86			
DSW00755	DSFFOE5J	DFSFOE5J	10	16	1	16	15.51.09.311	51	DSW00755	DSW01755		1	267	0	268	268			
DSW00601	DSFFHR20	DFSHR20	30	27	1	6	15.51.09.313	25	DSW00601	DSW01601		8	179	0	188	188			
DSW00750	DSFFIT2J	DFSIT2J	11	16	1	34	15.51.09.071	53	DSW00750	DSW01750		240	218	0	458	458			
DSW00354	DSFFHR2C	DFSHR2C	3	3	1	6	15.51.09.308	25	DSW00354	DSW01354		4	204	0	208	208			
DSW00199	DSFFHR2M	DFSHR2M	28	25	1	6	15.51.09.319	26	DSW00199	DSW01199		37	177	0	214	214			
DSW00300	DSFFOE1I	DFSFOE1I	25	15	1	6	15.51.09.335	22	DSW00300	DSW01300		96	139	0	235	235			
DSW00557	DSFFSC6F	DFSFC6F	39	6	1	4	15.51.09.393	16	DSW00557	DSW01557		148	103	0	251	251			
DSW00550	DSFFPS2H	DFSPPS2H	24	14	1	36	15.51.09.383	91	DSW00550	DSW01550		18	304	0	322	322			
DSW00794	DSFFPS2E	DFSPPS2E	22	5	1	36	15.51.09.460	83	DSW00794	DSW01794		111	254	0	365	365			
DSW00334	DSFFPS3M	DFSPPS3M	62	25	1	68	15.51.09.412	86	DSW00334	DSW01334		104	313	0	417	417			
DSW00594	DSFFHR2H	DFSHR2H	9	14	1	6	15.51.09.400	26	DSW00594	DSW01594		30	239	0	270	270			
DSW00857	DSFFHR2D	DFSHR2D	21	4	1	6	15.51.09.496	25	DSW00857	DSW01857		84	212	0	296	296			
DSW00730	DSFFOE4M	DFSFOE4M	13	25	1	9	15.51.09.305	47	DSW00730	DSW01730		52	371	0	423	423			
DSW00780	DSFFPS3D	DFSPPS3D	20	4	1	68	15.51.09.282	84	DSW00780	DSW01780		28	422	0	449	449			
DSW00540	DSFFPS2C	DFSPPS2C	17	3	1	36	15.51.09.070	88	DSW00540	DSW01540		255	357	0	612	612			
DSW00134	DSFFHR2C	DFSHR2C	52	3	1	6	15.51.09.457	23	DSW00134	DSW01134		59	224	0	283	283			
DSW00338	DSFFHR2P	DFSHR2P	49	28	1	6	15.51.09.478	26	DSW00338	DSW01338		31	227	0	258	258			
DSW00632	DSFFPS3C	DFSPPS3C	19	3	1	68	15.51.09.065	83	DSW00632	DSW01632		254	510	0	764	764			
DSW00217	DSFFIT2I	DFSIT2I	57	15	1	34	15.51.09.416	50	DSW00217	DSW01217		74	348	0	423	423			
DSW00581	DSFFPS2E	DFSPPS2E	4	5	1	36	15.51.09.443	80	DSW00581	DSW01581		4	408	0	413	413			
DSW00853	DSFFOE20	DFSFOE20	16	27	1	4	15.51.09.494	16	DSW00853	DSW01853		95	249	0	344	344			
DSW00073	DSFFOE2D	DFSFOE2D	3	4	1	4	15.51.09.530	13	DSW00073	DSW01073		124	173	0	297	297			
:																			

Figure 9. Transaction Transit Log (standard)

A description of the information contained in this report follows.

Source LTERM

The logical terminal at which the input transaction is entered.

Source Transact Code

The transaction code specified in the input transaction.

PSB

The PSB associated with the transaction.

Region

The region into which the transaction is scheduled.

Cls

The transaction class.

Pr

The transaction priority.

Approx No DB Calls

Approximate number of database calls, irrespective of type, made by this transaction. This number is derived from the 07 (application schedule end) IMS log record.

This field is reported as “-” when the count is not available. If the 07 log record is not read prior to IMS PA reporting the transaction, then some transaction statistics, including DB calls and CPU time, cannot be reported. This is usually caused by WFI processing when many transactions are executed by the one program schedule.

IMS PA normally reports a transaction when all log records for that transaction have been read, including the 07 log record. In this case, all transaction statistics are available. But sometimes the IMS PA internal queues become full because many transactions are waiting for their associated 07 log record to complete their statistics. In this case, IMS PA frees space in its internal queues by reporting the oldest transactions with incomplete statistics.

Input Transact Arrival

The time at which the transaction first arrives on the IMS message queue. This is marked by log record types 01 and 35.

Observe that the records are not listed in order of arrival time, but rather transaction completion time. It is recommended that you use Form-based reporting for a more complete understanding of when transactions start and end. For example, if analyzing a performance problem at a particular time of day, it is likely that processing start time is more useful than queue arrival time. For more information on Form-based reporting, see “Form-based Transaction Transit List reports” on page 85.

CPU Time (msec)

The program execution CPU time (as compared to the elapsed time).

The program execution CPU time is an *approximation* at completion level 5. Resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times.

At completion level 6, accurate resource usage metrics are obtained from the type 56FA transaction accounting record.

Userid

The userid associated with the message.

Output LTERM

The logical terminal to which each output message is sent.

Elapsed Time (msec)

The following elapsed times, in milliseconds, are recorded:

Input Queue

The elapsed time that the transaction input message is queued on the message queue (or shared queue) prior to it being processed in a dependent message processing region.

Progrm Exec

Processing time. The elapsed time that the transaction is processed in a dependent region, including syncpoint.

Output Queue

The elapsed time from when the transaction finishes processing to when the output message (response) is sent. A zero output queue time can indicate that the message was sent prior to the end of transaction processing:

- During syncpoint phase 2 processing, or
- Immediately after the message was issued by the application for a PCB with EXPRESS=YES or OTMA COMMIT MODE=1 (send-then-commit).

If the character E appears to the right of a value in this column, it indicates that the PCB associated with this message specified

EXPRESS=YES. Output can occur before the end of program execution and the reported Output Queue time can be negative.

Total Time

Total transaction elapsed time. The total elapsed time that the transaction incurs in message queues and being processed by IMS. Total time consists of input queue, processing and output queue times.

Transit Time

IMS transaction end-user response time. The elapsed time from when the input transaction is enqueued by IMS (01/35) to when the response is sent back to the originating LTERM (31 Communications).

Note:

1. Only transactions that respond back to their originating LTERM incur a transit (response) time.
2. The response back to the originating LTERM can be issued by another transaction as a result of a program switch.

Report content (shared queues)

This example shows a Transaction Transit Log applicable to shared queue log data.

For a description of the report applicable to log data without shared queues, see “Report content (standard)” on page 58.

IMS Performance Analyzer															
Transaction Transit Log															
Log 04Jun2018 16.10.15.93															
Report 17.24 08Jun2018 Page 1															
*****Elapsed Time (msec)*****															
Source	Transact	PSB	Org	Proc	Reg	Approx	Input	CPU	Userid	Input	Program	Queue	Exec	Queue	Queue
Source	Code		Id	Id		No	DB	Time		Queue	Queue	Queue	Queue	Queue	Queue
						Calls	Arrival	(msec)		Queue	Queue	Queue	Queue	Queue	Queue
TP0003AA	TIMIDB	PIMMIDBP	IM02	IM02	2	16	16.10.15.927	40	TIMP03	37	707	0	69	0	743
	TIMULUDU	PIMULUDP		IM02	2	3	16.10.16.671	16	TIMP03	1,410	4,551				5,961
TP0003AA	TIMMIDBM	PIMMIDBP	IM02	IM02	2	3	16.10.24.818	14	TIMP03	9	41	0	21	0	51
TP0004AA	TIMIDB	PIMMIDBP	IM02	IM03	27	16	16.10.22.393	48	TIMP04	73	3,997	0	44	0	4,070
	TIMULUDU	PIMULUDP		IM02	2	3	16.10.26.463	18	TIMP04	1	94				95
TP0005AA	TIMIDB	PIMMIDBP	IM02	IM02	2	7	16.10.29.419	25	TIMP05	10	95	0	18	0	105
	TIMULUDU	PIMULUDP		IM03	27	3	16.10.29.524	15	TIMP05	13	2,285				2,298
TP0004AA	TIMMIDBM	PIMMIDBP	IM02	IM02	2	1	16.10.34.486	13	TIMP04	12	94	0	54	0	106
TP0004AA	TIMMIDBM	PIMMIDBP	IM02	IM02	2	1	16.10.34.486	13	TIMP04	12	94	0	54	0	106
TP0003AA	TIMMIDBP	PIMMIDBP	IM02	IM02	21	8	16.10.33.019	53	TIMP03	77	1,512	0	25	0	1,589
	TIMULUDU	PIMULUDP		IM03	27	3	16.10.34.608	15	TIMP03	3	654				657
	TIMULUDU	PIMULUDP		IM02	2	3	16.10.34.608	18	TIMP03	7	144				151
TP0005AA	TIMMIDBM	PIMMIDBP	IM02	IM02	2	1	16.10.37.573	14	TIMP05	34	58	0	36	0	92
TP0006CA	TIMIDB	PIMMIDBP	IM03	IM03	27	7	16.10.36.650	30	TIMP06	7	2,262	0	20	0	2,270
	TIMULUDU	PIMULUDP		IM02	2	3	16.10.38.920	18	TIMP06	20	108				128
TP0007AA	TIMIDB	PIMMIDBP	IM02	IM02	2	7	16.10.43.411	24	TIMP07	9	111	0	36	0	120
	TIMULUDU	PIMULUDP		IM02	2	3	16.10.43.531	19	TIMP07	28	86				114
TP0004AA	TIMMIDBP	PIMMIDBP	IM02	IM02	21	10	16.10.42.614	58	TIMP04	26	251	0	15	0	276
	TIMULUDU	PIMULUDP		IM02	2	3	16.10.42.890	19	TIMP04	8	127				135
	TIMULUDU	PIMULUDP		IM03	27	3	16.10.42.890	18	TIMP04	26	760				786
TP0006CA	TIMMIDBM	PIMMIDBP	IM03	IM03	27	3	16.10.47.022	18	TIMP06	24	44	0	23	0	68
TP0003AA	TIMMIDBP	PIMMIDBP	IM02	IM03	25	7	16.10.42.639	53	TIMP03	92	871				963
	TIMLMBUP	PIMLUPDA		IM02	21	23	16.10.43.602	95	TIMP03	1,544	2,890	0	31	2	4,434
:															5,397

Figure 10. Transaction Transit Log (shared queues)

The content of this report is similar to the standard report described in “Report content (standard)” on page 58, except note the following:

Org Id

The IMS subsystem ID of the originating subsystem.

Proc Id

The IMS subsystem ID of the processing subsystem.

Output Queue

The portion of the transit time from when the program execution completes to the time the message is sent to the terminal. Output Queue time is calculated independently of the CQS and Local queue times. The Output Queue time is always blank for APPC/OTMA transactions. If the PCB associated with the message specified EXPRESS=YES, output can occur before the end of program execution and the reported Output Queue time can be negative.

Output CQS

The time from when the output message was put onto the shared message queue to the time it was read from the shared message queue by any IMS subsystem in the sysplex. The Output CQS time is always blank for APPC/OTMA transactions.

Output Local

The time from when the message was put (enqueued) onto the local IMS message queue (from the shared message queue, if CQS is active) to the time the message is sent to the terminal. The Output Local time is always blank for APPC/OTMA transactions.

Transaction Transit Graphic Summary report

The Transaction Transit Graphic Summary report consists of four graphs. The graphs can help you determine at a glance whether abnormal transit times exist and whether the input queue, processing, output queue, or program switching is a likely bottleneck.

Log records: This report is derived from IMS log records 01, 03, 06, 07, 08, 0A, 31, 32, 33, 34, 35, 38, 40, 72.

Report options

To request this report, activate the Transaction Transit **Graphic Summary** report in a Log Report Set. There are no report-specific options, however global transit report options apply.

On the Transaction Transit Options (MSGQ) panel, the following options are applicable:

- The percentile transit time
- The time interval along the vertical axis of the graphs
- Whether the time increments begin with the first value encountered, or are adjusted to align on the hour
- Transaction Code selection criteria

The report period is controlled by the Global (or Run-time) report interval.

The output data set is controlled by the Report Output DDname on the Log Global Options panel.

This example shows a Transaction Transit Graphic Summary report.

- Average (mean) transit time
- User-specified percentile transit time (*nnn*% where *nnn* is the value specified for **Peak Transaction Time Percentage** on the Transaction (MSGQ) Transit Options panel)
- Transaction response count
- Responses per second

I = in the input queue
P = processing
O = in the output queue
S = program switching

M = message processing



Transaction Transit Extract by Interval provides a facility to extract transaction transit time data to a file for subsequent processing by IMS PA to produce graphs, or to export for use by external programs or transfer to a PC.

Log records: This extract is derived from IMS log records 01, 03, 06, 07, 08, 31, 32, 33, 34, 35, 38, 40, 72.

Extract options

To specify the extract options, select the Transaction Transit **Extract by Interval** in the Log Report Set.

Select whether to accumulate data by time interval for individual transactions or for all transactions. Specify the output data set which is to store the extract data. Optionally, specify an input data set containing previous extracts which are to be merged with the current extract. You can specify Selection Criteria nominating particular transaction codes to include or exclude from the extract. This filtering applies after the Selection Criteria specified on the Transaction Transit Options (MSGQ) panel.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The output data set for the report which summarizes the extract processing is controlled by the Report Output DDname on the Log Global Options panel. The number of print lines per page is ignored as the size of the summary report is static.

All options on the Transaction Transit Options (MSGQ) panel are applicable except the percentile transit time which is calculated by later IMS PA processing. In particular, note that the following options are relevant:

- The size of the time intervals
- Whether the time increments begin with the first value encountered, or are adjusted to align on the hour

Extract by Interval file content

The data is stored in the extract file in a proprietary format. IMS PA provides facilities to filter and convert the extract data to an export file for use by external programs or to download to PC. Use option 8 **Graphing & Export** from the Primary Option Menu for this purpose.

Figure 13 on page 67 shows an example of the contents of the export file and Table 3 on page 67 describes the record format.

A report with a summary of the extract processing is produced at the end of processing. The **Start** date and time is that of the start of the first interval on the extract file. The **End** date and time is that of the start of the last interval on the extract file.

IMS Performance Analyzer
Extract by Time Interval

Extract Data Set: IMSPA.EXTRACT.DATA
Start : 27May2014 07:00:00
End : 27May2014 08:00:00
Record Count : 12873
Time Interval : 15 minutes
Time interval is aligned to even hour
Extract contains Trancode data
Extract contains Interval Totals

Figure 12. Transaction Transit Extract by Interval: Summary report

Graphing and export of interval data

The graphing and export facility operates on transit time interval data previously extracted from log files.

For selected Transaction (MSGQ) and Fast Path (EMH) transit time by interval data, IMS PA provides an online facility to:

- Graph the data
- Export the data for use by external programs
- Download the exported data to a PC

Refer to “Transaction Transit Extract by Interval” and “Fast Path Transit Extract by Interval” in the *IMS Performance Analyzer for z/OS: User’s Guide* for details of how to do the extracts.

To use the extract by interval Graphing & Export facility, select option 8 **Graphing & Export** from the IMS PA Primary Option Menu.

This facility is only applicable to processing *extract by interval* data. The extract data sets produced by other IMS PA reports can be processed directly by applications such as DB2, or downloaded to PC for manipulation and graphing using your familiar PC spreadsheet and charting tools.

Note: Extract by interval data is stored in proprietary format and is the same format for message queue transactions (Transaction Transit Extract by Interval) and Fast Path transactions (Fast Path Transit Extract by Interval). However, for Fast Path transactions, the following fields are not available. So when graphing or exporting extract by interval data, the Fast Path transactions will have these fields set to zero:

- Program switch time
- Output CQS time
- Output local queue time
- CPU time

Filtering and processing options can be applied to the extract by interval data set for graphing or export:

- The peak transaction time percentage is used to calculate for each time interval, or by transaction code within each interval, the transit time (in milliseconds) within which that percentage of transactions completes.
- A date-time range can be specified to narrow the time period of the data to be graphed or exported.

- The data can be presented either accumulated by time interval or by transaction code within time interval for a specified transaction code or all, provided it has been extracted at that level of detail.

Graphing interval data

This facility uses GDDM-PGF to display or print graphs of selected transaction transit time by time interval data from an Extract Data Set, and the filtering and processing options specified on the Extract Graphing & Export panel. The Extract Data Set contains data extracted during Log Report Set processing using the **Extract by Interval** report facility.

This facility is invoked from option **G** on the Extract Graphing & Export panel.

You can produce up to eight line graphs, and select which data items are to appear on each graph; you may also select one or more data items to appear on all graphs. The data item values are plotted on the y-axis against the time interval on the x-axis. If you select a "Count" item to appear on the same graph as one or more "Transit Time" items, the graph contains two y-axes, with Transit Time (msecs) on the left and Count on the right.

If multiple graphs are requested, they are presented one per page in ascending graph-number order in the following sequence:

1. First, if requested **By Interval**, all requested graphs with summary level data for all transactions are presented in turn.
2. Then, if requested **By Transaction Within Interval**, all requested graphs per transaction code are presented in descending order of transaction code.

If displaying the graphs, press **Enter** to page forward and view them sequentially. Press **Exit** (F3) or **Cancel** (F12) at any stage if you wish to prematurely terminate the display.

Exporting interval data

The facility makes selected transaction transit time by time interval data available to external programs or PC spreadsheet applications. It is invoked by selecting option **E** on the Extract Graphing & Export panel.

It creates an external format Export Data Set from a proprietary format Extract Data Set using filtering and processing options specified on the Extract Graphing & Export panel. The Extract Data Set was originally created during Log Report Set processing using the **Extract by Interval** report facility.

Optionally, the Export file can be transferred to a PC workstation file. The data can then provide input to your PC applications in the usual way to produce graphs or other analyses.

Exported interval data file content:

This is an example of the contents of the Transit Extract by Interval export file

Type,Date,Time,Trancode,Count,Min,Avg	Input,Avg	Switch,Avg	Pgm	Exec,Avg	Output,Avg	Out	CQS,Avg	Out	Loc,Avg	Total,90%	Input ,...	
2,2018/05/27,07:51:00,*TOTAL*	3384,	22,	5,	0,	168,	0,	0,	0,	174,	32,	0,	261,...
2,2018/05/27,07:51:00,DSFFDE1A,	8,	94,	2,	0,	134,	0,	0,	0,	137,	4,	0,	166,...
2,2018/05/27,07:51:00,DSFFDE1B,	10,	134,	5,	0,	154,	0,	0,	0,	159,	15,	0,	176,...
2,2018/05/27,07:51:00,DSFFDE1C,	7,	125,	2,	0,	142,	0,	0,	0,	145,	3,	0,	160,...
2,2018/05/27,07:51:00,DSFFDE1D,	9,	105,	2,	0,	144,	0,	0,	0,	147,	4,	0,	175,...
2,2018/05/27,07:51:00,DSFFDE1E,	7,	122,	4,	0,	146,	0,	0,	0,	150,	9,	0,	172,...
2,2018/05/27,07:51:00,DSFFDE1F,	4,	149,	90,	0,	197,	0,	0,	0,	288,	312,	0,	277,...
2,2018/05/27,07:51:00,DSFFDE1G,	8,	128,	2,	0,	160,	0,	0,	0,	162,	3,	0,	197,...
2,2018/05/27,07:51:00,DSFFDE1H,	12,	93,	3,	0,	132,	0,	0,	0,	135,	4,	0,	162,...
2,2018/05/27,07:51:00,DSFFDE1I,	7,	112,	3,	0,	144,	0,	0,	0,	147,	7,	0,	170,...
2,2018/05/27,07:51:00,DSFFDE1J,	9,	115,	3,	0,	147,	0,	0,	0,	150,	4,	0,	185,...
2,2018/05/27,07:51:00,DSFFDE1K,	4,	115,	3,	0,	146,	0,	0,	0,	149,	4,	0,	189,...
2,2018/05/27,07:51:00,DSFFDE1L,	13,	130,	3,	0,	161,	0,	0,	0,	164,	5,	0,	203,...
:												
2,2018/05/27,07:51:00,DSFFSC6M,	18,	48,	7,	0,	78,	0,	0,	0,	85,	26,	0,	107,...
2,2018/05/27,07:51:00,DSFFSC6N,	20,	48,	14,	0,	71,	0,	0,	0,	86,	82,	0,	100,...
2,2018/05/27,07:51:00,DSFFSC6O,	17,	50,	6,	0,	71,	0,	0,	0,	77,	25,	0,	99,...
2,2018/05/27,07:51:00,DSFFSC6P,	14,	49,	3,	0,	73,	0,	0,	0,	76,	4,	0,	89,...
2,2018/05/27,07:52:00,*TOTAL*	3878,	23,	2,	0,	163,	0,	0,	0,	166,	6,	0,	254,...
2,2018/05/27,07:52:00,DSFFDE1A,	13,	92,	2,	0,	130,	0,	0,	0,	133,	4,	0,	156,...
2,2018/05/27,07:52:00,DSFFDE1B,	8,	132,	2,	0,	141,	0,	0,	0,	143,	3,	0,	150,...
2,2018/05/27,07:52:00,DSFFDE1C,	7,	111,	1,	0,	137,	0,	0,	0,	139,	3,	0,	160,...
2,2018/05/27,07:52:00,DSFFDE1D,	9,	105,	3,	0,	133,	0,	0,	0,	137,	4,	0,	153,...
2,2018/05/27,07:52:00,DSFFDE1E,	7,	128,	3,	0,	148,	0,	0,	0,	152,	4,	0,	164,...
2,2018/05/27,07:52:00,DSFFDE1F,	14,	123,	3,	0,	144,	0,	0,	0,	147,	4,	0,	169,...
:												

Figure 13. Export file contents: Transit Extract by Interval

The field headings are optionally included as the first record in the export file. The headings are comma separated, in the same sequence but of different length to the data fields.

Each subsequent row represents a record of type 2 containing accumulated data for the given transaction code for the given time interval. The time shown is the start time of the interval and is included in the interval. If there is no transaction code shown, the row represents totals for the interval. The transaction data appears in alphabetical order by transaction code with *TOTAL* (the total for the interval) appearing first.

The data fields are fixed length, comma separated values. Character fields are left-justified and blank-filled to the right. Numeric fields are right-justified and blank-filled to the left.

The record format of the export file is shown in the following table.

Table 3. Export file record layout: Transit Extract by Interval

Field description	Column heading	Field length (bytes)
Record Type (= 2)	Type	1
Date (User-defined format)	Date	10
Sort yyyy/mm/dd		
U.S. mm/dd/yyyy		
European dd/mm/yyyy		
Julian yyyyddd		
Batch ddMMMyyyy where MMM = Jan, Feb,...		
Time (hh:mm:ss)	Time	8
Transaction Code or *TOTAL*	Trancode	8

Table 3. Export file record layout: Transit Extract by Interval (continued)

Field description	Column heading	Field length (bytes)
Transaction count	Count	10
Minimum Transit time (msec)	Min	8
Input Queue time (msec)	Avg Input	6
Program Switch time (msec)	Avg Switch	6
Program Execution time (msec)	Avg Pgm Exec	6
Output Queue time (msec)	Avg Output	6
Output CQS time (msec)	Avg Out CQS	6
Output Local Queue time (msec)	Avg Out Loc	6
Total Transit time (msec)	Avg Total	6
Input Queue time User-defined percentage (msec)	nnn% Input	6
Program Switch time User-defined percentage (msec)	nnn% Switch	6
Program Execution time User-defined percentage (msec)	nnn% Pgm Exec	6
Output Queue time User-defined percentage (msec)	nnn% Output	6
Output CQS time User-defined percentage (msec)	nnn% Out CQS	6
Output Local Queue time User-defined percentage (msec)	nnn% Out Loc	6
Total Transit time User-defined percentage (msec)	nnn% Total	6
Maximum Transit time (msec)	Max	8
CPU Time (msec)	CPU	8

The export file makes selected transaction transit time by time interval data available to external programs or PC spreadsheet applications.

Exported interval data report:

This panel provides a summary report of your requested export processing when executing in foreground. If executing in batch mode, a similar report is produced and is written to SYSPRINT. You can use the report to indicate whether the results of the export are as expected, prior to proceeding with further processing of the export data.

For example, if the number of records written to the Export Data Set is unreasonably large, you may choose to return to previous panels to change the filters and processing options to reduce the amount of data selected for export. The number of export records written does not include the record containing the headings.

Extract Start and **Extract End** show the period of the data in the Extract file. **Export Start** and **Export End** show the period of the data in the Export file specified using the **From** and **To** date and time option on the Extract Export panel. Compare these periods to verify that you are exporting the required portion of the extract data.

```
Extract Export Report
Command ==> _____
Extract DSN:  IMSPA.EXTRACT.DATA
Extract Start: 2018/05/27 07:51:00
Extract End:   2018/05/27 07:56:00
Extract Records read: 1250

Export DSN:    IMSPA.EXPORT.DATA
Export Start:  2018/05/27 07:51:00
Export End:    2018/05/27 07:53:00
Export Records written: 26

IPI0139I Export request completed successfully, RC=0
```

Figure 14. Extract Export report

Note: If you requested transfer to a Workstation File, this panel does *not* indicate its success; check for the message Transfer successful on return to the Extract Export panel.

Graphing the exported interval data:

The Export data can be processed by external programs such as DB2, or transferred to a Workstation file and graphed using your familiar PC Tools.

You can produce graphs like the example shown in Figure 15 on page 70. This is an example of a line graph of transit time (Msecs) by time of day showing the averages for Input, Output, Total, and Program Execution time. It is useful for determining and comparing performance trends.

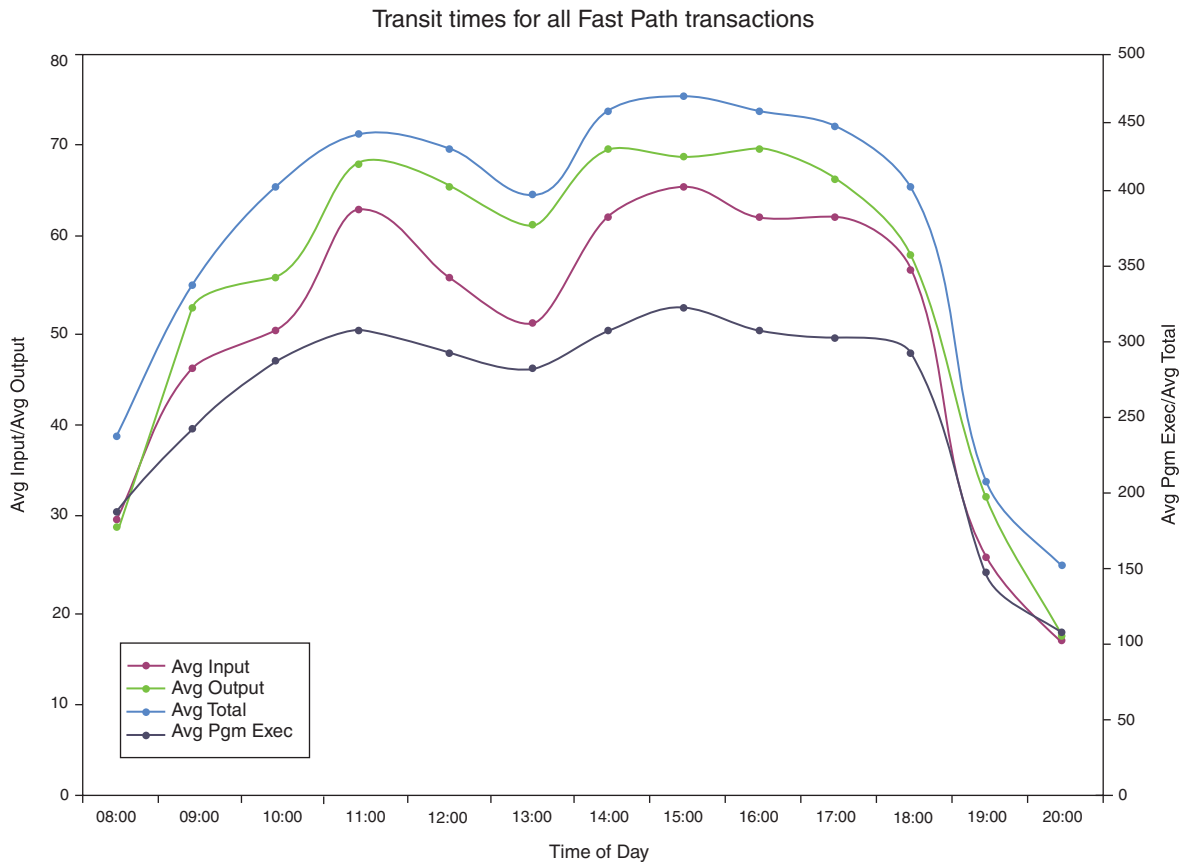


Figure 15. Using PC tools to graph Transit Extract by Interval Export data

Transaction Exception report and extract

The Transaction Exception report shows transaction performance information that affects response time. The report can be ordered by Transaction Code, User ID, Message Class, or Time of Input. The User ID, Message Class, and Time of Input reports optionally show a breakdown by transaction code.

Log records: The report is derived from the IMS log records 01, 03, 06, 07, 08, 31, 32, 33, 34, 35, 38, 40, 72.

Each of the Transaction Exception reports is designed to give a system analyst insight into a different facet of response tuning:

- The Transaction Code and Message Class reports show areas in application design and scheduling that may require attention.
- The User ID report shows whether the distribution of service among system users is adequate.
- The Time of Input report highlights performance problems caused by momentary surges of transaction input.

Optionally, two extract files may be produced, one containing detail records of all transaction activity, and one containing only exception transactions as determined by the values specified in an Expectation Set.

The Transaction Exception Recap report is always produced at the end to give a summary of the processing of the selected reports and requested extracts.

The content of the Transaction Exception report differs from the Transaction Transit Analysis report in the following ways:

- The Analysis report only reports transactions that are directly involved in end-to-end response. Therefore, only transactions and their program switches that respond back to the originating LTERM are reported.

The Transaction Exception report shows all transaction activity.

- The Analysis report tracks the life of the transaction, from the time of the input message, across program switches, to the time of the output message. Program to program message switches are attributed to the program under the originating transaction and reported as Switch Queue time.

The Transaction Exception report treats each transaction individually. Input messages are reported under Input Queue time and output messages under Output Queue time for the transaction, regardless of the source.

- The Transaction Exception report includes DB and DC call statistics, and optionally shared queue time.
- The Transaction Exception report can optionally produce two extract files, Total Traffic showing details of all transactions, and Exception Traffic showing details of transactions that exceed performance thresholds.

Report options

To specify the report options, select the Transaction **Transit Exception** report in a Log Report Set.

Several reporting sequences are available for this report. It can be ordered by:

- Transaction Code
- User ID
- Message Class
- Time of input message

The User ID, Message Class, and Time of Input reports can be further broken down by Transaction Code.

The reports can be requested in either of two formats. Extended format FORMAT2 gives a consistent breakdown of transactions (Exceptions + OK = Total) for all reports: Transaction Code, User ID, Class, and Time. Original format FORMAT1 omits OK transactions (non-exceptions) from the User ID, Class, and Time reports.

In the Log Global Options panel, you can specify the name of a Transaction Substitution Exit to change the Transaction Code name that is reported. Where Transaction Code and Program (PSB) Name are reported together as the report ordering sequence, then IMS PA changes the Program name to *USERXIT. This ensures that transactions with substituted names are grouped and reported in a single report line.

Shared queue users can optionally select to report shared queue times.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output is written to the data set specified by the Report Output DDname.

MSC, BMP, APPC, and OTMA transactions can be included for reporting by selecting the desired options in the Transaction Transit Options (MSGQ) panel.

Transaction exceptions are determined by the specification of an Expectation Set. If the Expectation Set is not specified, then all transactions are treated as exceptions. A transaction is defined as an exception if it is outside the range defined in the Expectation Set for any of the following criteria:

- Input queue time
- Processing time
- Output queue time
- Total transit time
- DB DL/I calls
- DC DL/I calls
- DB waits
- CPU time

Specify the Total Traffic data set to create a Total Traffic extract. All transactions have a detail record written to the Total Traffic data set.

Specify the Exception Traffic data set to create an Exception Traffic extract. Only exception transactions have an exception record written to the Exception Traffic data set.

Selection Criteria can be specified to filter on Transaction Code, User ID and Class. These are applied after the Transaction Code filter specified in the Selection Criteria on the Transaction Transit Options (MSGQ) panel.

Extract file content

The following figure shows an example of the contents of the extract file.

Trancode,Program	,T,Q,InLTERM	,OutLTERM,Nodename,Userid	,Org ,Proc,PST,Cls,Pri,	InQTime,	ProcTime,	OutQTime,	TotalTime,...
CEXTCONV,CEXTPGM	,M,G,IPI2	,IPI2 ,VAPIPI2B,IPI2	,ICDE,ICDE, , 5, 8,	176818,	732474,	0,	909292,...
CEXTCONV,CEXTPGM	,M,G,IPI2	,IPI2 ,VAPIPI2B,IPI2	,ICDE,ICDE, , 5, 8,	4494,	36948,	0,	41442,...
CEXTCONV,CEXTPGM	,M,G,IPI2	,IPI2 ,VAPIPI2B,IPI2	,ICDE,ICDE, , 5, 8,	2801,	30135,	0,	32936,...
CEXTCONV,CEXTPGM	,M,G,IPI2	,IPI2 ,VAPIPI2B,IPI2	,ICDE,ICDE, , 5, 8,	3973,	31713,	0,	35686,...
CEXTCONV,CEXTPGM	,M,G,IPI2	, , ,VAPIPI2B,IPI2	,ICDE,ICDE, , 5, 8,	33345,	15171,	,	48516,...
CEXSConv,CEXSPGM	,M,G,IPI2	,IPI2 ,VAPIPI2B,IPI2	,ICDE,ICDE, , 15, 8,	14814,	35879,	0,	50693,...
CEXSConv,CEXSPGM	,M,G,IPI2	, , ,VAPIPI2B,IPI2	,ICDE,ICDE, , 15, 8,	3329,	10763,	,	14092,...
CEXTCONV,CEXTPGM	,M,G,IPI2	,IPI2 ,VAPIPI2B,IPI2	,ICDE,ICDE, , 5, 8,	12461,	30567,	0,	43028,...
CEXTCONV,CEXTPGM	,M,G,IPI2	, , ,VAPIPI2B,IPI2	,ICDE,ICDE, , 5, 8,	3692,	8591,	,	12283,...
CEXSConv,CEXSPGM	,M,G,IPI2	,IPI2 ,VAPIPI2B,IPI2	,ICDE,ICDE, , 15, 8,	13707,	30607,	697,	45011,...
CEXSConv,CEXSPGM	,M,G,IPI2	, , ,VAPIPI2B,IPI2	,ICDE,ICDE, , 15, 8,	4353,	8708,	,	13061,...
CEXTCONV,CEXTPGM	,M,G,IPI2	,IPI2 ,VAPIPI2B,IPI2	,ICDE,ICDE, , 5, 8,	14170,	36518,	0,	50688,...
CEXTCONV,CEXTPGM	,M,G,IPI2	,IPI2 ,VAPIPI2B,IPI2	,ICDE,ICDE, , 5, 8,	7271,	29610,	0,	36881,...
CEXTCONV,CEXTPGM	,M,G,IPI2	, , ,VAPIPI2B,IPI2	,ICDE,ICDE, , 5, 8,	6731,	388466,	,	395197,...
CEXSConv,CEXSPGM	,M,G,IPI2	,IPI2 ,VAPIPI2B,IPI2	,ICDE,ICDE, 3, 15, 8,	5131,	34726,	0,	39857,...
CEXSConv,CEXSPGM	,M,G,IPI2	,IPI2 ,VAPIPI2B,IPI2	,ICDE,ICDE, 3, 15, 8,	2111,	25191,	2724,	30026,...
CEXSConv,CEXSPGM	,M,G,IPI2	,IPI2 ,VAPIPI2B,IPI2	,ICDE,ICDE, 3, 15, 8,	4177,	24439,	560,	29176,...
CEXSConv,CEXSPGM	,M,G,IPI2	, , ,VAPIPI2B,IPI2	,ICDE,ICDE, 3, 15, 8,	3185,	10479,	,	13664,...
CEXTCONV,CEXTPGM	,M,G,IPI2	,IPI2 ,VAPIPI2B,IPI2	,ICDE,ICDE, 3, 5, 8,	14845,	36678,	598,	52121,...
CEXTCONV,CEXTPGM	,M,G,IPI2	, , ,VAPIPI2B,IPI2	,ICDE,ICDE, 3, 5, 8,	3565,	9675,	,	13240,...
CEXSConv,CEXSPGM	,M,G,IPI2	,IPI2 ,VAPIPI2B,IPI2	,ICDE,ICDE, 3, 15, 8,	23644,	56053,	0,	79697,...
CEXSConv,CEXSPGM	,M,G,IPI2	, , ,VAPIPI2B,IPI2	,ICDE,ICDE, 3, 15, 8,	4246,	9119,	,	13365,...
CEXTCONV,CEXTPGM	,M,G,IPI2	,IPI2 ,VAPIPI2B,IPI2	,ICDE,ICDE, 3, 5, 8,	17149,	45275,	0,	62424,...
CEXTCONV,CEXTPGM	,M,G,IPI2	,IPI2 ,VAPIPI2B,IPI2	,ICDE,ICDE, 3, 5, 8,	3340,	31680,	1626,	36646,...
CEXTCONV,CEXTPGM	,M,G,IPI2	,IPI2 ,VAPIPI2B,IPI2	,ICDE,ICDE, 3, 5, 8,	2533,	28515,	2640,	33688,...
CEXTNONC,CEXTPGM	,M,G,IPI2	,IPI2 ,VAPIPI2B,IPI2	,ICDE,ICDE, 3, 5, 8,	17458,	237057,	0,	254515,...
CEXTNONC,CEXTPGM	,M,G,IPI2	,IPI2 ,VAPIPI2B,IPI2	,ICDE,ICDE, 3, 5, 8,	4182,	30903,	0,	35085,...
:							

Figure 16. Extract file content: Transaction (MSGQ) Transit Traffic

The record formats are the same for both the Total Traffic and Exception Traffic extract data sets. The record layout is defined by the assembler macro IPITRDR in the SIPIMAC library.

Each record is 268 bytes long, and this is the default length if not specified. However, you can define your extract file with a smaller record length. For example, set the record length to 164 if shared queue elapsed times and the queue time stamps are not required.

The Traffic extract data sets can be used as input to other reporting and statistical analysis tools. Specify a delimiter character in the Log Global Options to ensure that the extract is suitable for use by these tools.

The field headings are optionally included as the first record in the extract file depending on the extract options set in Log Global Options. The headings line up with the column data fields that they describe. The data fields are fixed length, and can be separated by a blank or comma depending on the delimiter character set in Log Global Options.

The extract contains similar information to the Transaction Transit Log report, but includes additional information and is in a format suitable for import into DB2 or a PC reporting tool.

Each data row represents a single transaction, and details its execution statistics.

The following table shows the record format of the extract file.

Table 4. Extract file record layout: Transaction (MSGQ) Transit Traffic

Field description	Column heading	Field length (bytes)
Transaction Code or PSB Name	Trancode	8
PSB Name	Program	8
Transaction type	T	1
Queue type	Q	1
Input LTERM	InLTERM	8
Output LTERM	OutLTERM	8
Input VTAM Node name	Nodename	8
User ID	Userid	8
Originating IMS ID	Org	4
Processing IMS ID	Proc	4
Region PST ID	PST	3
Message Class	Cls	3
Priority	Pri	3
Input Queue Elapsed time (<i>microseconds</i>)	InQTime	11
Processing Elapsed time (<i>microseconds</i>)	ProcTime	11
Output Queue Elapsed time (<i>microseconds</i>)	OutQTime	11
Total Elapsed time (<i>microseconds</i>)	TotalTime	11
CPU time (<i>microseconds</i>)	CPU	11
DB calls	DBCall	7

Table 4. Extract file record layout: Transaction (MSGQ) Transit Traffic (continued)

Field description	Column heading	Field length (bytes)
DC calls	DCCall	7
DB waits	DBWait	7
Shared Queue Input time (<i>microseconds</i>)	ShrInQTime	11
Shared Queue Output time (<i>microseconds</i>)	ShrOutQTime	11
Input Message Arrival date (YYYY-MM-DD)	InQDate	10
Input Message Arrival time (HH.MM.SS.THMIJU)	InQTOD	15
Processing Start time	ProcStartTOD	15
Processing End time	ProcEndTOD	15
Output Sent time	OutSentTOD	15
Region PST ID	PST	4

Report content (FORMAT1)

These examples show the original format Transaction Exception reports applicable to both local and shared queue transaction processing.

Several reporting options are available, ordered by Transaction Code, User ID, Message Class, or Time of Input.

IMS Performance Analyzer																			
Transaction Exception by Trancode										Transaction Exception by Userid									
From 30Nov2011 13:45:38:59					To 30Nov2011 14:21:57:58					From 30Nov2011 13:45:38:59					To 30Nov2011 14:21:57:58				
Min					Max					Min					Max				
-- Average					-- 90%					-- Average					-- 90%				
Transit Time					Peak Transit Time					Transit Time					Peak Transit Time				
Trancode	PSB	Transact Count	Tran Time	Input Queue	Pgm Exec	Output Queue	Total	Input Queue	Exec	Output Queue	Total	Tran Time	DB	DC	DB	Approximate	CPU	Tran/Min	
ADDINV	*OK*	5	22	6	34	0	40	8	76	0	82	98	1	2	0	6	0	0	
ADDPART	*OK*	4	19	7	20	0	27	8	25	1	34	31	2	2	0	6	0	0	
CEXSCONV	*OK*	10	11	8	55	0	64	18	191	0	198	359	3	4	0	5	0	0	
CEXSNONC	*OK*	5	11	9	31	0	40	14	61	0	73	77	3	3	0	4	0	0	
CEXTCONV	CEXTPGM	3	129	125	156	1	281	386	327	4	462	408	5	4	0	17	0	0	
	OK	12	8	7	24	0	31	13	41	1	50	58	4	4	0	5	0	0	
CEXTCONV	*Total*	15	8	31	50	0	81	148	147	2	232	408	4	4	0	7	0	0	
CEXTNCONC	CEXTPGM	3	139	41	372	0	413	117	740	0	854	800	4	2	0	21	0	0	
	OK	7	13	8	29	0	38	15	48	0	60	55	4	2	0	4	0	0	
CEXTNCONC	*Total*	10	13	18	132	0	150	60	406	0	463	800	4	2	0	9	0	0	
* . . *																			
** Grand Total **		153	7	12	65	1	77	53	222	4	247	800	2	4	0	6	4		
Transaction Exception by Class																			
From 30Nov2011 13:45:38:59					To 30Nov2011 14:21:57:58					From 30Nov2011 13:45:38:59					To 30Nov2011 14:21:57:58				
Min					Max					Min					Max				
-- Average					-- 90%					-- Average					-- 90%				
Transit Time					Peak Transit Time					Transit Time					Peak Transit Time				
Class	Trancode	Transact Count	Tran Time	Input Queue	Pgm Exec	Output Queue	Total	Input Queue	Exec	Output Queue	Total	Tran Time	DB	DC	DB	Approximate	CPU	Tran/Min	
1	DSPALLI	1	323	6	317	0	323	6	317	0	323	323	6	9	0	8	0	0	
	DSPINV	1	354	5	349	0	354	5	349	0	354	354	4	10	0	7	0	0	
	IVTCX	4	269	10	304	0	314	19	358	0	360	357	1	4	0	12	0	0	
	Except	6	269	9	314	0	322	6	317	0	323	357	3	6	0	10	0	0	
	OK	55	19	7	24	1	32	15	39	3	50	98	2	4	0	7	2	0	
1	*Total*	61	19	8	52	1	60	6	317	0	323	357	2	4	0	7	2	0	
* . . *																			
5	CEXTCONV	3	129	125	156	1	281	386	327	4	462	408	5	4	0	17	0	0	
	CEXTNCONC	3	139	41	372	0	413	117	740	0	854	800	4	2	0	21	0	0	
	Except	6	129	83	264	1	347	386	327	4	462	800	5	3	0	19	0	0	
	OK	19	8	8	26	0	34	14	43	1	54	58	4	4	0	4	1	0	
5	*Total*	25	8	26	83	0	109	386	327	4	462	800	4	3	0	8	1	0	
6	MQATREQ1	4	359	7	458	1	466	10	615	2	622	638	2	2	0	31	0	0	
15	*OK*	15	11	9	47	0	56	17	158	0	166	359	3	4	0	5	0	0	
** Grand Total **		153	7	12	65	1	77	53	222	4	247	800	2	4	0	6	4		
Transaction Exception by Time																			
From 30Nov2011 13:45:38:59					To 30Nov2011 14:21:57:58					From 30Nov2011 13:45:38:59					To 30Nov2011 14:21:57:58				
Min					Max					Min					Max				
-- Average					-- 90%					-- Average					-- 90%				
Transit Time					Peak Transit Time					Transit Time					Peak Transit Time				
Time	Trancode	Transact Count	Tran Time	Input Queue	Pgm Exec	Output Queue	Total	Input Queue	Exec	Output Queue	Total	Tran Time	DB	DC	DB	Approximate	CPU	Tran/Min	
13:00:00	CEXTCONV	3	129	125	156	1	281	386	327	4	462	408	5	4	0	17	0	0	
	CEXTNCONC	3	139	41	372	0	413	117	740	0	854	800	4	2	0	21	0	0	
	IVTCX	4	269	10	304	0	314	19	358	0	360	357	1	4	0	12	0	0	
	IVTNO	2	34	69	223	0	292	142	618	0	760	550	1	3	0	1	0	0	
	Except	12	34	56	270	0	327	386	327	4	462	800	3	3	0	13	0	0	
	OK	78	8	9	33	0	42	24	109	4	128	475	2	4	0	5	2	0	
13:00:00	*Total*	90	8	15	65	0	80	386	327	4	462	800	2	4	0	6	2	0	
14:00:00	DSPALLI	1	323	6	317	0	323	6	317	0	323	323	6	9	0	8	0	0	
	DSPINV	1	354	5	349	0	354	5	349	0	354	354	4	10	0	7	0	0	
	IVTNO	1	408	3	405	0	408	3	405	0	408	408	1	2	0	2	0	0	
	IVTNV	1	148	4	144	0	148	4	144	0	148	148	1	2	0	1	0	0	
	MQATREQ1	4	359	7	458	1	466	10	615	2	622	638	2	2	0	31	0	0	
	Except	8	148	6	381	0	387	6	317	0	323	638	2	4	0	18	0	0	
	OK	55	7	7	19	1	27	14	37	4	48	98	2	4	0	4	2	0	
14:00:00	*Total*	63	7	7	65	1	72	14	232	3	239	638	2	4	0	6	2	0	
** Grand Total **		153	7	12	65	1	77	53	222	4	247	800	2	4	0	6	4		

Figure 17. Transaction Exception report FORMAT1: Breakdown by Transaction Code

Report lines: Transaction Exception by Trancode

The Transaction Exception by Trancode report has the following rows:

- Min**- Minimum threshold values specified in the Expectation Set. Only appears if Print Expectations (PRINTEXP) is specified and there are values.
- Max**- Maximum threshold values specified in the Expectation Set. Only appears if Print Expectations (PRINTEXP) is specified and there are values.

Trancode/PSB

Exception statistics for each transaction code that ran in the time interval, reporting only those transactions that exceeded one or more thresholds in the Expectation Set.

- ***OK*** OK statistics for transactions that did not exceed any thresholds in the Expectation Set. When the exception count is zero, this is the only line printed.

Total

Total activity for the Trancode/PSB combination (Exceptions + OK).

**** Grand Total ****

All transaction activity in the report period.

Report lines: Transaction Exception by Userid, Class, or Time

The Transaction Exception by Userid, Class, or Time reports have the following rows:

- Min**- Minimum threshold values specified in the Expectation Set. Only appears if Print Expectations (PRINTEXP) is specified and there are values.
- Max**- Maximum threshold values specified in the Expectation Set. Only appears if Print Expectations (PRINTEXP) is specified and there are values.

Trancode

Exception statistics for each transaction code that ran in the time interval, reporting only those transactions that exceeded one or more thresholds in the Expectation Set.

Except

Roll-up of exception statistics for all transactions in the interval that exceeded one or more thresholds in the Expectation Set.

- ***OK*** Roll-up of OK statistics for all transactions in the time interval that did not exceed any thresholds in the Expectation Set.

Total

Total statistics for all transactions in the time interval (Exceptions + OK).

**** Grand Total ****

All transaction activity in the report period.

Report columns

The first two columns in the report are ordering columns according to your selection. For example:

- If you select Transaction Code as the ordering operand, the first two column headers are **Trancode** and **PSB**.
- If you select User ID as the ordering operand, the first two column headers are **Userid** and **Trancode**.
- If you select Class as the ordering operand, the first two column headers are **Class** and **Trancode**.
- If you select Time Interval, the first two column headers are **Time** and **Trancode**.

For each of User ID, Class, and Time of Input, multiple report lines are written for every transaction code processed. A ***Total*** report line signifies the accumulated totals at the end of each User ID, Class, or Time of Input. Optionally, only this total report line may be produced to provide a summary of transaction activity by User ID, Class, or Time of Input.

The second report column can also be one of the following:

Total

Accumulated totals of all transaction codes within each User ID, Class or Time of Input.

OK

Total of all transactions that performed within the thresholds of the Expectation Set.

Except

Total of all transactions that exceeded at least one criteria in the Expectation Set.

MSC

MSC transaction processed remotely.

The report heading contains the reporting period. **From** specifies the date and time of the first transaction to be processed, and **To** specifies the date and time of the last transaction to be processed. **Elapsed** is the reporting period elapsed time, the time between the first and last transactions that were processed.

The following fields appear in the report after the two ordering fields:

Transact Count

Number of transactions completed during the time period being examined.

Min Tran Time

The shortest total transit time, in milliseconds, for a single transaction.

Average Transit Time

The average (mean) transit time, in milliseconds, required to process each transaction. These transit times are broken down into their component parts:

Input Queue

Input queue time

Pgm Exec

Program execution time

Output Queue

Output queue time

Total

Total time

nnn% Peak Transit Time

A statistical estimate, based on a normal distribution, that *nnn%* (between 50% and 100% as specified in the Transaction (MSGQ) Transit Options) of all transactions had transit times less than the time shown. This estimate shows that *nnn%* of transactions completed within the total transit time shown. Times are in milliseconds. The estimated transit times are broken down into their component parts:

Input Queue

Input queue time

Pgm Exec

Program execution time

Output Queue

Output queue time

Total

Total time

The total time is a statistical estimate itself, rather than the sum of the component estimates.

The peak values are a statistical estimate only, so care should be taken when interpreting the values if the transaction volume is low.

Max Tran Time

The longest total transit time, in milliseconds, for a single transaction.

Average Approximate

The averages for the DB, DC, and CPU statistics are approximations derived from the IMS type 07 log record. The totals from the 07 record are distributed among the transactions within a scheduling in proportion to the elapsed time of each transaction.

DB Calls

The average number of database calls, irrespective of type, made by this transaction.

DC Calls

The average number of data communication calls made by this transaction.

DB Waits

The average number of database waits (wait for PI enqueue) made by this transaction.

CPU The average CPU time in milliseconds used by this transaction.

Tran/Min

The transaction processing rate, calculated as the average number of transactions processed per minute during the report interval.

Recap report

A Recap report is produced at the end of processing to give transaction totals and data set names.

```

                                IMS Performance Analyzer
                                Transaction Exception Recap
From 30Nov2011 13:45:38:59   To 30Nov2011 14:21:57:58   Elapsed=   0 Hrs  36 Mins  18.997.047 Secs   Page   5

Total number of transactions examined (Total Traffic) . . . . . 153
Number of exception transactions (Exception Traffic) . . . . .  20

Expectation Set used in the analysis . . . EXPECT01 in Library IPI000.QAAUTO.TESTCASE.IPIEXPQ

Total Traffic Data Set . . . . . N/A
Exception Traffic Data Set . . . N/A
```

Figure 18. Transaction Exception report: Recap

Shared Queues

The following fields are only shown when the shared queue report is requested. In this case, Min Tran Time, Max Tran Time, DC Calls, DB Waits, and Tran/Min fields are excluded from the report.

Global Count

Number of transactions that were processed globally on the shared queue during the time period being examined.

Average Shared EMHQ Time

The average (mean) elapsed time, in milliseconds, that the transaction's Input and Output message spent on the shared queue.

***nnn%* Peak Shared EMHQ Time**

A statistical estimate, based on a normal distribution, that *nnn%* (between 50% and 100% as specified by you) of all transactions had shared queue Input and Output queue times less than the time shown. Times are in milliseconds.

The peak values are a statistical estimate only, so care should be taken when interpreting the values if the transaction volume is low.

Note: The User ID, Message Class, and Time of Input reports can also be produced when shared queue details are requested.

Report content (FORMAT2)

These examples show the extended format Transaction Exception reports applicable to both local and shared queue transaction processing.

Several reporting options are available, ordered by Transaction Code, User ID, Message Class, or Time of Input.

IMS Performance Analyzer																		
Transaction Exception by Trancode																		
From 30Nov2011 13:45:38:59			To 30Nov2011 14:21:57:58			Elapsed=		0 Hrs	36 Mins	18.997.047	Secs	Page	1					
		Transact	Min	-- Average	Transit Time	---		-- 90%	Peak	Transit Time	--	Max	-- Average	Approximate	--			
Trancode	PSB	Count	Tran Time	Input Queue	Pgm Exec	Output Queue	Total	Input Queue	Pgm Exec	Output Queue	Total	Tran Time	DB Calls	DC Calls	DB Waits	CPU	Tran/Min	
ADDINV	DFSSAM04	5	22	6	34	0	40	8	76	0	82	98	1	2	0	6	0	
ADDPART	DFSSAM04	4	19	7	20	0	27	8	25	1	34	31	2	2	0	6	0	
CEXS CONV	CEXSPGM	10	11	8	55	0	64	18	191	0	198	359	3	4	0	5	0	
CEXS NONC	CEXSPGM	5	11	9	31	0	40	14	61	0	73	77	3	3	0	4	0	
CEXT CONV	CEXTPGM	15	8	31	50	0	81	148	147	2	232	408	4	4	0	7	0	
	Except	3	129	125	156	1	281	386	327	4	462	408	5	4	0	17	0	
	OK	12	8	7	24	0	31	13	41	1	50	58	4	4	0	5	0	
CEXT NONC	CEXTPGM	10	13	18	132	0	150	60	406	0	463	800	4	2	0	9	0	
	Except	3	139	41	372	0	413	117	740	0	854	800	4	2	0	21	0	
	OK	7	13	8	29	0	38	15	48	0	60	55	4	2	0	4	0	
. . . .																		
MQATREQ1	MQDTPGM	4	359	7	458	1	466	10	615	2	622	638	2	2	0	31	0	
	Except	4	359	7	458	1	466	10	615	2	622	638	2	2	0	31	0	
PART	DFSSAM02	9	20	10	24	1	34	23	42	6	62	80	2	5	0	5	0	
** Grand Total **		153	7	12	65	1	77	53	222	4	247	800	2	4	0	6	4	
Transaction Exception by Userid																		
From 30Nov2011 13:45:38:59			To 30Nov2011 14:21:57:58			Elapsed=		0 Hrs	36 Mins	18.997.047	Secs	Page	2					
		Transact	Min	-- Average	Transit Time	---		-- 90%	Peak	Transit Time	--	Max	-- Average	Approximate	--			
Userid	Trancode	Count	Tran Time	Input Queue	Pgm Exec	Output Queue	Total	Input Queue	Pgm Exec	Output Queue	Total	Tran Time	DB Calls	DC Calls	DB Waits	CPU	Tran/Min	
DVP1	CEXTNONC	1	800	110	690	0	800	110	690	0	800	800	2	3	0	24	0	
	Except	1	800	110	690	0	800	110	690	0	800	800	2	3	0	24	0	
DVP1	IVTNO	2	34	69	223	0	292	142	618	0	760	550	1	3	0	1	0	
	Except	2	34	69	223	0	292	142	618	0	760	550	1	3	0	1	0	
DVP1	*Total*	3	34	83	379	0	461	142	823	0	962	800	1	3	0	9	0	
	Except	3	34	83	379	0	461	142	823	0	962	800	1	3	0	9	0	
IPI2	ADDINV	5	22	6	34	0	40	8	76	0	82	98	1	2	0	6	0	
IPI2	ADDPART	4	19	7	20	0	27	8	25	1	34	31	2	2	0	6	0	
. . . .																		
IPI2	PART	9	20	10	24	1	34	23	42	6	62	80	2	5	0	5	0	
IPI2	*Total*	150	7	10	59	1	69	49	197	4	215	638	2	4	0	6	4	
	Except	17	129	28	303	0	332	138	483	2	491	638	3	4	0	16	0	
	OK	133	7	8	27	1	36	21	87	4	103	475	2	4	0	4	4	
** Grand Total **		153	7	12	65	1	77	53	222	4	247	800	2	4	0	6	4	
Transaction Exception by Class																		
From 30Nov2011 13:45:38:59			To 30Nov2011 14:21:57:58			Elapsed=		0 Hrs	36 Mins	18.997.047	Secs	Page	3					
		Transact	Min	-- Average	Transit Time	---		-- 90%	Peak	Transit Time	--	Max	-- Average	Approximate	--			
Class	Trancode	Count	Tran Time	Input Queue	Pgm Exec	Output Queue	Total	Input Queue	Pgm Exec	Output Queue	Total	Tran Time	DB Calls	DC Calls	DB Waits	CPU	Tran/Min	
1	ADDINV	5	22	6	34	0	40	8	76	0	82	98	1	2	0	6	0	
1	ADDPART	4	19	7	20	0	27	8	25	1	34	31	2	2	0	6	0	
1	DLETINV	4	24	7	21	0	28	13	23	0	34	35	2	2	0	6	0	
1	DLETPART	3	26	6	22	1	29	9	24	3	32	31	4	2	0	6	0	
1	DSPALLI	4	21	6	94	0	99	6	285	0	291	323	5	7	0	7	0	
	Except	1	323	6	317	0	323	6	317	0	323	323	6	9	0	8	0	
	OK	3	21	6	19	0	25	6	24	0	30	30	4	6	0	6	0	
. . . .																		
15	CEXS CONV	10	11	8	55	0	64	18	191	0	198	359	3	4	0	5	0	
15	CEXS NONC	5	11	9	31	0	40	14	61	0	73	77	3	3	0	4	0	
15	*Total*	15	11	9	47	0	56	17	158	0	166	359	3	4	0	5	0	
** Grand Total **		153	7	12	65	1	77	53	222	4	247	800	2	4	0	6	4	
Transaction Exception by Time																		
From 30Nov2011 13:45:38:59			To 30Nov2011 14:21:57:58			Elapsed=		0 Hrs	36 Mins	18.997.047	Secs	Page	4					
		Transact	Min	-- Average	Transit Time	---		-- 90%	Peak	Transit Time	--	Max	-- Average	Approximate	--			
Time	Trancode	Count	Tran Time	Input Queue	Pgm Exec	Output Queue	Total	Input Queue	Pgm Exec	Output Queue	Total	Tran Time	DB Calls	DC Calls	DB Waits	CPU	Tran/Min	
13:00:00	CEXS CONV	10	11	8	55	0	64	18	191	0	198	359	3	4	0	5	0	
13:00:00	CEXS NONC	5	11	9	31	0	40	14	61	0	73	77	3	3	0	4	0	
13:00:00	CEXT CONV	15	8	31	50	0	81	148	147	2	232	408	4	4	0	7	0	
	Except	3	129	125	156	1	281	386	327	4	462	408	5	4	0	17	0	
	OK	12	8	7	24	0	31	13	41	1	50	58	4	4	0	5	0	
13:00:00	CEXT NONC	10	13	18	132	0	150	60	406	0	463	800	4	2	0	9	0	
	Except	3	139	41	372	0	413	117	740	0	854	800	4	2	0	21	0	
	OK	7	13	8	29	0	38	15	48	0	60	55	4	2	0	4	0	
13:00:00	IVTCV	24	12	10	38	1	49	36	143	7	177	475	1	4	0	2	1	
. . . .																		
14:00:00	PART	9	20	10	24	1	34	23	42	6	62	80	2	5	0	5	0	
14:00:00	*Total*	63	7	7	65	1	72	14	232	3	239	638	2	4	0	6	2	
	Except	8	148	6	381	0	387	9	556	1	563	638	2	4	0	18	0	
	OK	55	7	7	19	1	27	14	37	4	48	98	2	4	0	4	2	
** Grand Total **		153	7	12	65	1	77	53	222	4	247	800	2	4	0	6	4	

Figure 19. Transaction Exception report FORMAT2: Breakdown by Transaction Code

Report lines: Transaction Exception by Trancode

The Transaction Exception by Trancode report has the following rows:

- Min**- Minimum threshold values specified in the Expectation Set. Only appears if Print Expectations (PRINTEXP) is specified and there are values.
- Max**- Maximum threshold values specified in the Expectation Set. Only appears if Print Expectations (PRINTEXP) is specified and there are values.

Trancode/PSB

Total activity for the Trancode/PSB combination (Exceptions + OK). When the exception count is zero, this is the only line printed.

Except

Exception statistics for transactions that exceeded one or more thresholds in the Expectation Set.

OK

OK statistics for transactions that did not exceed any thresholds in the Expectation Set. When the exception count is zero, this is the only line printed.

** Grand Total **

All transaction activity in the report period.

Report lines: Transaction Exception by Userid, Class, or Time

The Transaction Exception by Userid, Class, or Time reports have the following rows:

- Min**- Minimum threshold values specified in the Expectation Set. Only appears if Print Expectations (PRINTEXP) is specified and there are values.
- Max**- Maximum threshold values specified in the Expectation Set. Only appears if Print Expectations (PRINTEXP) is specified and there are values.

Trancode

Total activity for the Trancode combination (Exceptions + OK). When the exception count is zero, this is the only line printed.

Except

Exception statistics for transactions that exceeded one or more thresholds in the Expectation Set.

OK

OK statistics for transactions that did not exceed any thresholds in the Expectation Set. When the exception count is zero, this is the only line printed.

Total

All transaction activity for the Userid, Class, or Time.

** Grand Total **

All transaction activity in the report period.

Other report options

The SUMMARY, PRINTEXP and SHRQ (Shared queues) options are honoured in the same way as the original FORMAT1, albeit in the extended format.

Transaction History File

The Transaction History File is used to collect historical performance data, useful for long-term trend analysis and capacity planning. Information is summarized for

each transaction code over a short time interval, including transaction transit, response and CPU times, as well as DLI call statistics. Data is provided in a format suitable for loading directly into DB2, from where you can run queries or produce reports.

Log records: The history records are derived from the following log input records: 01, 03, 06, 07, 08, 31, 32, 33, 34, 35, 38, 40, and 72.

History File options

To specify the history file options, select **Transaction History File** from the Transaction Transit Reports in a Log Report Set.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is applied.

You can specify Selection Criteria to include or exclude data from the report based on Transaction Code.

The Recap report output is written to the data set specified by the Report Output DDname. The default is **TRANHIST**.

The time interval specifies the interval over which you want the transaction activity summarized. By default, the data is accumulated in 15 minute intervals.

New files take their default allocation details from the Reporting Allocation Settings in your Profile Options. By default, data is appended to the end of an existing file. The default DDname for the history file is **IPITHIST**.

History File content

The following figure shows the format of the Transaction History File records. The record layout is defined by the assembler macro IPITRHR in the SIPIMAC library.

TRHRSTRT DS	0D	.Start of Transaction History record	
*			
TRHRDATE DS	CL10	.Date='yyyy-mm-dd'	POSITION=01 DATE EXTERNAL(10)
DS	CL1'-'	.Hyphen	
TRHRTIME DS	CL8	.Time='hh.mm.ss'	=12 TIME EXTERNAL(8)
TRHRPRID DS	CL4	.Processing IMS Subsystem ID	=20 CHAR(4)
TRHRTRAN DS	CL8	.Transaction Code	=24 CHAR(8)
*			
.End of Key			
*			
.Queue time Totals in microseconds:			
TRHRTRA# DS	XL8	.Transaction count -	POSITION=32 FLOAT
TRHRRSP# DS	XL8	.Response count-	POSITION=40 FLOAT
TRHRTINQ DS	XL8	.Input queue elapsed time	POSITION=48
TRHRTPRO DS	XL8	.Processing elapsed time	=56
TRHRTOUT DS	XL8	.Output queue elapsed time	=64
TRHRTTOT DS	XL8	.Total elapsed time -	=72
*		.Total=Input+Processing+Output	
TRHRTRSP DS	XL8	.End-User Response time -	=80
*			
.Queue time Sums-of-Squares:			
TRHR2INQ DS	XL8	.Input queue elapsed time	POSITION=88
TRHR2PRO DS	XL8	.Processing elapsed time	=96
TRHR2OUT DS	XL8	.Output queue elapsed time	=104
TRHR2TOT DS	XL8	.Total elapsed time	=112
TRHR2RSP DS	XL8	.End-User Response time	=120
*			
.Start of 07 Application End statistics:			
TRHRDLI# DS	XL8	.Transaction count with DLI stats -	=128
TRHRCPUT DS	XL8	.CPU time in microseconds	POSITION=136
*			
.DLI call statistics totals			
TRHRDBCL DS	XL8	.DB Calls	POSITION=144
TRHRDCCL DS	XL8	.DC Calls	=152
TRHRDBWT DS	XL8	.DB Waits	=160

Figure 20. Transaction History File record layout

All numerical fields are in Floating Point format.

The fields are:

Record Key

The 31 byte record key is made up of the following fields:

TRHRDATE

Date in the format yyyy-mm-dd. Character format, length 10.

- Hyphen to delineate date and time.

TRHRTIME

Time in the format hh.mm.ss. Character format, length 8.

TRHRPRID

Processing IMS Subsystem ID. Character format, length 4.

TRHRTRAN

Transaction Code. Character format, length 8.

TRHRTRA#

Transaction count. The number of times this Transaction Code was processed by an IMS region. FLOAT format, length 8.

TRHRRSP#

Response count. The number of times this Transaction Code was the

originating Transaction in a UOW and a response was sent back to the originating LTERM, either by this Trancode or a Program Switch.

Note: Use TRHRRSP# (not TRHRTRA#) when calculating End-User Response time averages.

Warning! TRHRRSP# may be zero.

Queue times

Queue time totals are in microseconds:

TRHRTINQ

Input queue elapsed time.

TRHRTPRO

Processing elapsed time.

TRHRTOUT

Output queue elapsed time.

TRHRTTOT

Total elapsed time. This is the sum of Input + Processing + Output.

TRHRTRSP

End-user response time. This is the elapsed time from when the originating transaction input message was enqueued to when the transaction (or a program switch) responded back to the originating LTERM.

Applicable only if TRHRRSP# is greater than zero.

Queue time Sums-of-Squares

Used to calculate Peak Percentile estimates.

TRHR2INQ

Input queue elapsed time.

TRHR2PRO

Processing elapsed time.

TRHR2OUT

Output queue elapsed time.

TRHR2TOT

Total elapsed time.

TRHR2RSP

End-user response time.

Start of 07 Application End statistics

The 07 Application End Statistics are:

TRHRDLI#

Transaction count with DLI statistics.

Note: Use TRHRDLI# (not TRHRTRA#) when calculating DLI statistics and CPU time averages. DLI statistics and CPU time are obtained from the Application End type 07 log record.

Sometimes the type 07 record is not cut until well after the transaction ends, especially for WFI and pseudo-WFI processing. If IMS PA flushes a completed transaction without the associated 07 record being processed, then the DLI statistics and CPU time are not available.

When statistics are available, both TRHRDLI# and TRHRTRA# are incremented by 1. When statistics are not available, only TRHRTRA# is incremented by 1.

Warning! TRHRDLI# may be zero.

TRHRCPUT

CPU time in microseconds.

DLI call statistics totals

The DLI call statistics totals are:

TRHRDBCL

DB Calls.

TRHRDCCL

DC Calls.

TRHRDBWT

DB Waits.

History File Recap report

The following figure shows an example of the Recap report produced at the end of Transaction History File processing.

The Transaction History File was requested by a command such as the following:

```
IMSPALOG      TRANHIST(
                DDNAME(TRANHIST),
                INTERVAL(00:15:00))
IMSPALOG      EXECUTE
```

IMS Performance Analyzer		Page	1
<u>Transaction History</u>			
History Data Set:	JCH.TRANSACTION.HIST0001		
Record Count :	290		
Start :	2018-04-04-05.45.00		
End :	2018-04-05-00.00.00		
Interval :	00:15:00		

Figure 21. Transaction History File: Recap report

Transaction Transit reports (Form-based)

“Form-based” reporting allows you to personalize the format and content of Transaction Transit reports and extracts to meet your individual requirements. They enable comprehensive, flexible analysis of transaction transit information giving you a good insight into different facets of response tuning.

For Log reporting, you can select fields from all the IMS fields available to IMS PA. This is done using Report Forms in the dialog or the FIELDS operand in batch commands.

List and Summary reports are available to run against IMS systems and Log files. You can request multiple reports in a single job and single pass of the data.

Form-based Transaction Transit List reports

The Form-based Transaction Transit List report is a detailed list of transaction transit records in transaction completion sequence.

You can tailor the format and content of the reports and extracts by specifying Report Forms, include only the first or all output messages, the minimum transaction Start Level and Completion Level, the data Precision, Transaction Mix, what Digit Grouping to use, and the Selection Criteria for filtering the input records. Additional extract options are delimiters, field labels, and whether to format numeric fields for DB2 or spreadsheet analysis.

Report options

To specify the options for an IMS log Form-based List report or extract, select **List** in the **Transaction Transit Reports (Form-based)** category in a Log Report Set.

The format of the operand is:

```
IMSPALOG    LIST(
              [DDNAME(ddname),]           default LISTnnnn
              [FROM(date,time),]
              [TO(date,time),]
              [EXTRACT(ddname),]          default LISXnnnn
              [STARTLVL(n),]              default 2
              [COMPLVL(n),]               default 3
              [PRECISION(n),]             default 3
              [TRANMIX(n),]               default 1
              [GROUP|NOGROUP|SECGROUP,]
              [OUTPUTMSG|NOOUTPUTMSG,]
              [INCL(TRANCODE(list))|EXCL(TRANCODE(list)),]
              [INCL(LTERM(list))|EXCL(LTERM(list)),]
              [INCL(LINE(list))|EXCL(LINE(list)),]
              [INCL(VTAMNODE(list))|EXCL(VTAMNODE(list)),]
              [INCL(CLASS(list))|EXCL(CLASS(list)),]
              [INCL(USERID(list))|EXCL(USERID(list)),]
              [DELIMIT(field-delimiter)|NODELIMIT,] default , (comma)
              [LABELS|NOLABELS,]
              [FLOAT|NOFLOAT,]
              [FIELDS(field1,...)])
```

The following global options may also be specified by selecting **Transit Options** in the **Transaction Transit Reports (Form-based)** category:

```
IMSPALOG    [BMPSYNC(YES|NO),]           default NO
              [PROCESSEDONLY(YES|NO),]    default NO
              [PROGRAMSWITCH(YES|NO)]     default YES
```

Related reference:

“IMS Program Switch reporting in IMS PA” on page 111

An IMS Program Switch is an output message from a transaction with a destination of an SMB (transaction) rather than a response to an LTERM (terminal).

Report content (default)

The Form-based Transaction Transit List report is a detailed list of transaction transit records. The order of transactions in the report is based on when they end (not when they start). You can tailor the format and content of the reports and extracts by specifying Report Forms, filtering criteria, and other reporting options.

For field descriptions, refer to the Chapter 16, “Glossary of Report Form field names,” on page 629. Field help information is also available using dialog option 10 **Report Forms**. Edit or view the Report Form, then enter line action H for help information on a field, or press **Prompt (F4)** from a form field, then line action H for a field in the prompt list.

The default Form-based Transit List report can be requested with the following command:

```
IMSPALOG    LIST
IMSPALOG    EXECUTE
```

This produces the same result as the following command in which you can see the defaults explicitly specified:

```
IMSPALOG    LIST(
              DDNAME(LIST0001),
              NOGROUP,
              STARTLV(2),
              COMPLVL(3),
              PRECISION(3),
              TRANMIX(1),
              FIELDS(ORGLTERM,
                    TRANCODE,
                    PROGRAM,
                    PSTID,
                    CLASS,
                    PRIORITY,
                    DBCALLS,
                    STARTIMS(TIME),
                    CPUTIME,
                    USERID,
                    LTERMOUT,
                    INPUTQ,
                    PROCESS,
                    OUTPUTQ,
                    TOTALTM,
                    RESPIMS))
IMSPALOG    EXECUTE
```

The following figure shows the default report format.

IMS Performance Analyzer																
Transaction Transit List																
LIST0001 Printed at 15:44:00 31Jul2018					Data from 16.11.51 30Jul2018					Page			1			
Org	Trancode	Program	PST	Cls	Pr	DB Call	IMS Tran	CPU	Output	InputQ	Process	OutputQ	Total	IMS	Resp	
LTERM						Count	Start	Time	Userid	LTERM	Time	Time	Time	Time	Time	
FUNTRM12	PART	DFSSAM02	2	1	7	0	16.11.51.745	18	FUNTRM12	FUNTRM12	217	437	44642	45296	45296	
FUNTRM12	PART	DFSSAM02	2	1	7	1	16.11.58.087	4	FUNTRM12	FUNTRM12	7	546	44316	44870	44870	
FUNTRM12	PART	DFSSAM02	2	1	7	1	16.12.36.986	4	FUNTRM12	FUNTRM12	4	234	12980	13219	13219	
FUNTRM12	PART	DFSSAM02	2	1	7	2	16.12.42.900	5	FUNTRM12	FUNTRM12	7	325	10297	10629	10629	
FUNTRM11	PART	DFSSAM02	2	1	7	2	16.13.10.746	5	DVP	FUNTRM11	5	294	0	298	54	
FUNTRM11	PART	DFSSAM02	2	1	7	2	16.13.13.750	5	DVP	FUNTRM11	5	284	0	288	40	
FUNTRM11	PART	DFSSAM02	2	1	7	1	16.13.16.687	4	DVP	FUNTRM11	7	349	0	356	45	
FUNTRM11	IVTCV	DFSIVP3	2	1	1	1	16.13.39.598	2	DVP	FUNTRM11	181	321	0	502	371	
FUNTRM12	IVTCV	DFSIVP3	2	1	1	1	16.13.45.556	2	FUNTRM12	FUNTRM12	6	291	0	297	60	
FUNTRM12	IVTCV	DFSIVP3	2	1	1	1	16.13.51.293	2	FUNTRM12	FUNTRM12	3	315	0	319	53	
FUNTRM11	IVTCV	DFSIVP3	2	1	1	1	16.13.59.904	2	DVP	FUNTRM11	6	33	0	40	35	
FUNTRM12	IVTCV	DFSIVP3	2	1	1	1	16.14.08.830	2	FUNTRM12	FUNTRM12	3	317	0	321	41	
FUNTRM11	IVTCV	DFSIVP3	2	1	1	1	16.14.15.121	2	DVP	FUNTRM11	6	292	0	298	38	

Figure 22. Form-based Transit List report (default)

Sample Report Forms

A Report Form is a user-defined template for the design of a report. The batch equivalent is the FIELDS operand. The following sample forms are supplied to demonstrate how Form-based Log Transaction Transit List reports can be tailored to meet your specific requirements.

For more information on the fields generated in the sample reports, you can use dialog option 10 **Report Forms** to display the list of sample forms, select the form you are interested in, then enter line action **H** for help information on any field.

List reports

ALLLIST

Transaction List report/extract

DBCTLIST

List of DBCTL Transactions

FPLOG

Fast Path Transaction Transit Log

FPTRANX

Fast Path Transaction Exception - Basic

FPTRANXD

Fast Path Transaction Exception - Detailed

OLRLIST

HALDB Online Reorg List

SMQLIST

SMQ Transaction Transit Log

SWITLIST

Program-Switch List

SYNCCOUT

Synchronous Callout

TRANLIST

Transaction Transit Log

ALLLIST: Transaction List report:

The Transaction List report provides a list of transactions together with the transactions start time, originating LTERM, transaction code, program or PSB name, region PST ID, and more. You can use sample report form **ALLLIST** to format this report.

IMS Performance Analyzer Transaction List Report/Extract														
LIST0500 Printed at 14:53:21 07May2014					Data from 15.45.28 20Nov2013					Page 1				
IMS Tran Start	Org LTERM	Trancode	Program	Queue PST Type	Reg Typ	Cls	Pr	Userid	Output LTERM	CPU Time	InputQ Time	Process Time	OutputQ Time	SMQ Glob Time OutQTime
15.45.28.267	3101	CEXTCONV	CEXTPGM	1 LOCAL	MPP	5	8	CEX001	3101	5	39295	20	0	-...
15.46.07.582	3101	CEXTCONV	CEXTPGM	1 LOCAL	MPP	5	8	CEX001	3101	2	5	6	0	-...
15.46.07.593	3101	CEXTCONV	CEXTPGM	1 LOCAL	MPP	5	8	CEX001	3101	2	1	5011	0	-...
15.46.12.605	3101	CEXTCONV	CEXTPGM	1 LOCAL	MPP	5	8	CEX001	3101	3	2	20010	0	-...
15.46.32.618	3101	CEXTCONV	CEXTPGM	1 LOCAL	MPP	5	8	CEX001	-	0	3	3	-	-...
15.46.32.621	3101	CEXSconv	CEXSPGM	1 LOCAL	MPP	15	8	CEX001	3101	4	4	10	0	-...
15.46.32.635	3101	CEXSconv	CEXSPGM	1 LOCAL	MPP	15	8	CEX001	-	0	2	4	-	-...
15.46.32.638	3101	CEXTCONV	CEXTPGM	1 LOCAL	MPP	5	8	CEX001	3101	2	6	7	0	-...
15.46.32.651	3101	CEXTCONV	CEXTPGM	1 LOCAL	MPP	5	8	CEX001	-	0	1	2	-	-...
15.46.32.652	3101	CEXSconv	CEXSPGM	1 LOCAL	MPP	15	8	CEX001	3101	2	2	7	0	-...
15.46.32.661	3101	CEXSconv	CEXSPGM	1 LOCAL	MPP	15	8	CEX001	-	0	0	4	-	-...
15.46.32.663	3101	CEXTCONV	CEXTPGM	1 LOCAL	MPP	5	8	CEX001	3101	2	5	7	0	-...
15.46.32.675	3101	CEXTCONV	CEXTPGM	1 LOCAL	MPP	5	8	CEX001	3101	1	3	7	0	-...
:														

Figure 23. Transaction List report

DBCTLIST: DBCTL List report:

The DBCTL List report lists DBCTL transactions, their performance characteristics, and CICS identification information. You can use sample report form **DBCTLIST** to format this report.

IMS Performance Analyzer													
List of DBCTL Transactions													
LIST0250 Printed at 11:47:24 23Sep2014				Data From 17.03.44 15Nov2010							Page	1	
Trancode	Task	CICS num	IMS Tran Program	Start	Total IMS Time	CPU Time	DB Get Count	DB Updat Count	DB Wait Count	FP Get Count	FP Updat Count	FP Wait Count	Failur... Reason...
ASMC	256	DFHSAM05	17.03.44.395897	0.244663	0.001172		7	0	0	0	0	0	0...
ASMC	257	DFHSAM05	17.03.50.374184	0.006926	0.000807		4	0	0	0	0	0	0...
ASMC	258	DFHSAM04	17.04.01.191729	0.055918	0.000911		1	1	0	0	0	0	0...
ASMC	259	DFHSAM04	17.04.10.604946	0.092451	0.000755		1	1	0	0	0	0	0...
ASMC	260	DFHSAM04	17.04.24.406089	0.045200	0.000911		0	2	0	0	0	0	0...
ASMC	261	DFHSAM05	17.04.31.734486	0.045356	0.000599		3	0	0	0	0	0	0...
ASMC	262	DFHSAM05	17.04.41.221412	0.003509	0.000547		2	0	0	0	0	0	0...
ASMC	263	DFHSAM05	17.04.49.653645	0.002337	0.000443		1	0	0	0	0	0	0...
ASMC	266	DFHSAM04	17.05.05.253961	0.040851	0.000599		0	1	0	0	0	0	0...
ASMC	267	DFHSAM04	17.05.14.521368	0.002389	0.000547		1	0	0	0	0	0	0...
ASMC	268	DFHSAM04	17.05.30.442985	0.003724	0.000703		1	0	0	0	0	0	0...
ASMC	269	DFHSAM05	17.05.37.367194	0.009821	0.001016		6	0	0	0	0	0	0...
ASMC	270	DFHSAM04	17.05.46.855622	0.006260	0.000755		1	1	0	0	0	0	0...
:													

Figure 24. DBCTL List report

Related reference:

“DBCTSUMM: DBCTL Summary report” on page 102

The DBCTL Summary report summarizes DBCTL transaction activity. You can use sample report form **DBCTSUMM** to format this report.

FPLOG: Fast Path Transaction Transit Log List report:

The Fast Path Transit Log list report provides a list of Fast Path transactions with transaction syncpoint time, originating LTERM, and Fast Path-specific and general performance indicators.

The Fast Path Transit Log list report is the forms-based equivalent of the Fast Path Log report. It is recommended to use TRANMIX(4) with this report to include transactions that use Fast Path (EMH and DEDB). You can use sample report form **FPLOG** to format this report.

IMS Performance Analyzer FP Transaction Transit Log													
LIST0250 Printed at 13:52:21 28Nov2016							Data from 16.03.21 10Nov2015			Page 1			
Syncpoint Time	Trancode	Routing Code	Org LTERM	Userid	Proc IMS ID	PST	FP Call Count	MSDB Calls	InputQ Time	Process Time	OutputQ Time	Total IMS Time	OutTermQ... Time...
16.03.21.092329	IVTFD	IVTFD	IP12	IP12	IEDE	5	1	0	0.000085	0.000551	0.000477	0.001113	0.008070...
16.03.22.102754	IVTFD	IVTFD	IP12	IP12	IEDE	5	1	0	0.000095	0.000553	0.000431	0.001079	0.002870...
16.03.23.108107	IVTFD	IVTFD	IP12	IP12	IEDE	5	1	0	0.000087	0.000519	0.001043	0.001649	0.007112...
16.03.24.118084	IVTFD	IVTFD	IP12	IP12	IEDE	5	1	0	0.000087	0.000529	0.000500	0.001116	0.003109...
16.03.25.123137	IVTFD	IVTFD	IP12	IP12	IEDE	5	1	0	0.000119	0.000512	0.000369	0.001000	0.003480...
16.03.26.128685	IVTFD	IVTFD	IP12	IP12	IEDE	5	2	0	0.000087	0.000579	0.000480	0.001146	0.001790...
16.03.27.132511	IVTFD	IVTFD	IP12	IP12	IEDE	5	1	0	0.000088	0.000532	0.000372	0.000992	0.006698...
16.03.28.141552	IVTFD	IVTFD	IP12	IP12	IEDE	5	2	0	0.000088	0.000564	0.000489	0.001141	0.006550...
16.03.29.150222	IVTFD	IVTFD	IP12	IP12	IEDE	5	2	0	0.000084	0.000589	0.000491	0.001164	0.003686...
16.03.30.156354	IVTFD	IVTFD	IP12	IP12	IEDE	5	2	0	0.000096	0.000601	0.000440	0.001137	0.006805...
16.03.31.165823	IVTFD	IVTFD	IP12	IP12	IEDE	5	1	0	0.000085	0.001236	0.000441	0.001762	0.005948...
16.03.41.920093	IVTFM	IVTFM	IP12	IP12	IEDE	3	0	1	0.000086	0.000104	0.000422	0.000612	0.007057...
16.03.42.928801	IVTFM	IVTFM	IP12	IP12	IEDE	3	0	1	0.000092	0.000100	0.000467	0.000659	0.004894...
:													

Figure 25. Fast Path Transaction Transit Log List report

FPTRANX: Fast Path Transaction Exception - Basic List report:

The Fast Path Transaction report provides information about IMS Fast Path (IFP) transactions, and message queue transactions, that use Fast Path databases. You can use sample report form **FPTRANX** to format this report.

The Fast Path Transaction report is the forms-based equivalent of the Fast Path Transaction Exception report. It is recommended to use TRANMIX(4) with this report to include transactions that use Fast Path (EMH and DEDB). You can use sample report form **FPTRANX** to format this report.

IMS Performance Analyzer FP Transact Exception - Basic														
LIST0250 Printed at 14:20:27 28Nov2016 Data from 16.03.21 10Nov2015										Page	1			
Syncpoint Time	Sync Fail	Trancode	Routing Code	Queue Type	Userid	PST	BALG Q Count	InputQ Time	Process Time	OutputQ Time	Total IMS Time	OutTermQ Time	FP Call... Count	C...
16.03.21.092329		IVTFD	IVTFD	LOCAL	IP12	5	0	0.000085	0.000551	0.000477	0.001113	0.008070	1...	
16.03.22.102754		IVTFD	IVTFD	LOCAL	IP12	5	0	0.000095	0.000553	0.000431	0.001079	0.002870	1...	
16.03.23.108107		IVTFD	IVTFD	LOCAL	IP12	5	0	0.000087	0.000519	0.001043	0.001649	0.007112	1...	
16.03.24.118084		IVTFD	IVTFD	LOCAL	IP12	5	0	0.000087	0.000529	0.000500	0.001116	0.003109	1...	
16.03.25.123137		IVTFD	IVTFD	LOCAL	IP12	5	0	0.000119	0.000512	0.000369	0.001000	0.003480	1...	
16.03.26.128685		IVTFD	IVTFD	LOCAL	IP12	5	0	0.000087	0.000579	0.000480	0.001146	0.001790	2...	
16.03.27.132511		IVTFD	IVTFD	LOCAL	IP12	5	0	0.000088	0.000532	0.000372	0.000992	0.006698	1...	
16.03.28.141552		IVTFD	IVTFD	LOCAL	IP12	5	0	0.000088	0.000564	0.000489	0.001141	0.006550	2...	
16.03.29.150222		IVTFD	IVTFD	LOCAL	IP12	5	0	0.000084	0.000589	0.000491	0.001164	0.003686	2...	
16.03.30.156354		IVTFD	IVTFD	LOCAL	IP12	5	0	0.000096	0.000601	0.000440	0.001137	0.006805	2...	
16.03.31.165823		IVTFD	IVTFD	LOCAL	IP12	5	0	0.000085	0.001236	0.000441	0.001762	0.005948	1...	
16.03.41.920093		IVTFM	IVTFM	LOCAL	IP12	3	0	0.000086	0.000104	0.000422	0.000612	0.007057	0...	
16.03.42.928801		IVTFM	IVTFM	LOCAL	IP12	3	0	0.000092	0.000100	0.000467	0.000659	0.004894	0...	
:														

Figure 26. Fast Path Transaction Exception - Basic List report

FPTRANXD: Fast Path Transaction Exception - Detailed List report:

This version of the Fast Path Transaction Exception report provides very detailed information about Fast Path calls and buffer usage.

It is recommended to use TRANMIX(4) with this report to include transactions that use Fast Path (EMH and DEDB). You can use sample report form **FPTRANXD** to format this report.

IMS Performance Analyzer FP Transact Exception - Detailed														
LIST1000 Printed at 14:32:46 28Nov2016 Data from 16.03.21 10Nov2015										Page	1			
Syncpoint Time	Sync Fail	Trancode	Routing Code	Queue Type	Userid	PST	BALG Q Count	InputQ Time	Process Time	OutputQ Time	Total IMS Time	OutTermQ Time	FP Call... Count	C...
16.03.21.092329		IVTFD	IVTFD	LOCAL	IP12	5	0	0.000085	0.000551	0.000477	0.001113	0.008070	1...	
16.03.22.102754		IVTFD	IVTFD	LOCAL	IP12	5	0	0.000095	0.000553	0.000431	0.001079	0.002870	1...	
16.03.23.108107		IVTFD	IVTFD	LOCAL	IP12	5	0	0.000087	0.000519	0.001043	0.001649	0.007112	1...	
16.03.24.118084		IVTFD	IVTFD	LOCAL	IP12	5	0	0.000087	0.000529	0.000500	0.001116	0.003109	1...	
16.03.25.123137		IVTFD	IVTFD	LOCAL	IP12	5	0	0.000119	0.000512	0.000369	0.001000	0.003480	1...	
16.03.26.128685		IVTFD	IVTFD	LOCAL	IP12	5	0	0.000087	0.000579	0.000480	0.001146	0.001790	2...	
16.03.27.132511		IVTFD	IVTFD	LOCAL	IP12	5	0	0.000088	0.000532	0.000372	0.000992	0.006698	1...	
16.03.28.141552		IVTFD	IVTFD	LOCAL	IP12	5	0	0.000088	0.000564	0.000489	0.001141	0.006550	2...	
16.03.29.150222		IVTFD	IVTFD	LOCAL	IP12	5	0	0.000084	0.000589	0.000491	0.001164	0.003686	2...	
16.03.30.156354		IVTFD	IVTFD	LOCAL	IP12	5	0	0.000096	0.000601	0.000440	0.001137	0.006805	2...	
16.03.31.165823		IVTFD	IVTFD	LOCAL	IP12	5	0	0.000085	0.001236	0.000441	0.001762	0.005948	1...	
16.03.41.920093		IVTFM	IVTFM	LOCAL	IP12	3	0	0.000086	0.000104	0.000422	0.000612	0.007057	0...	
16.03.42.928801		IVTFM	IVTFM	LOCAL	IP12	3	0	0.000092	0.000100	0.000467	0.000659	0.004894	0...	
:														

Figure 27. Fast Path Transaction Exception - Detailed List report

OLRLIST: HALDB Online Reorg List report:

You can use the HALDB Online Reorg List report to show HALDB Online Reorganization (OLR) statistics.

To limit the report output to the relevant programs, you must add selection criteria of Program INC 0* to the report in the report set.

The reason for this requirement is that during online reorganization, IMS dynamically builds a PSB whose name is constructed using the 7-byte HALDB partition name and prefixed with a numeric character zero('0').

Tip: You can further limit the program selection criteria by adding the partition id after the zero (for example, '0PART1*').

IMS Performance Analyzer HALDB Online Reorg List													
LIST0250 Printed at 11:13:47 15Aug2018				Data from 14.30.43 24Feb2018									
Program	PST	IMS Tran Start	DB AccM	Database DBD Name	DB Org Type	Total IMS Time	DB Lock Time	High Lock Cnt	FF DBUd count	DB Call Count	DB ISRT Count	DB Block Inserts	DB Block Updates
0PARTZP1	3	14.30.43.698270	ESDS	PARTZP1	HIDAM	42.36887	-	13,390	18,171	-	-	18,128	18,171
0PARTZP2	5	14.30.43.952517	ESDS	PARTZP2	HIDAM	42.58618	-	13,157	17,516	-	-	17,475	17,516
0PARTZP3	6	14.30.44.569369	ESDS	PARTZP3	HIDAM	41.96463	-	12,039	16,099	-	-	16,055	16,099
0PARTZP4	4	14.30.46.599590	ESDS	PARTZP4	HIDAM	40.29813	-	11,401	15,220	-	-	15,181	15,220

Figure 28. HALDB Online Reorg List report

SMQLIST: SMQ Transaction Transit Log report:

The SMQ Transaction Transit Log report lists all transactions processed in a shared queues sysplex environment. The report highlights standard transit information, information specific to sysplex processing including the originating and processing systems, and time spent by the input and output messages on the shared message queue.

This report is the equivalent of the Transaction Transit Log report, shared queues version. You can use sample report form **SMQLIST** to format this report.

IMS Performance Analyzer															
SMQ Transaction Transit Log															
LIST0002 Printed at 15:49:10 13Apr2018 Data from 12.04.21 20Sep2014															
Input LTERM	Trancode	Program	Org IMS ID	Proc IMS ID	PST	DB Call Count	IMS Tran Start	CPU Output Time LTERM	InputQ Time	Process Time	OutputQ Time	SMQ Glob OutQTime	SMQ Loc1 OutQTime	Total Time	IMS Resp Time
3101	IVTCV	DFSIVP3	1901	1901	2	1	12.04.21.969860	1.068 3101	232.723	4.093.375	0.000	-	-	4.326.098	626.884
3101			1901	1901		0	12.04.22.596744	0.000 3101	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3101	IVTCV	DFSIVP3	1901	1901	3	0	12.04.27.701870	0.964 3101	0.804	5.434.993	0.000	-	-	5.435.797	6.267
3101			1901	1901		0	12.04.27.708137	0.000 3101	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TXNTR701	IVPREXX	IVPREXX	1901	1901	1	0	12.01.44.606792	4.156 TXNTR701	1.057	281.757	0.480	-	-	283.294	283.294
TXNTR701			1901	1901		0	12.01.44.889477	0.000 TXNTR701	0.000	0.000	0.480	0.000	0.000	0.000	0.000
3102	IVPREXX	IVPREXX	1901	1901	1	0	12.01.45.004048	4.156 3102	0.112	7.644	0.000	-	-	7.756	7.107
3102			1901	1901		0	12.01.45.011155	0.000 3102	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3103	IVPREXX	IVPREXX	1901	1901	1	0	12.01.45.077900	4.156 3103	0.138	5.859	0.000	-	-	5.997	4.077
3103			1901	1901		0	12.01.45.081977	0.000 3103	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3109	IVPREXX	IVPREXX	1901	1901	1	0	12.02.59.003398	4.156 3109	0.123	8.730	0.000	-	-	8.853	8.571
3109			1901	1901		0	12.02.59.011969	0.000 3109	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TXNTR701	IVPREXX	IVPREXX	1901	1901	1	0	12.10.22.906968	4.156 TXNTR701	0.121	22.056	0.534	-	-	22.711	22.711
TXNTR701			1901	1901		0	12.10.22.929017	0.000 TXNTR701	0.000	0.000	0.534	0.000	0.000	0.000	0.000
3102	IVPREXX	IVPREXX	1901	1901	1	0	12.10.23.009604	4.156 3102	0.109	4.447	0.000	-	-	4.556	4.189
3102			1901	1901		0	12.10.23.013793	0.000 3102	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3103	IVPREXX	IVPREXX	1901	1901	1	0	12.10.23.048445	4.156 3103	0.092	5.910	0.000	-	-	6.002	3.676
3103			1901	1901		0	12.10.23.052121	0.000 3103	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3101	IVTNO	DFSIVP1	1901	1901	2	1	12.06.29.393975	1.918 3101	110.949	461.803	0.000	-	-	572.752	554.080
3101			1901	1901		0	12.06.29.948055	0.000 3101	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3101	IVTNO	DFSIVP1	1901	1901	2	1	12.06.55.139803	1.918 3101	0.127	5.210	0.000	-	-	5.337	2.626
3101			1901	1901		0	12.06.55.142429	0.000 3101	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Figure 29. SMQ Transaction Transit Log report

Related reference:

“SMQTCOD: SMQ Transaction Analysis report” on page 107

The SMQ Transaction Analysis report summarizes transaction activity in a shared queues sysplex environment. You can use sample report form **SMQTCOD** to format this report.

SWITLIST: Transaction Program-Switch List report:

The Program Switch List report examines program switches in transactions processed by IMS. PGMSWIT is an important field that clearly shows the program switch sequence.

Note: To track transactions involved in program switch sequences, ensure the Transaction Transit option for program switches is set to 2, that is PROGRAMSWITCH(YES).

IMS Performance Analyzer Program-Switch List													
LIST0001 Printed at 10:59:19 15Feb2018				Data from 14.24.15 16Jan2018									
Org LTERM	IMS Tran Start	Parent Trancode	Trancode	P2P	Prog Swit#	InputQ Time	PgmSwitch Time	Process Time	OutputQ Time	Total IMS Time	IMS Resp Time	CPU Reg Time Typ	
IP12	14.24.15.871157		CEXTCONV	N	0	0.044983	-	0.151816	0.000000	0.196799	0.196457	0.013099 MPP	
IP12	14.24.17.074726		CEXTCONV	N	0	0.007642	-	0.010525	0.000000	0.018167	0.017368	0.002568 MPP	
IP12	14.24.18.094647		CEXTCONV	N	0	0.013308	-	5.011606	0.000000	5.024914	5.024567	0.002570 MPP	
IP12	14.24.24.121574		CEXTCONV	N	0	0.002742	-	10.01830	0.000000	10.02104	10.02080	0.003713 MPP	
IP12	14.24.35.145376		CEXTCONV	N	0	0.006682	-	0.005020	-	0.011702	0.033539	0.000607 MPP	
	14.24.35.153251	CEXTCONV	CEXSCONV	Y	1	0.011119	0.010015	0.014871	0.000000	0.024886	-	0.005878 MPP	
IP12	14.24.36.181913		CEXSCONV	N	0	0.010110	-	0.004158	-	0.014268	0.036348	0.000368 MPP	
	14.24.36.192434	CEXSCONV	CEXTCONV	Y	1	0.011594	0.010734	0.014327	0.000000	0.025061	-	0.003367 MPP	
IP12	14.24.37.220822		CEXTCONV	N	0	0.007357	-	0.003972	-	0.011329	0.024751	0.000367 MPP	
	14.24.37.228598	CEXTCONV	CEXSCONV	Y	1	0.008258	0.007964	0.009020	0.000000	0.016984	-	0.003285 MPP	
IP12	14.24.38.248831		CEXSCONV	N	0	0.012004	-	0.020115	-	0.032119	0.068783	0.000397 MPP	
	14.24.38.262068	CEXSCONV	CEXTCONV	Y	1	0.043383	0.042656	0.012787	0.000000	0.055443	-	0.003295 MPP	
IP12	14.24.39.323708		CEXTCONV	N	0	0.021307	-	0.016773	0.000000	0.038080	0.036164	0.002384 MPP	
IP12	14.24.40.365620		CEXTCONV	N	0	0.008858	-	0.064416	-	0.073274	-	0.015719 MPP	
IP12	14.24.44.640726		CEXSCONV	N	0	0.024338	-	0.022540	0.000000	0.046878	0.046330	0.006794 MPP	

Figure 30. Program-Switch List report

SYNCCOUT: Synchronous Callout List report:

The Synchronous Callout List report provides a detailed analysis of synchronous callout activity in regions and by application programs.

You can create a Synchronous Callout report in IMS Performance Analyzer by using a Form-Based Transaction Transit report. Use the IMSPALOG batch command with either the LIST or SUMMARY operands together with one or more of the following FIELDS:

- ICALCNT
- SCOACKCT
- SCOACKTM
- SCONAKCT
- SCONAKTM
- SCOCALCT
- SCOCALTM
- SCOEXTCT
- SCOEXTTM

IMS Performance Analyzer Synchronous Callout List														
LIST0001 Printed at 14:38:28 26Aug2014			Data from 10.18.37 19Apr2011								Page 1			
IMS Tran	Trancode	Userid	ICAL Count	SyncCout ACK Cnt	SyncCout ACK Time	SyncCout NAK Cnt	SyncCout NAK Time	SyncCout Resp Cnt	SyncCout RespTime	SyncCout XRsp Cnt	SyncCout XRspTime	IMS Resp Time	Total IMS Time	
Start														
10.18.37.003866	SMQLG	OTM00010	1	1	0.000535	0	-	1	0.001498	1	0.000963	0.002159	0.002159	
10.18.37.008050	SMQLG	OTM00004	1	1	0.000592	0	-	1	0.001290	1	0.000698	0.003192	0.003192	
10.18.37.003877	SMQLG	OTM00002	1	1	0.000598	0	-	1	0.001503	1	0.000905	0.002715	0.002715	
10.18.37.008039	SMQLG	OTM00007	1	1	0.000620	0	-	1	0.001375	1	0.000755	0.002684	0.002684	
10.18.37.012222	SMQLG	OTM00003	1	1	0.000595	0	-	1	0.001223	1	0.000628	0.002376	0.002376	
10.18.37.003900	SMQLG	OTM00003	1	1	0.000686	0	-	1	0.001170	1	0.000484	0.003672	0.003672	
10.18.37.008014	SMQLG	OTM00010	1	1	0.000503	0	-	1	0.001180	1	0.000677	0.001357	0.001357	
10.18.37.012246	SMQLG	OTM00002	1	1	0.000726	0	-	1	0.001415	1	0.000689	0.003731	0.003731	
10.18.37.016037	SMQLG	OTM00010	1	1	0.000479	0	-	1	0.001192	1	0.000713	0.001325	0.001325	
10.18.37.020087	SMQLG	OTM00003	1	1	0.000711	0	-	1	0.001482	1	0.000771	0.003908	0.003908	
10.18.37.003852	SMQLG	OTM00001	1	1	0.000493	0	-	1	0.001261	1	0.000768	0.001441	0.001441	
10.18.37.008061	SMQLG	OTM00009	1	1	0.000652	0	-	1	0.001192	1	0.000540	0.003683	0.003683	
10.18.37.012196	SMQLG	OTM00001	1	1	0.000472	0	-	1	0.001124	1	0.000652	0.001280	0.001280	
10.18.37.016090	SMQLG	OTM00004	1	1	0.000728	0	-	1	0.001490	1	0.000762	0.003913	0.003913	
10.18.37.020036	SMQLG	OTM00001	1	1	0.000503	0	-	1	0.001253	1	0.000750	0.001410	0.001410	
10.18.37.003889	SMQLG	OTM00006	1	1	0.000671	0	-	1	0.001402	1	0.000731	0.003193	0.003193	
10.18.37.008028	SMQLG	OTM00001	1	1	0.000609	0	-	1	0.001175	1	0.000566	0.001841	0.001841	
10.18.37.012233	SMQLG	OTM00006	1	1	0.000586	0	-	1	0.001357	1	0.000771	0.003096	0.003096	
10.18.37.016054	SMQLG	OTM00001	1	1	0.000532	0	-	1	0.001504	1	0.000972	0.002107	0.002107	

Figure 31. Synchronous Callout List report

Related reference:

“Synchronous Callout report” on page 474

The Synchronous Callout report provides a detailed analysis of sync callout activity in regions and by application programs. Individual subsystem activity is broken down by Region and Program, with statistics of sync callout activity per Transaction.

TRANLIST: Transaction Transit Log report:

The Transaction Transit Log report lists all transactions processed by IMS systems including shared queues sysplexes. You can use sample report form **TRANLIST** to format this report.

The report provides identification information including transaction code, user id and start time, as well as a breakdown of IMS response time into its transit time components. This report form is the equivalent of the Transaction Transit Logreport.

IMS Performance Analyzer															
Transaction Transit Log															
LIST0001 Printed at 15:49:10 13Apr2018						Data from 12.04.21 20Sep2014									
Org	Trancode	Program	PST	Cls	Pr	DB Call	IMS Tran	CPU		Output	InputQ	Process	OutputQ	Total	IMS Resp
LTERM						Count	Start	Time	Userid	LTERM	Time	Time	Time	Time	Time
3101	IVTCV	DFSIVP3	2	1	1	1	12.04.21.969860	1.068	AXW	3101	232.723	4.093.375	0.000	4.326.098	626.884
						0	12.04.22.596744	0.000		3101	0.000	0.000	0.000	0.000	0.000
3101	IVTCV	DFSIVP3	3	1	1	0	12.04.27.701870	0.964	AXW	3101	0.804	5.434.993	0.000	5.435.797	6.267
						0	12.04.27.708137	0.000		3101	0.000	0.000	0.000	0.000	0.000
TXNTR701	IVPREXX	IVPREXX	1	1	1	0	12.01.44.606792	4.156	CEX001	TXNTR701	1.057	281.757	0.480	283.294	283.294
						0	12.01.44.889477	0.000		TXNTR701	0.000	0.000	0.480	0.000	0.000
3102	IVPREXX	IVPREXX	1	1	1	0	12.01.45.004048	4.156	CEX001	3102	0.112	7.644	0.000	7.756	7.107
						0	12.01.45.011155	0.000		3102	0.000	0.000	0.000	0.000	0.000
3103	IVPREXX	IVPREXX	1	1	1	0	12.01.45.077900	4.156	CEX001	3103	0.138	5.859	0.000	5.997	4.077
						0	12.01.45.081977	0.000		3103	0.000	0.000	0.000	0.000	0.000
3109	IVPREXX	IVPREXX	1	1	1	0	12.02.59.003398	4.156	AXW	3109	0.123	8.730	0.000	8.853	8.571
						0	12.02.59.011969	0.000		3109	0.000	0.000	0.000	0.000	0.000
TXNTR701	IVPREXX	IVPREXX	1	1	1	0	12.10.22.906968	4.156	CEX001	TXNTR701	0.121	22.056	0.534	22.711	22.711
						0	12.10.22.929017	0.000		TXNTR701	0.000	0.000	0.534	0.000	0.000
3102	IVPREXX	IVPREXX	1	1	1	0	12.10.23.009604	4.156	CEX001	3102	0.109	4.447	0.000	4.556	4.189
						0	12.10.23.013793	0.000		3102	0.000	0.000	0.000	0.000	0.000
3103	IVPREXX	IVPREXX	1	1	1	0	12.10.23.048445	4.156	CEX001	3103	0.092	5.910	0.000	6.002	3.676
						0	12.10.23.052121	0.000		3103	0.000	0.000	0.000	0.000	0.000
3101	IVTNO	DFSIVP1	2	1	1	1	12.06.29.393975	1.918	AXW	3101	110.949	461.803	0.000	572.752	554.080
						0	12.06.29.948055	0.000		3101	0.000	0.000	0.000	0.000	0.000
3101	IVTNO	DFSIVP1	2	1	1	1	12.06.55.139803	1.918	AXW	3101	0.127	5.210	0.000	5.337	2.626
						0	12.06.55.142429	0.000		3101	0.000	0.000	0.000	0.000	0.000
3101	IVTNO	DFSIVP1	2	1	1	1	12.06.56.749479	1.918	AXW	3101	0.130	4.755	0.000	4.885	2.697
						0	12.06.56.752176	0.000		3101	0.000	0.000	0.000	0.000	0.000
TXNTR701	IVPREXX	IVPREXX	1	1	1	0	12.28.31.696663	9.505	CEX001	TXNTR701	0.873	257.489	0.443	258.805	258.805
						0	12.28.31.954883	0.000		TXNTR701	0.000	0.000	0.443	0.000	0.000
3102	IVPREXX	IVPREXX	1	1	1	0	12.28.32.062287	9.505	CEX001	3102	0.112	19.027	0.000	19.139	18.847
						0	12.28.32.081134	0.000		3102	0.000	0.000	0.000	0.000	0.000
3103	IVPREXX	IVPREXX	1	1	1	0	12.28.32.147297	9.505	CEX001	3103	0.139	19.726	0.000	19.865	17.451
						0	12.28.32.164748	0.000		3103	0.000	0.000	0.000	0.000	0.000
3101	DVPTRANS	DVPPGM01	1	1	8	0	13.01.44.358040	3.385	AXW	-	177.203	129.062	0.000	306.265	-
3101	PART	DFSAM02	1	1	7	2	13.44.09.609507	25.234	AXW	3101	1.732	673.262	0.000	674.994	673.612
						0	13.44.10.283119	0.000		3101	0.000	0.000	0.000	0.000	0.000
3109	CEXTCONV	CEXTPGM	1	1	8	0	13.46.38.646152	199.999.95	AXW	3109	1.630	10.032.949	0.000	10.034.579	10.033.375
						0	13.46.48.679527	0.000		3109	0.000	0.000	0.000	0.000	0.000
3109	IVPREXX	IVPREXX	2	1	1	0	13.44.34.727669	27.786	AXW	3109	0.768	275.834	0.000	276.602	276.258
						0	13.44.35.003927	0.000		3109	0.000	0.000	0.000	0.000	0.000
3101	DVPTRANS	DVPPGM01	1	1	8	0	15.38.30.512816	2.656	AXW	-	99.972.938	141.458	0.000	100.114.40	-

Figure 32. Transaction Transit Log report

Form-based Transaction Transit Summary reports

The Form-based Transaction Transit Summary provides a summary of transaction performance.

You can tailor the format and content of the reports and extracts by specifying Report Forms, the Time Interval for summarizing activity over time, the Totals Level to include the grand total and optional sub-totals, the minimum transaction Start Level and Completion Level, the data Precision, Transaction Mix, what Digit Grouping to use, and the Selection Criteria for filtering the input records. Additional extract options are delimiters, field labels, and whether to format numeric fields for DB2 or spreadsheet analysis.

Report options

To specify the options for an IMS log Form-based Summary report or extract, select **Summary** in the **Transaction Transit Reports (Form-based)** category in a Log Report Set.

The format of the operand is:


```

IMSPALOG    SUMMARY(
             [DDNAME(ddname),]          defaultt SUMMnnnn
             [FROM(date,time),]
             [TO(date,time),]
             [INTERVAL(hh:mm:ss),]      defaultt 00:01:00
             [EXTRACT(ddname),]          defaultt SUMXnnnn
             [STARTLVL(n),]              defaultt 2
             [COMPLVL(n),]                defaultt 3
             [PRECISION(n),]              defaultt 3
             [TRANMIX(n),]                defaultt 1
             [GROUP|NOGROUP|SECGROUP,]
             [TOTALS(n)|NOTOTALS,]        defaultt 0
             [INCL(TRANCODE(list))|EXCL(TRANCODE(list)),]
             [INCL(LTERM(list))|EXCL(LTERM(list)),]
             [INCL(LINE(list))|EXCL(LINE(list)),]
             [INCL(VTAMNODE(list))|EXCL(VTAMNODE(list)),]
             [INCL(CLASS(list))|EXCL(CLASS(list)),]
             [INCL(USERID(list))|EXCL(USERID(list)),]
             [DELIMIT(field-delimiter)|NODELIMIT,]    defaultt , (comma)
             [LABELS|NOLABELS,]
             [FLOAT|NOFLOAT,]
             FIELDS(field1[(options)],...))

```

The following global options may also specified by selecting **Transit Options** in the **Transaction Transit Reports (Form-based)** category:

```

IMSPALOG    [BMPSYNC(YES|NO),]           defaultt NO
             [PROCESSEDONLY(YES|NO),]     defaultt NO
             [PROGRAMSWITCH(YES|NO)]      defaultt YES

```

The level of summarization can be varied depending on the number of key fields. You can specify up to 8 key fields to summarize and sort by, and you can request up to 7 levels of sub-totaling, illustrated in the following example.

Summarize and sort by						
Key field 1	Key field 2	Key field 3				
IMS Tran Start	Trancode	Proc IMS ID	Tran Count	Avg Process Time	IMS	Avg Resp Time
08.59.00	IVTNO	IMD3	2	1		2
08.59.00	PART	IMD3	2	1744		77
08.59.00	PART	I8D1	1	1906		266
08.59.00			5	1079		85
09.00.00	IVTNO	I8D1	2	1		2
09.00.00	IVTNO	I9D1	2	5		3
09.00.00	PART	I8D1	1	1394		10
09.00.00			5	281		4
09.01.00	PART	I9D1	2	1146		140
09.01.00			2	1146		140
Total			12	758		60

Summarization interval

TOTALS(1)

Subtotals: level 1

Grand total

Summarize and sort by						
Key field 1	Key field 2	Key field 3				
IMS Tran Start	Trancode	Proc IMS ID	Tran Count	Avg Process Time	IMS	Avg Resp Time
08.59.00	IVTNO	IMD3	2	1		2
08.59.00	IVTNO		2	1		2
08.59.00	PART	IMD3	2	1744		77
08.59.00	PART	I8D1	1	1906		266
08.59.00	PART		3	1798		140
08.59.00			5	1079		85
09.00.00	IVTNO	I8D1	2	1		2
09.00.00	IVTNO	I9D1	2	5		3
09.00.00	IVTNO		4	3		3
09.00.00	PART	I8D1	1	1394		10
09.00.00	PART		1	1394		10
09.00.00			5	281		4
09.01.00	PART	I9D1	2	1146		140
09.01.00	PART		2	1146		140
09.01.00			2	1146		140
Total			12	758		60

TOTALS(2)

Subtotals: level 2

Subtotals: level 1

Grand total

Figure 33. Form-based Summary report showing different levels of totaling

If you specify NOTOTALS, no totals are printed. TOTALS(0) provides only the grand total, no sub-totals. TOTALS(1) to TOTALS(7) provides the grand total and subtotals to the corresponding key level. The grand total line is labeled **Total** or **T*** if the column is narrow.

Related reference:

“TMS Program Switch reporting in IMS PA” on page 111

An IMS Program Switch is an output message from a transaction with a destination of an SMB (transaction) rather than a response to an LTERM (terminal).

Report content (default)

The Form-based Transaction Transit Summary report provides a summary of transaction performance. You can tailor the format and content of the reports and extracts by specifying Report Forms, filtering criteria, and other reporting options.

For field descriptions, refer to the Chapter 16, “Glossary of Report Form field names,” on page 629. Field help information is also available using dialog option 10 **Report Forms**. Edit or view the Report Form, then enter line action **H** for help information on a field, or press **Prompt (F4)** from a form field, then line action **H** for a field in the prompt list.

The default Form-based Transit Summary report can be requested with the command:

```
IMSPALOG    SUMMARY
IMSPALOG    EXECUTE
```

This produces the same result as the following command in which you can see the defaults explicitly specified:

```
IMSPALOG    SUMMARY (
              DDNAME (SUMM0001),
              NOGROUP,
              TOTALS (0),
              INTERVAL (00:01:00),
              STARTLVL (2),
              COMPLVL (3),
              PRECISION (3),
              TRANMIX (1),
              FIELDS (TRANCODE (ASCEND),
                     TRANCNT,
                     INPUTQ (AVE),
                     PROCESS (AVE),
                     OUTPUTQ (AVE),
                     TOTALTM (AVE),
                     INPUTQ (90),
                     PROCESS (90),
                     OUTPUTQ (90),
                     TOTALTM (90),
                     CPUTIME (AVE),
                     DBCALLS (AVE),
                     DBWAITS (AVE),
                     DCCALLS (AVE)))
IMSPALOG    EXECUTE
```

The following figure shows the default report format.

IMS Performance Analyzer													
Transaction Transit Summary													
SUMMDD	Printed at 15:44:00 23Jul2018			Data from 12.32.25 22Aug2014 to 12.32.37 22Aug2014									
Trancode	Tran Count	Avg InputQ Time	Avg Process Time	Avg OutputQ Time	Avg Total IMS Time	90% InputQ Time	90% Process Time	90% OutputQ Time	90% Total IMS Time	Avg CPU Time	Avg DB Call Count	Avg DB Wait Count	Avg DC Call Count
DSPALLI	1	1	18	0	20	1	18	0	20	8	6	0	9
DSPINV	1	1	12	0	14	1	12	0	14	7	4	0	10
IVTNO	1	0	1	0	2	0	1	0	2	-	-	-	-
PART	4	1	13	0	14	1	19	0	21	5	2	0	4
Total	7	1	12	0	13	1	20	0	21	6	3	0	6

Figure 34. Form-based Transit Summary report (default)

Sample Report Forms

A Report Form is a user-defined template for the design of a report. The batch equivalent is the FIELDS operand. The following sample forms are supplied to demonstrate how Form-based Log Transaction Transit Summary reports can be tailored to meet your specific requirements.

For more information on the fields generated in the sample reports, you can use dialog option 10 **Report Forms** to display the list of sample forms, select the form you are interested in, then enter line action H for help information on any field.

Summary reports

ALLSUMM

Transaction Summary report

ALLSUMMX

Transaction Summary extract

BADRESP

Bad Transaction Response Time

COMPLVL

Transaction Completion Summary

CPUHIGH

High CPU Usage Transactions

DASH

Transaction Dashboard

DBCTSUMM

Summary of DBCTL Transactions

FPANAL

Fast Path Transit Analysis by Trancode

FPBUFUSE

Fast Path Buffer Usage

FPDBCALL

Fast Path Database Calls

FPMSG

Fast Path Message Statistics

FPRESUSE

Fast Path Resource Usage

MSGLEN

Message Length Analysis

OLRSUMM

HALDB Online Reorg Summary report

QTYPE

Queue-type Summary

RESPDIST

Response Time Distribution %

SMQTCOD

SMQ Transaction Analysis

SWITSUMM

Program-Switch Summary report

TRANCLAS

Transit Analysis by Class

TRANINTV

Interval Transaction Analysis

TRANPRTY

Transit Analysis by Priority

TRANRES1

Transaction Resource Usage report

TRANRESD

Transaction Resource Usage DLI Call Summary report

TRANRESU

Transaction Resource Usage

TRANTCOD

Transit Analysis by Trancode

ALLSUMM: Transaction Summary report:

The Transaction Summary report provides a summary of transaction activity grouped by time and transaction code. For each transaction, the report includes a transaction count and averages for CPU time, input queue time, processing time, output queue time, and more. You can use sample report form **ALLSUMM** to format this report.

IMS Performance Analyzer Transaction Summary Report															
SUMM0500 Printed at 14:51:10 28Nov2016				Data from 17.05.30 10Nov2015 to 17.14.23 10Nov2015								Page 1			
Trancode	Tran Count	Avg CPU Time	Avg InputQ Time	Avg Process Time	Avg OutputQ Time	Avg SMQ OutQTime	Avg Glob SMQ OutQTime	Avg Locl SMQ OutQTime	Avg IMS Time	Avg UOR Time	Avg IMS Resp Time	Avg DB Call Count	Avg DB Get Count	Avg DB Updat... Count...	Avg...
ADDINV	10	0.002108	0.004555	0.009272	0.000014	0.004975	0.000012	0.013841	0.009489	0.012495	0.00	0.00	0.00	0.00...	
ADDPART	8	0.002115	0.003790	0.009437	0.000055	0.004838	0.000011	0.013281	0.009682	0.011809	1.50	0.00	1.50	1.50...	
CEXSCONV	15	0.002016	0.004395	0.673819	0.000000	-	-	0.678133	0.675963	0.843202	3.33	1.33	2.00	2.00...	
CEXSNONC	10	0.001901	0.205100	0.206208	0.000021	0.006334	0.000012	0.411097	8.903942	0.348816	3.00	1.20	1.80	1.80...	
CEXTCONV	20	0.002592	0.003821	1.009421	0.000000	0.001928	0.000012	1.013060	1.011854	1.342749	4.25	1.70	2.55	2.55...	
CEXTNONC	16	0.002700	0.131414	2.007797	0.000013	0.003975	0.000017	2.139121	7.455700	2.680362	3.75	1.50	2.25	2.25...	
DLETINV	8	0.002258	0.004567	0.008557	0.000000	0.003064	0.000012	0.013123	0.008742	0.011381	2.00	1.00	1.00	1.00...	
DLETPART	6	0.002303	0.003870	0.009040	0.000049	0.005665	0.000012	0.012959	0.009213	0.012040	4.00	3.00	1.00	1.00...	
DSPALLI	8	0.002727	0.005586	0.014500	0.000000	0.003194	0.000012	0.020087	0.014746	0.019032	4.75	4.75	0.00	0.00...	
DSPINV	16	0.002760	0.004987	0.009787	0.000026	0.004073	0.000012	0.014799	0.010117	0.013774	3.88	3.88	0.00	0.00...	
DVPTRAN2	32	0.007116	0.003668	4.680457	0.000000	-	-	4.684125	4.783285	2.989042	128.16	42.72	85.44	85.44...	
IVPREXX	1	0.010246	-	89.29445	-	-	-	89.29445	89.29445	-	0.00	0.00	0.00	0.00...	
IVTCV	12	0.000971	0.002462	0.006497	0.000000	-	-	0.008959	0.006796	0.005112	1.25	0.67	0.58	0.58...	
IVTCX	12	0.003828	0.001974	0.033538	0.000000	-	-	0.035512	0.033943	0.031770	1.25	0.67	0.58	0.58...	
IVTFD	11	0.000190	0.000030	0.000641	-	-	-	0.000672	0.000525	0.000672	1.36	0.73	0.64	0.64...	
IVTFM	8	0.000176	0.000034	0.000342	-	-	-	0.000377	0.000217	0.000377	0.00	0.00	0.00	0.00...	
IVTNO	22	0.000604	0.004791	0.003569	0.000060	0.003257	0.000012	0.008419	0.155102	0.007379	1.36	0.73	0.64	0.64...	
IVTNV	22	0.000562	0.004984	0.003618	0.000109	0.003620	0.000012	0.008711	0.154291	0.007836	1.36	0.73	0.64	0.64...	
MQATREQ1	4	0.009152	0.004457	0.334054	0.000000	-	-	0.338511	0.334305	0.331896	2.50	1.00	1.50	1.50...	
PART	42	0.001896	2.271696	0.010689	0.000099	0.004934	0.000013	0.014477	0.011390	0.013678	1.29	1.29	0.00	0.00...	
Total	283	0.002548	0.355927	1.083211	0.000040	0.004270	0.000013	1.101288	1.734144	0.674723	16.45	6.00	10.45	10.45...	

Figure 35. Transaction Summary report

The Transaction Summary extract provides a transaction summary grouped by date, time and transaction code suitable for an extract. It provides transaction counts, CPU time averages, and more. You can use sample report form **ALLSUMMX** to format this report.

MS Tran Start	IMS Tran Start	Trancode	Tran Count	CPU Time Avg	InputQ Time Avg	Process Time Avg	OutputQ Time Avg	SMQ Glob OutQ	Time Avg...
015-11-10,11.59.00	CEXTCONV	10,0.002232,0.006563,0.508197,0.000152,0.006379,0.000018,0.514689,1.113737,0.738112	3.00	1.00	0.00	0.00	0.00	0.00	1.00
015-11-10,11.59.00	CXSTCONV	15,0.003160,0.007778,1.010657,0.000133,0.005367,0.000018,1.018396,1.616620,1.520219	4.00	1.00	0.00	0.00	0.00	0.00	1.00
015-11-10,12.00.00	CXSNONC	5,0.001992,0.004271,0.006337,0.000085,0.003834,0.000019,0.010455,0.086613,0.015745	3.00	1.00	0.00	0.00	0.00	0.00	1.00
015-11-10,12.00.00	CXTNONC	9,0.002973,0.005746,1.676197,0.000082,0.004218,0.000025,1.681849,2.235942,2.516471	3.89	1.00	0.00	0.00	0.00	0.00	1.00
015-11-10,12.00.00	IVTVC	15,0.001055,0.006044,0.007617,0.000000,0.003819,0.000017,0.013660,0.007855,0.012824	1.20	0.00	0.00	0.00	0.00	0.00	1.00
015-11-10,12.01.00	IVTVC	9,0.001877,0.008153,0.013596,0.000000,0.007049,0.000017,0.021750,0.015355,0.021545	1.33	0.00	0.00	0.00	0.00	0.00	1.00
015-11-10,12.01.00	IVTVC	24,0.003321,0.005597,0.022117,0.000098,0.004431,0.000017,0.027812,0.022410,0.027401	1.25	0.00	0.00	0.00	0.00	0.00	1.00
015-11-10,12.01.00	IVTFD	5,0.000217,0.000078,0.000608,0.000504,0.000000,0.001190,0.000602,0.000685,1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
015-11-10,12.02.00	IVTFD	6,0.000331,0.000087,0.001771,0.000481,0.000000,0.002339,0.001767,0.001858,1.67	1.00	0.00	0.00	0.00	0.00	0.00	1.00
015-11-10,12.02.00	IVTFM	8,0.000095,0.000091,0.000098,0.000514,0.000000,0.000703,0.000095,0.000190,0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
015-11-10,12.02.00	IVTNO	11,0.000661,0.006850,0.005218,0.000000,0.003451,0.000018,0.012068,0.001758,0.011758	1.36	0.00	0.00	0.00	0.00	0.00	1.00
015-11-10,12.02.00	IVTNN	5,0.000544,0.005568,0.005405,0.000000,0.003859,0.000019,0.010973,0.006843,0.010572	1.00	0.00	0.00	0.00	0.00	0.00	1.00
015-11-10,12.03.00	ADDINV	5,0.002314,0.006555,0.010664,0.000142,0.004300,0.000020,0.017360,0.010837,0.017069	0.80	0.00	0.00	0.00	0.00	0.00	1.00
015-11-10,12.03.00	ADDPART	4,0.002319,0.008862,0.010776,0.000062,0.004876,0.000019,0.019700,0.012288,0.019447	1.50	0.00	0.00	0.00	0.00	0.00	1.00
015-11-10,12.03.00	DLCTINV	1,0.002559,0.006134,0.012148,0.000252,0.005854,0.000020,0.018534,0.012327,0.018534	2.00	1.00	0.00	0.00	0.00	0.00	1.00
015-11-10,12.03.00	DSPALLI	4,0.002769,0.006158,0.010570,0.000152,0.004639,0.000018,0.016880,0.011502,0.016652	4.75	4.00	0.00	0.00	0.00	0.00	1.00
015-11-10,12.03.00	DSPINV	8,0.002920,0.007754,0.010966,0.000115,0.005049,0.000019,0.018835,0.011805,0.018738	3.88	3.00	0.00	0.00	0.00	0.00	1.00
015-11-10,12.03.00	IVTVN	6,0.000613,0.007322,0.005499,0.000000,0.003912,0.000021,0.012821,0.009650,0.012367	1.67	1.00	0.00	0.00	0.00	0.00	1.00
015-11-10,12.03.00	MQATREQ1	4,0.009895,0.006400,0.322004,0.000267,0.008444,0.000030,0.328671,0.323544,0.328530	2.50	1.00	0.00	0.00	0.00	0.00	1.00
015-11-10,12.03.00	PART	9,0.002175,0.008458,0.011094,0.000136,0.004821,0.000019,0.019689,0.011595,0.019528	1.67	1.00	0.00	0.00	0.00	0.00	1.00
015-11-10,12.04.00	DLCTINV	3,0.002640,0.007237,0.012140,0.000120,0.004937,0.000021,0.019497,0.012713,0.018945	2.00	1.00	0.00	0.00	0.00	0.00	1.00
015-11-10,12.04.00	DIFTPART	3,0.002631,0.010409,0.011869,0.000214,0.006262,0.000020,0.022492,0.014446,0.022458	4.00						

BADRESP: Bad Transaction Response Time report:

The Bad Transaction Response Time report provides an analysis of transaction response time by reporting the longest response times first. You can use sample report form **BADRESP** to format this report.

Instead of reporting in the usual transaction code sequence, the report is sorted in descending response time sequence so those transactions with the worst response time can be easily identified. The breakdown of transit time is provided to identify the reasons for the long response time.

IMS Performance Analyzer														
Bad Transaction Response Time														
SUMM0001 Printed at 15:49:10 13Apr2018 Data from 12.01.44 20Sep2014 to 02.34.43 22Feb2018														
Trancode	Tran Count	Avg InputQ Time	Avg Process Time	Avg OutputQ Time	Avg Total Time	Avg IMS Resp Time	90% InputQ Time	90% Process Time	90% OutputQ Time	90% Total Time	90% IMS Resp Time	Avg CPU Time	Avg DB Call Count	
CEXTCONV	1	1.630	10.032.949	0.000	10.034.579	10.033.375	1.631	10.032.950	0.001	10.034.580	10.033.376	199.999.95	0	
DVPTRAN2	13	0.337	3.856.681	22.940.293	26.797.311	3.855.810	0.960	10.057.721	54.438.617	53.630.691	10.059.273	3.153	0	
PART	34	29.161	325.519	0.000	354.682	161.308	172.345	1.115.327	0.019	1.173.611	543.033	8.110	2	
DSPALLI	22	1.067	67.994	0.006	69.067	67.918	4.034	229.130	0.041	232.505	231.601	8.942	6	
IVPREXX	120	0.211	50.250	0.226	50.686	49.675	0.477	157.730	1.333	158.730	158.083	5.665	0	
IVTNO	49	4.924	28.970	0.007	33.901	32.257	33.504	138.910	0.074	170.494	166.644	1.936	1	
IVTCV	152	4.120	676.556	0.000	680.675	18.746	36.271	2.115.017	0.001	2.125.728	102.342	1.283	1	
DVPTRAN5	19	5.274.288	899.568	0.000	6.173.856	18.020	34.673.568	2.630.515	0.001	35.387.559	48.206	2.212	0	
JLMTRAN5	65	0.677	18.501	0.000	19.177	15.279	2.039	46.609	0.001	48.341	44.479	2.157	0	
TAL	475	215.093	423.818	627.898	1.266.809	166.655	6.095.620	2.133.130	7.569.768	10.442.984	1.606.721	424.559	0	

COMPLVL: Transaction Completion Summary report:

The Transaction Completion Summary report provides a breakdown of transaction activity on the IMS log for each region type, such as MPP, BMP. The breakdown by

completion level indicates for each type of transaction, how far they progressed towards completing. You can use sample report form **COMPLVL** to format this report.

IMS Performance Analyzer													
Transaction Completion Summary													
SUMM0002 Printed at 16:05:02 13Apr2018				Data From 12.01.44 20Sep2014 to 02.34.43 22Feb2018									
Reg Comp	Tran	Count	Avg	Count	Avg	Count	Avg	Count	Avg	Count	Avg	Count	Avg
Typ Level	Count	InputQ	InputQ	Process	Process	OutputQ	OutputQ	Total	Total	IMS	IMS	CPU	CPU
		Time	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time
- 1	188	0	0	0	0	0	0	0	0	0	0	0	0
MPP 5	475	475	215093	475	423818	475	627898	475	1266809	473	166655	475	424559
T*	663	475	215093	475	423818	475	627898	475	1266809	473	166655	475	424559

Figure 38. Transaction Completion Summary report

The following completion levels indicate how transactions were processed:

- 0 System generated output messages, not related to transaction activity, reported by IMS PA for completeness when analysis of overall message activity is being performed.
- 1 Transaction input messages remain on the input queue but have not been processed by a dependent region. This could indicate that no dependent regions are eligible or available to process this transaction code.
- 2 Transactions are being processed by a dependent region but have not completed. This usually indicates long running transactions or transactions at the end of the log that have not completed.
- 3 Transactions have finished processing in the dependent region but the output message has not been sent. This could indicate that the output LTERM is not available to receive messages.
- 4 Transactions have completed processing, but the dependent region schedule has not terminated (type 07 log record is not available). This usually indicates that the transactions were processed by long running WFI or pseudo-WFI regions. IMS PA attempts to wait until the schedule is completed before reporting a completed transaction, but virtual storage constraints in the IMS PA batch job cause it to report transactions without their type 07 accounting statistics (completion level 5). All transit time information is available for these transactions, however CPU usage and DB/DC DLI call counts obtained from the type 07 application termination records are not available.
- 5 Transactions have completed processing, and the dependent region schedule has terminated (type 07 log record is available). Information about the transaction is available for reporting, including CPU usage and DB/DC call counts, but are *approximations* only. Type 07 application termination record statistics are apportioned equally amongst all transactions processed by the program schedule.
- 6 Transactions have ended and accurate resource utilization statistics are available. For Unit-of-Recovery (UOR) transactions, resource utilization statistics are derived from the type 56FA transaction-level accounting record. This record provides accurate and reliable information for each Unit-of-Recovery (UOR). Resource statistics for transactions reported over the entire schedule are taken from the type 07 record. This includes DBCTL, ODBM, and non-message driven BMP transactions.

All application statistics fields are available for reporting.

CPUHIGH: High CPU Usage Transactions report:

The High CPU Usage Transactions report provides an analysis of transaction CPU usage by reporting the highest CPU times first. You can use sample report form **CPUHIGH** to format this report.

Instead of reporting in the usual transaction code sequence, the report is sorted in descending CPU time sequence so those transactions with the highest CPU usage can be easily identified.

IMS Performance Analyzer High CPU Usage Transactions													
SUMM0003 Printed at 15:49:10 13Apr2018 Data from 12.01.44 20Sep2014 to 02.34.43 22Feb2018													
Trancode	Tran Count	Avg InputQ Time	Avg Process Time	Avg OutputQ Time	Avg Total Time	90% InputQ Time	90% Process Time	90% OutputQ Time	90% Total Time	Tot CPU	Avg CPU Time	Avg DB Call Count	Avg DC Call Count
CEXTCONV	1	1.630	10.032.949	0.000	10.034.579	1.631	10.032.950	0.001	10.034.580	199.999.95	199.999.95	0	4
IVPREXX	120	0.211	50.250	0.226	50.686	0.477	157.730	1.333	158.730	679.801	5.665	0	3
PART	34	29.161	325.519	0.002	354.682	172.345	1.115.327	0.019	1.173.611	275.729	8.110	2	4
DSPALLI	22	1.067	67.994	0.006	69.067	4.034	229.130	0.041	232.505	196.721	8.942	6	9
IVTCV	152	4.120	676.556	0.000	680.675	36.271	2.115.017	0.001	2.125.728	195.009	1.283	1	4
JLMTRAN5	65	0.677	18.501	0.000	19.177	2.039	46.609	0.001	48.341	140.200	2.157	0	4
IVTNO	49	4.924	28.970	0.007	33.901	33.504	138.910	0.074	170.494	94.882	1.936	1	2
DVPTRAN5	19	5.274.288	899.568	0.000	6.173.856	34.673.568	2.630.515	0.001	35.387.559	42.026	2.212	0	4
DVPTRAN2	13	0.337	3.856.681	22.940.293	26.797.311	0.960	10.057.721	54.438.617	53.630.691	40.991	3.153	0	4
Total	475	215.093	423.818	627.898	1.266.809	6.095.620	2.133.130	7.569.768	10.442.984	201.665.31	424.559	1	4

Figure 39. High CPU Usage Transactions report

DASH: Transaction Dashboard report:

The Transaction Dashboard report provides a high-level overview of the type of activity in your IMS environment. You can use sample report form **DASH** to format this report.

Transaction activity is broken down by region type (such as MPP, BMP) and transaction type (OTMA, IMS Connect, APPC MSC).

IMS Performance Analyzer																	
Transaction Dashboard																	
SUMM0004 Printed at 15:49:10 13Apr2018					Data from 12.01.44 20Sep2014 to 02.34.43 22Feb2018												
Reg	Typ	OTMA	APPC	MSC	Tran Count	Avg InputQ Time	Avg Process Time	Avg OutputQ Time	Avg Total Time	IMS Resp Time	Avg CPU Time	90% InputQ Time	90% Process Time	90% OutputQ Time	90% Total Time	IMS Resp Time	90% CPU Time
MPP	OTMA				475	215.093	423.818	627.898	1.266.809	166.655	424.559	6.095.620	2.133.130	7.569.768	10.442.984	1.606.721	12.188.785
T*					475	215.093	423.818	627.898	1.266.809	166.655	424.559	6.095.620	2.133.130	7.569.768	10.442.984	1.606.721	12.188.785

Figure 40. Transaction Dashboard report

DBCTSUMM: DBCTL Summary report:

The DBCTL Summary report summarizes DBCTL transaction activity. You can use sample report form **DBCTSUMM** to format this report.

It summarizes transaction activity information detailed in sample report form "DBCTLIST: DBCTL List report" on page 88.

IMS Performance Analyzer															
Summary of DBCTL Transactions															
SUMM0002 Printed at 15:50:47 23Aug2014					Data from 15.24.57 26Jul2014 to 15.25.10 26Jul2014									Page 1	
Program	Tran Count	Avg Process Time	90% Process Time	Max Process Time	Avg CPU Time	Avg DB Call Count	DB Get Count	DB Updat Count	Avg DB Wait Count	FP Call Count	Avg FP Get Count	FP Updat Count	Avg FP Wait Count		
DFHSAM04	24	479	2943	9493	1	1	1	1	0	-	-	-	-		
DFHSAM05	24	71	278	817	1	3	3	0	0	-	-	-	-		
DFHSAM24	24	487	3007	9705	1	2	1	1	0	-	-	-	-		
DFHSAM25	24	69	270	799	1	3	3	0	0	-	-	-	-		
Total	96	276	2037	9705	1	2	2	0	0	-	-	-	-		

Figure 41. DBCTL Summary report

Related reference:

“DBCTLIST: DBCTL List report” on page 88

The DBCTL List report lists DBCTL transactions, their performance characteristics, and CICS identification information. You can use sample report form **DBCTLIST** to format this report.

FPANAL: Fast Path Transit Analysis by Trancode Summary report:

The Fast Path Transit Analysis by Trancode Summary report provides a summary of transaction activity grouped by transaction code and Fast Path routing code. You can use sample report form **FPANAL** to format this report.

It is recommended to use TRANMIX(4) with this report to include transactions that use Fast Path (EMH and DEDB).

IMS Performance Analyzer FP Transit Analysis by Trancode															
SUMM0250 Printed at 12:42:06 28Nov2016				Data from 16.03.21 10Nov2015 to 16.09.39 10Nov2015								Page 1			
Trancode	Routing Code	Tran Count	Min Total	Avg InputQ	90% Process Time	Avg OutputQ	90% Total	90% InputQ	90% Process Time	90% OutputQ	90% Total	Max...	Shr	Qs...	Global...
IVTFD	IVTFD	110	0.000976	0.000090	0.000712	0.000560	0.001362	0.000108	0.001301	0.001071	0.002152	0.004885			
IVTFM	IVTFM	80	0.000547	0.000113	0.000109	0.000660	0.000891	0.000348	0.000120	0.001259	0.001583	0.003631			
Total		190	0.000547	0.000100	0.000458	0.000606	0.001164	0.000253	0.001047	0.001155	0.001970	0.004885			

Figure 42. Fast Path Transit Analysis by Trancode Summary report

FPBUFUSE: Fast Path Buffer Usage Summary report:

The Fast Path Buffer Usage Summary report provides a summary of Fast Path buffer usage grouped by transaction code, Fast Path routing code, and region job name. You can use sample report form **FPBUFUSE** to format this report.

It is recommended to use TRANMIX(4) with this report to include transactions that use Fast Path (EMH and DEDB).

IMS Performance Analyzer FP Buffer Usage											
SUMM0500 Printed at 16:11:03 28Nov2016			Data from 16.03.21 10Nov2015 to 16.09.39 10Nov2015						Page 1		
Trancode	Routing	Jobname	Tran	Min	Max	Avg	90%	Max	Min	Max	Avg...
Code	Code		Count	NBA	NBA	NBA	NBA	NBA	OBA	OBA	OBA...
Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count
IVTFD	IVTFD	IEDEIFP1	110	6	6	1.00	1	1	5	5	0.00...
IVTFM	IVTFM	IEDEIFP2	80	6	6	0.25	1	1	5	5	0.00...
Total			190	6	6	0.68	1	1	5	5	0.00...

Figure 43. Fast Path Buffer Usage Summary report

FPDBCALL: Fast Path Database Calls Summary report:

The Fast Path Database Calls Summary report provides a summary of Fast Path database call activity grouped by transaction code, Fast Path routing code, and region job name. You can use sample report form **FPDBCALL** to format this report.

It is recommended to use TRANMIX(4) with this report to include transactions that use Fast Path (EMH and DEDB).

IMS Performance Analyzer FP Database Calls											
SUMM0500 Printed at 13:39:38 28Nov2016			Data from 05.50.00 07Oct2015 to 05.48.58 07Oct2015						Page 1		
Trancode	Routing	Jobname	Tran	Avg	Max	Avg	Max	Avg	Max	Avg	Max...
Code	Code		Count	FP GU	FP GU	FP GN	FP GN	FP GNP	FP GNP	FP GHU	FP GHU
Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count
DBABCPU0	-	ABCDEFH	10	0.00	0	0.00	0	0.00	0	0.00	0
DBABDPU0	-	HH0ACCC	2	0.00	0	0.00	0	0.00	0	0.00	0
DCPAA	-	HHBBB303	1	3.00	3	0.00	0	0.00	0	1.00	1
DCPBA	-	HHBBB503	1	3.00	3	0.00	0	0.00	0	1.00	1
DCPCA	-	HHBBB203	2	9.00	9	0.00	0	1.00	1	2.00	2
DEFG	-	-	1,964	2.00	2	0.00	0	0.00	0	0.00	0
DEFG	-	HHBM910	772	2.01	4	0.00	0	0.00	0	0.00	1
DEFG	-	HHBM920	2,404	2.00	2	0.00	0	0.00	0	0.00	0
DEFG	-	HHBM950	1	2.00	2	0.00	0	0.00	0	0.00	0
DEFG	-	HHBM960	37	2.00	2	0.00	0	0.00	0	0.00	0
DEFG	-	HHBM970	1,500	2.00	4	0.00	0	0.00	0	0.00	1
DEFG	-	HHBM980	1,053	2.00	2	0.00	0	0.00	0	0.00	0
DEFG	-	HHBBB30	169	2.00	2	0.00	0	0.00	0	0.00	0
DEFG	-	HHBBB40	1,166	2.01	4	0.00	0	0.00	0	0.01	1
DEFG	-	HHBBB70	216	2.01	3	0.00	0	0.00	0	0.01	1
HIJK	-	HHBBB20	2	1.50	2	2.00	2	0.00	0	0.00	0
HIJK	-	HHBBB50	3	1.00	1	2.00	2	0.00	0	0.00	0
JWLS	-	HHAZSRV	1	16110.00	16,110	0.00	0	0.00	0	0.00	0
JWOD	-	-	1	318.00	318	0.00	0	0.00	0	0.00	0
JWRE	-	HHBBB40	2	3.00	3	0.00	0	0.00	0	0.00	0
JWRE	-	HHBBB70	8	2.25	3	0.00	0	0.00	0	0.00	0
PDDSCMP	-	RDASDA	1	1213.00	1,213	0.00	0	0.00	0	0.00	0
PDDSCDM	-	RDASDB	1	0.00	0	0.00	0	0.00	0	3062.00	3,062
PDDSCHH	-	SDASCM	1	59734.00	59,734	143814.00	143,814	0.00	0	0.00	0
PDDSCMM	-	TDASCM	1	59338.00	59,338	104673.00	104,673	44284.00	44,284	8004.00	8,004

Figure 44. Fast Path Database Calls Summary report

FPMSG: Fast Path Message Statistics Summary report:

The Fast Path Message Statistics Summary report provides a summary of Fast Path message statistics grouped by transaction code and Fast Path routing code. You can use sample report form **FPMSG** to format this report.

It is recommended to use TRANMIX(4) with this report to include transactions that use Fast Path (EMH and DEDB).

IMS Performance Analyzer FP Message Statistics									
SUMM0001 Printed at 15:04:32 28Nov2016			Data from 05.55.00 02Aug2014 to 06.49.57 03Aug2014					Page	1
Trancode	Routing Code	Local First	Shr Qs Local	Shr Qs Global	Tran Count	Avg Input Msg Len	Max Input Msg Len	Avg Output Msg Len	Max Output Msg Len
ABCAB	-	0	0	0	12	-	-	-	-
ABAAA	-	0	0	0	2	1566.00	1,566	1884.00	1,882
ABBAZA	-	0	0	0	3	1784.00	1,784	1884.00	1,882
CDLCD	-	0	0	0	9,292	789.86	888	806.72	2,891
CDLDS	-	0	0	0	5	702.00	702	2115.00	2,113
CDMOD	-	0	0	0	1	-	-	-	-
CDNCD	-	0	0	0	2	569.00	569	1411.00	1,411
DLLAMP	-	0	0	0	10	712.00	602	4230.00	4,231
DLLCDM	-	0	0	0	1	-	-	-	-
DLLCML	-	0	0	0	1	-	-	-	-
DLLDGH	-	0	0	0	2	-	-	-	-
EDTS	-	0	0	0	1	-	-	-	-
EIPSOESB	-	0	0	0	2	-	-	-	-
GGCF0002	-	0	0	0	17	643.00	646	-	-
GGFXMENU	-	0	0	0	1	922.00	922	947.00	947
GGTMCLOP	-	0	0	0	1	1230.00	1,330	-	-
GGTMEC10	-	0	0	0	8	1490.00	1,490	1751.00	1,751
:									

Figure 45. Fast Path Message Statistics Summary report

FPRESUSE: Fast Path Resource Usage Summary report:

The Fast Path Resource Usage Summary report provides a summary of Fast Path resource usage grouped by transaction code, Fast Path routing code, and region job name. You can use sample report form **FPRESUSE** to format this report.

Resources reported include VSO, buffers, GET and UPDATE counts. It is recommended to use TRANMIX(4) with this report to include transactions that use Fast Path (EMH and DEDB).

IMS Performance Analyzer FP Resource Usage												
SUMM0500 Printed at 14:13:51 28Nov2016			Data from 16.03.21 10Nov2015 to 16.09.39 10Nov2015							Page 1		
Trancode	Routing Code	Jobname	Tran Count	Avg FP Get Count	Max FP Get Count	Avg FP Updat Count	Max FP Updat Count	Avg DEDB Get Count	Max DEDB Get Count	Avg OTHREAD Buffers	Max... OTHREAD Buffers	VSO R... Datas...
IVTFD	IVTFD	IEDEIFP1	110	0.73	1	0.64	1	1.00	1	0.64	1	0...
IVTFM	IVTFM	IEDEIFP2	80	0.00	0	0.00	0	0.00	0	0.00	0	0...
Total			190	0.42	1	0.37	1	0.58	1	0.37	1	0...

Figure 46. Fast Path Resource Usage Summary report

MSGLEN: Message Length Analysis report:

The Message Length Analysis report shows for each transaction code, statistical information about the number and length of all input and output messages. You can use sample report form **MSGLEN** to format this report.

IMS Performance Analyzer Message Length Analysis											
SUMM0001 Printed at 16:05:02 13Apr2018			Data from 12.01.44 20Sep2014 to 02.34.43 22Feb2018								
Trancode	Tran Count	Min Input Msg Len	Avg Input Msg Len	90% Input Msg Len	Max Input Msg Len	Tot Input Msg Len	Min Output Msg Len	Avg Output Msg Len	90% Output Msg Len	Max Output Msg Len	Tot Output Msg Len
CEXTCONV	1	1,044	1,044	1,045	1,044	1,044	1,093	1,093	1,094	1,093	1,093
DSPALLI	22	980	980	981	980	21,560	1,486	1,486	1,487	1,486	32,692
DVPTRAN2	13	1,018	1,029	1,041	1,040	13,374	1,060	1,667	2,073	2,072	21,672
DVPTRAN5	19	1,066	1,069	1,075	1,074	20,310	1,120	1,636	2,220	2,219	27,808
IVPREXX	120	980	980	981	980	117,600	995	1,005	1,007	1,006	120,643
IVTCV	152	1,046	1,078	1,095	1,094	163,911	1,113	1,147	1,162	1,161	174,388
IVTNO	49	992	992	993	992	48,608	1,053	1,053	1,054	1,053	51,597
JLMTRAN5	65	1,067	1,072	1,077	1,076	69,706	1,120	1,199	1,553	2,221	77,909
PART	34	973	975	979	978	33,164	997	1,347	1,999	2,307	45,783
Total	475	973	1,030	1,092	1,094	489,277	995	1,170	1,524	2,307	553,585

Figure 47. Message Length Analysis report

OLRSUMM: HALDB Online Reorg Summary report:

The HALDB Online Reorg List report shows summarized HALDB Online Reorganization (OLR) statistics. It summarizes the number of high availability large database (HALDB) updates and inserts performed by transactions, which programs were called, and the average total IMS time for each program in the time period you specify.

To limit the report output to the relevant programs, you must add selection criteria of Program INC 0* to the report in the report set.

The reason for this requirement is that during online reorganization, IMS dynamically builds a PSB whose name is constructed using the 7-byte HALDB partition name and prefixed with a numeric character zero('0').

Tip: You can further limit the program selection criteria by adding the partition id after the zero (for example, '0PART1*').

IMS Performance Analyzer HALDB Online Reorg Summary											
SUMM0001 Printed at 11:13:10 15Aug2018			Data from 14.30.43 24Feb2014 to 14.30.46 24Feb2014								
IMS Tran Start	Database Program	DBD Name	Tran Count	Updates /Second	Avg Total IMS Time	Avg DB Lock Time	Avg High Lock Cnt	Max DB Lock Time	Max High Lock Cnt	Avg FF DBUpd count	Avg DB Call Count
14.30.00	0PARTZP1	PARTZP1	1	6,263	42.36887	-	13390.00	-	13,390	18171.00	-
14.30.00	0PARTZP2	PARTZP2	1	6,037	42.58618	-	13157.00	-	13,157	17516.00	-
14.30.00	0PARTZP3	PARTZP3	1	5,549	41.96463	-	12039.00	-	12,039	16099.00	-
14.30.00	0PARTZP4	PARTZP4	1	5,246	40.29813	-	11401.00	-	11,401	15220.00	-
Total			4	23,095	41.80445	-	12496.75	-	13,390	16751.50	-

Figure 48. HALDB Online Reorg Summary report

QTYPE: Queue-type Summary report:

The Queue Type Summary report provides a breakdown of how transactions are processed in a shared queues sysplex environment. For each region type, you can see at a glance the performance characteristics of transactions processed globally versus those processed locally in a shared queues environment. You can use sample report form **QTYPE** to format this report.

You can compare input queue times for transactions that were processed locally against those that required putting onto the CQS shared queue for processing on the back-end system.

IMS Performance Analyzer													
Queue-type Summary													
SUMM0001 Printed at 15:52:35 13Apr2018 Data from 12.01.44 20Sep2014 to 02.34.43 22Feb2018													
Reg Queue	Tran	Avg	Tot	Avg	Tot	Avg	Tot	Avg	Tot	Avg	Tot	Avg	Tot
Typ Type	Count	InputQ	InputQ	Process	Process	OutputQ	OutputQ	IMS Resp	IMS Resp	Total	Total	CPU	CPU
		Time	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time
MPP MSGQ	475	215.093	102.169.12	423.818	201.313.61	627.898	298.251.48	166.655	78.828.002	1.266.809	601.734.21	424.559	201.665.31
T*	475	215.093	102.169.12	423.818	201.313.61	627.898	298.251.48	166.655	78.828.002	1.266.809	601.734.21	424.559	201.665.31

Figure 49. Queue-type Summary report

RESPDIST: Response Time Distribution % report:

The Response Time Distribution % sample report form, **RESPDIST**, generates a report that shows the percentage of transactions within a series of pre-defined ranges. You can use this sample form to create your own report that, for example, shows the percentage of transactions with a response time within a required service level.

Range values (distributions) can be reported as counts or percentages.

IMS Performance Analyzer													
Response Time Distribution %													
SUMM0250 Printed at 15:52:35 11Aug2008 Data from 10.23.34 11Apr2007 to 10.26.24 11Apr2007													
IMS Tran Proc	Tran	Min	Avg	Max	<10	<50	<100	<200	<500	>=500	>=500		
Start IMS ID	Count	IMS Time	IMS Time	IMS Time	IMS Time	IMS Time	IMS Time	IMS Time	IMS Time	IMS Time	IMS Time	Total	Total
Trancode													
10.23.00 U211 PC00IMSC	1	918	918	918	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%		1	1
10.24.00 U211 PC00IMSC	1	1173	1173	1173	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%		1	1
10.25.00 U211 FAM0WB01	3	2339	2876	3352	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%		3	3
10.25.00 U211 FAM0WB02	7	994	2664	5281	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%		7	7
10.25.00 U211 FAM0WB07	3	2608	3044	3747	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%		3	3
10.26.00 U211 FAM0T041	1	229	229	229	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%		0	0
10.26.00 U211 FIN0T000	2	1231	1364	1497	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%		2	2
10.26.00 U211 FIN0T039	1	1134	1134	1134	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%		1	1
10.26.00 U211 IMSPROBE	1	275	275	275	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%		0	0
Total	20	229	2143	5281	0.00%	0.00%	0.00%	0.00%	10.00%	90.00%		18	18

Figure 50. Response Time Distribution % report

SMQTCOD: SMQ Transaction Analysis report:

The SMQ Transaction Analysis report summarizes transaction activity in a shared queues sysplex environment. You can use sample report form **SMQTCOD** to format this report.

For each transaction code, the number of transactions processed and standard transit information is reported. Information specific to sysplex processing including originating and processing systems, as well as time spent by the input and output messages on the shared message queue is also reported.

This report summarizes the detailed information in the List report generated using report form **SMQLIST**.

IMS Performance Analyzer SMQ Transaction Analysis																
SUMM0002 Printed at 15:52:35 13Apr2018 Data from 12.01.44 20Sep2014 to 02.34.43 22Feb2018																
Queue	Tran	Avg	Avg	Avg	Avg	90%	90%	90%	90%	Count	Avg	Avg	90%	90%	Avg	Avg
Trancode Type	Count	InputQ	Process	OutputQ	Total	Time	Time	Time	Total	SMQ Glob	SMQ Loc1	SMQ Glob	SMQ Loc1	SMQ Glob	DB Call	CPU
CEXTCONV MSGQ	1	1.630	10.032.949	0.000	10.034.579	1.631	10.032.950	0.001	10.034.580	0	0.000	0.000	0.001	0.001	0	199.999.95
DSPALLI MSGQ	22	1.067	67.994	0.006	69.067	4.034	229.130	0.041	232.605	0	0.000	0.000	0.001	0.001	6	8.942
DVPTRANS MSGQ	13	0.337	3.856.681	22.940.293	26.797.311	0.960	10.057.721	54.438.617	53.630.691	0	0.000	0.000	0.001	0.001	0	3.153
DVPTRANS MSGQ	19	5.274.288	899.568	0.000	6.173.856	34.673.568	2.630.515	0.001	35.387.559	0	0.000	0.000	0.001	0.001	0	2.212
IVPREXX MSGQ	120	0.211	50.250	0.226	50.686	0.477	157.730	1.333	158.730	0	0.000	0.000	0.001	0.001	0	5.665
IVTCV MSGQ	152	4.120	676.556	0.000	680.675	36.271	2.115.017	0.001	2.125.728	0	0.000	0.000	0.001	0.001	1	1.283
IVTNO MSGQ	49	4.924	28.970	0.007	33.901	33.504	138.910	0.074	170.494	0	0.000	0.000	0.001	0.001	1	1.936
JLMTRANS MSGQ	65	0.677	18.501	0.000	19.177	2.039	46.609	0.001	48.341	0	0.000	0.000	0.001	0.001	0	2.157
PART MSGQ	34	29.161	325.519	0.002	354.682	172.345	1.115.327	0.019	1.173.611	0	0.000	0.000	0.001	0.001	2	8.110
Total	475	215.093	423.818	627.898	1.266.809	6.095.620	2.133.130	7.569.768	10.442.984	0	0.000	0.000	0.001	0.001	1	424.559

Figure 51. SMQ Transaction Analysis report

Related reference:

“SMQLIST: SMQ Transaction Transit Log report” on page 91

The SMQ Transaction Transit Log report lists all transactions processed in a shared queues sysplex environment. The report highlights standard transit information, information specific to sysplex processing including the originating and processing systems, and time spent by the input and output messages on the shared message queue.

SWITSUMM: Program-Switch Summary report:

The Program Switch Summary report provides an analysis of transaction transit performance by transaction code. The report form uses field ORGTRAN to group all program switch transactions by their originating transaction code.

IMS Performance Analyzer Program-Switch Summary												
SUMM0001 Printed at 10:59:19 15Feb2018 Data from 14.24.15 16Jan2018 to 14.31.46 16Jan2018												
Org	Parent	Prog	Reg	Tran	InputQ	Avg	Avg	Avg	Avg	Avg	Avg	Avg
Trancode	Trancode	Trancode	Switch#	Count	Time	Time	Time	Time	Time	Time	Time	Time
ADDINV	ADDINV	ADDINV	0 MPP	5	0.019419	-	0.026187	0.000466	0.046072	0.045795	0.004037	
ADDPART	ADDPART	ADDPART	0 MPP	4	0.023442	-	0.018527	0.000425	0.042394	0.042394	0.003830	
CEXSCONV	CEXSCONV	CEXSCONV	0 MPP	10	0.023038	-	1.066110	0.004128	1.090798	1.113207	0.001764	
CEXSCONV	CEXSCONV	CEXTCONV	1 MPP	6	0.026241	0.025708	0.022532	0.000000	0.048240	-	0.004061	
CEXSNONC	CEXSNONC	CEXSNONC	0 MPP	3	0.008481	-	0.006431	0.000394	0.015043	0.027807	0.001284	
CEXSNONC	CEXSNONC	CEXTNONC	1 MPP	2	0.007938	0.007655	0.013825	0.000000	0.021480	-	0.003170	
CEXTCONV	CEXTCONV	CEXTCONV	0 MPP	22	0.015440	-	1.861669	0.008364	1.883192	1.983831	0.003605	
CEXTCONV	CEXTCONV	CEXSCONV	1 MPP	5	0.063163	0.062614	0.038548	0.000324	0.101486	-	0.004408	
CEXTNONC	CEXTNONC	CEXTNONC	0 MPP	7	0.009921	-	2.166445	0.000414	2.176603	2.533422	0.004361	
CEXTNONC	CEXTNONC	CEXSNONC	1 MPP	2	0.019124	0.018040	0.013268	0.000020	0.031327	-	0.003671	
DLETINV	DLETINV	DLETINV	0 MPP	4	0.040619	-	0.029115	0.000732	0.070466	0.069923	0.004251	
DLETPART	DLETPART	DLETPART	0 MPP	3	0.055213	-	0.018569	0.004871	0.078653	0.077995	0.004220	
DSPALLI	DSPALLI	DSPALLI	0 MPP	4	0.005049	-	0.013199	0.000399	0.018647	0.018389	0.004492	
DSPINV	DSPINV	DSPINV	0 MPP	8	0.006307	-	0.016039	0.000024	0.022370	0.021393	0.004756	

Figure 52. Program-Switch Summary report

TRANCLAS: Transit Analysis by Class report:

The Transit Analysis by Class report provides a breakdown of transaction transit performance by transaction class, as specified by the TRANSACT macro MSGTYPE parameters. You can use sample report form **TRANCLAS** to format this report.

IMS Performance Analyzer Transit Analysis by Class															
SUMM0002 Printed at 15:49:10 13Apr2018			Data from 12.01.44 20Sep2014 to 02.34.43 22Feb2018												
Cls	Tran Count	Min Total Time	Avg InputQ Time	Avg Process Time	Avg OutputQ Time	Avg IMS Resp Time	90% InputQ Time	90% Process Time	90% OutputQ Time	90% IMS Resp Time	Max Total Time	Avg CPU Time	Avg DB Call Count	Avg DB Wait Count	Avg DB Wait Count
1	475	2.392	215.093	423.818	627.898	166.655	6.095.620	2.133.130	7.569.768	1.606.721	100.114.40	424.559	1	0	0
T*	475	2.392	215.093	423.818	627.898	166.655	6.095.620	2.133.130	7.569.768	1.606.721	100.114.40	424.559	1	0	0

Figure 53. Transit Analysis by Class report

TRANINTV: Interval Transaction Analysis report:

The Interval Transaction Analysis report summarizes transaction activity for each user-specified time interval. You can use sample report form **TRANINTV** to format this report.

For example, the performance characteristic of each transaction is reported for every 15 minute interval during the day so that you can identify how transaction performance varies over time.

IMS Performance Analyzer Interval Transaction Analysis															
SUMM0003 Printed at 15:52:35 13Apr2018			Data from 12.01.44 20Sep2014 to 02.34.43 22Feb2018												
IMS Tran Start	Tran Count	Min Total Time	Avg InputQ Time	Avg Process Time	Avg OutputQ Time	Avg Total Time	90% InputQ Time	90% Process Time	90% OutputQ Time	90% Total Time	Max Total Time	Avg DB Call Count	Avg DC Call Count	Avg DB Wait Count	Avg CPU Time
12.01.00 IVPREXX	3	5.997	0.436	98.420	0.160	99.016	1.058	281.758	0.481	283.295	283.294	0	2	0	4.156
12.02.00 IVPREXX	1	8.853	0.123	8.730	0.000	8.853	0.124	8.731	0.001	8.854	8.853	0	2	0	4.156
12.04.00 IIVTCV	2	4.326.098	116.764	4.764.184	0.000	4.880.948	232.724	5.434.994	0.001	5.435.798	5.435.797	1	4	0	1.016
12.06.00 IIVTNO	3	4.885	37.069	157.256	0.000	194.325	110.950	461.804	0.001	572.753	572.752	1	2	0	1.918
12.10.00 IVPREXX	3	4.556	0.107	10.804	0.178	11.090	0.122	22.057	0.535	22.712	22.711	0	2	0	4.156
12.28.00 IVPREXX	3	19.139	0.375	98.747	0.148	99.270	0.874	257.490	0.444	258.806	258.805	0	3	0	9.505
13.01.00 DVPTTRANS	1	306.265	177.203	129.062	0.000	306.265	177.204	129.063	0.001	306.266	306.265	0	0	0	3.385
13.44.00 IVPREXX	1	276.602	0.768	275.834	0.000	276.602	0.769	275.835	0.001	276.603	276.602	0	4	0	27.786
13.44.00 PART	1	674.994	1.732	673.262	0.000	674.994	1.733	673.263	0.001	674.995	674.994	2	5	0	25.234
13.46.00 CEXTCONV	1	10.034.579	1.630	10.032.949	0.000	10.034.579	1.631	10.032.950	0.001	10.034.580	10.034.579	0	4	0	199.999.95
15.38.00 DVPTTRANS	1	100.114.40	99.972.938	141.458	0.000	100.114.40	99.972.939	141.459	0.001	100.114.40	100.114.40	0	0	0	2.656
09.45.00 IVPREXX	3	35.655	0.484	247.902	0.000	248.386	1.206	663.249	0.001	664.454	664.453	0	3	0	6.062
09.46.00 IVPREXX	3	41.241	0.294	52.476	0.210	52.980	0.388	62.421	0.632	63.386	63.385	0	3	0	6.062
09.52.00 IVPREXX	3	44.218	0.166	65.346	0.579	66.091	0.212	88.960	1.737	90.907	90.906	0	3	0	6.062
10.10.00 IVPREXX	3	19.559	0.186	75.112	0.183	75.480	0.284	185.350	0.549	186.181	186.180	0	3	0	6.062
12.05.00 IIVTCV	51	6.488	3.328	17.247	0.000	20.575	29.807	56.333	0.001	82.730	333.652	1	4	0	1.239
12.06.00 IIVTCV	3	8.197	0.379	9.948	0.000	10.327	0.413	12.859	0.001	13.192	13.191	1	4	0	1.259
12.09.00 IIVTCV	4	9.193	0.542	10.044	0.000	10.586	0.702	11.765	0.001	12.435	12.581	1	4	0	1.224
12.10.00 IIVTCV	32	6.663	0.473	8.796	0.000	9.269	0.567	10.501	0.001	10.998	11.908	1	4	0	1.270
19.16.00 IVPREXX	1	67.599	0.512	67.087	0.000	67.599	0.513	67.088	0.001	67.600	67.599	0	3	0	6.062
19.30.00 IVPREXX	1	66.847	0.254	66.593	0.000	66.847	0.255	66.594	0.001	66.848	66.847	0	3	0	6.062
19.45.00 IVPREXX	3	19.121	0.208	27.320	0.167	27.695	0.372	43.016	0.503	43.889	43.888	0	3	0	6.062

Figure 54. Interval Transaction Analysis report

TRANPRTY: Transit Analysis by Priority report:

The Transit Analysis by Priority report provides a breakdown of transaction transit performance by transaction priority, as specified in the TRANSACT macro **PRTY** parameter. You can use sample report form **TRANPRTY** to format this report.

IMS Performance Analyzer Transit Analysis by Priority															
SUMM0005 Printed at 15:49:10 13Apr2018			Data from 12.01.44 20Sep2014 to 02.34.43 22Feb2018												
Pr	Tran Count	Min Total Time	Avg InputQ Time	Avg Process Time	Avg OutputQ Time	Avg IMS Resp Time	90% InputQ Time	90% Process Time	90% OutputQ Time	90% IMS Resp Time	Max Total Time	Avg CPU Time	Avg DB Call Count	Avg DB Wait Count	Avg DB Wait Count
1	321	2.392	2.781	343.570	0.086	32.371	27.620	1.414.548	0.776	135.842	8.354.340	3.021	1	0	0
7	54	10.612	8.561	224.638	0.004	110.994	72.717	875.635	0.030	398.267	2.112.756	8.190	3	0	0
8	98	5.505	1.023.076	800.655	3.043.100	640.191	13.969.360	3.955.345	17.985.635	3.760.218	100.114.40	2.043.094	0	0	0
10	2	22.758	276.318	216.530	0.000	492.478	551.371	411.569	0.001	962.939	962.938	15.104	2	0	0
T*	475	2.392	215.093	423.818	627.898	166.655	6.095.620	2.133.130	7.569.768	1.606.721	100.114.40	424.559	1	0	0

Figure 55. Transit Analysis by Priority report

TRANRES1: Transaction Resource Usage report:

The Transaction Resource Usage report provides, for each transaction code, an analysis of IMS response time together with resource usage including CPU time, and database(DB) and data communications(DC) call activity.

IMS Performance Analyzer Transaction Resource Usage																			
SUMM0250 Printed at 10:22:38 15Feb2018 Data From 14.46.08 08Feb2018 to 16.55.31 08Feb2018																			
Trancode	Reg	Tran	Avg	Count	Avg	Avg	Count	Avg	Avg	Count	Avg	Avg	>0.5	>0.5	Avg	Avg	Avg	Max	Avg
Type		Count	Time	Time	InputQ	PgmSwitch	PgmSwitch	Process	OutputQ	OutputQ	IMS Resp	Total	InputQ	Process	CPU	DB Call	Total IO	Total IO	DB IO
CEXSCONV	MPP	7	0.001202	1	0.006392	-	-	712.8731	0.000000	6	165.0199	712.8795	0.00%	42.86%	0.004195	5.00	1.00	1	0.000515
CEXTNCONC	MPP	7	0.001475	1	0.006609	-	-	712.8772	0.000352	6	165.0273	712.8841	0.00%	42.86%	0.003757	5.00	1.00	1	0.000364
DSPINV	MPP	4	0.004538	4	6495.093	6232.493	2	0.027924	-	-	-	6495.119	100.00%	0.00%	0.003092	1.00	0.00	0	0.000000
DVPTRAN1	MPP	4	0.000587	1	0.005496	-	-	0.017056	0.000000	4	0.021137	0.022552	0.00%	0.00%	0.004383	15.00	1.00	1	0.000342
IIVTCM	JMP	37	0.000290	37	0.324288	-	-	0.347792	0.001326	34	0.625661	0.673298	32.43%	5.41%	0.006073	1.70	0.70	3	0.000792
MQATREQ1	MPP	6	0.000655	6	0.013161	-	-	193.1494	0.000304	6	193.1621	193.1628	0.00%	100.00%	42.91364	8.50	1.83	5	0.000536
PART	MPP	4	0.005462	4	6496.037	6233.485	2	0.085398	-	-	-	6496.120	100.00%	0.00%	0.005514	1.00	0.25	1	0.000830
Total		69	0.006560	54	753.2856	6232.989	4	161.6310	0.000876	56	56.43951	914.9171	28.99%	20.29%	3.765769	3.65	0.81	5	0.000629

Figure 56. Transaction Resource Usage report

TRANRES1: Transaction Resource Usage DLI Call Summary report:

The Transaction Resource Usage DLI Call Report provides, for each transaction code, a summary of IMS database(DB) and data communications(DC) calls, together with resource usage including CPU time.

IMS Performance Analyzer Transaction Resource Usage DLI Call Summary																			
SUMM025A Printed at 10:22:38 15Feb2018 Data From 14.46.08 08Feb2018 to 16.55.31 08Feb2018																			
Trancode	Reg	Tran	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg
Type		Count	CPU	DB Call	DB GU	DB GN	DB GNP	DB GHU	DB GHN	DB GHNP	DB ISRT	DB DLET	DB REPL	DC Call	DC GU	DC GN	DC ISRT	DC PURG	
CEXSCONV	MPP	7	0.004195	0.00	5.00	0.00	0.00	2.00	0.00	0.00	1.00	1.00	1.00	4.14	1.14	1.00	2.00	0.00	
CEXTNCONC	MPP	7	0.003757	0.00	5.00	0.00	0.00	2.00	0.00	0.00	1.00	1.00	1.00	2.14	1.14	0.00	1.00	0.00	
DSPINV	MPP	4	0.003092	0.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	1.00	0.00	1.00	0.00	
DVPTRAN1	MPP	4	0.004383	0.00	15.00	0.00	0.00	5.00	0.00	0.00	5.00	0.00	0.00	7.25	1.25	0.00	3.00	3.00	
IIVTCM	JMP	37	0.006073	0.00	1.70	0.32	0.00	0.32	0.08	0.00	0.32	0.24	0.08	3.95	1.00	1.00	1.95	0.00	
MQATREQ1	MPP	6	42.91364	0.00	8.50	0.00	0.00	4.00	0.00	0.00	1.50	1.50	1.50	2.00	1.00	0.00	1.00	0.00	
PART	MPP	4	0.005514	0.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	1.00	0.00	1.00	0.00	
Total		69	3.765769	0.00	3.65	0.29	0.00	0.00	1.22	0.04	0.00	0.80	0.75	0.38	3.58	1.04	0.64	1.72	0.17

Figure 57. Transaction Resource Usage DLI Call Summary report

TRANRESU: Transaction Resource Usage report:

The Transaction Resource Usage report provides, for each transaction code, a breakdown of IMS response time together with resource usage including CPU time and DB/DC DLI call activity. You can use sample report form **TRANRESU** to format this report.

IMS Performance Analyzer Transaction Resource Usage													
SUMM0005 Printed at 15:52:35 13Apr2018 Data from 12.01.44 20Sep2014 to 02.34.43 22Feb2018													
Trancode	Tran Count	Avg InputQ Time	Avg Process Time	Avg OutputQ Time	Avg Total Time	90% InputQ Time	90% Process Time	90% OutputQ Time	90% Total Time	Avg CPU Time	Avg DB Call Count	Avg DB Wait Count	Avg DC Call Count
CEXTCNV	1	1.630	10.032.949	0.000	10.034.579	1.631	10.032.950	0.001	10.034.580	199.999.95	0	0	4
DSPALLI	22	1.067	67.994	0.006	69.067	4.034	229.130	0.041	232.505	8.942	6	0	9
DVPTRAN2	13	0.337	3.856.681	22.940.293	26.797.311	0.960	10.057.721	54.438.617	53.630.691	3.153	0	0	4
DVPTRAN5	19	5.274.288	899.568	0.000	6.173.856	34.673.568	2.630.515	0.001	35.387.559	2.212	0	0	4
IVPREXX	120	0.211	50.250	0.226	50.686	0.477	157.730	1.333	158.730	5.665	0	0	3
IVTCV	152	4.120	676.556	0.000	680.675	36.271	2.115.017	0.001	2.125.728	1.283	1	0	4
IVTNO	49	4.924	28.970	0.007	33.901	33.504	138.910	0.074	170.494	1.936	1	0	2
JLMTRAN5	65	0.677	18.501	0.000	19.177	2.039	46.609	0.001	48.341	2.157	0	0	4
PART	34	29.161	325.519	0.002	354.682	172.345	1.115.327	0.019	1.173.611	8.110	2	0	4
Total	475	215.093	423.818	627.898	1.266.809	6.095.620	2.133.130	7.569.768	10.442.984	424.559	1	0	4

Figure 58. Transaction Resource Usage report

TRANTCOD: Transit Analysis by Trancode report:

The Transit Analysis by Trancode report provides a breakdown of transaction transit performance by transaction code. For each transaction code you can see at a glance how the transaction performed, and if necessary identify the phase of processing that caused excessive response time. You can use sample report form **TRANTCOD** to format this report.

IMS Performance Analyzer Transit Analysis by Trancode																
SUMM0004 Printed at 15:52:35 13Apr2018 Data from 12.01.44 20Sep2014 to 02.34.43 22Feb2018																
Org	Trancode	Tran Count	Min IMS Resp Time	Avg InputQ Time	Avg PgmSwitch Time	Avg Process Time	Avg OutputQ Time	Avg Total Time	90% InputQ Time	90% PgmSwitch Time	90% Process Time	90% OutputQ Time	90% Total Time	Max IMS Resp Time	Avg CPU	Avg Time
CEXTCNV	CEXTCNV	1	10.033.375	1.630	0.000	10.032.949	0.000	10.034.579	1.631	0.001	10.032.950	0.001	10.034.580	10.033.375	199.999.95	
DSPALLI	DSPALLI	22	16.273	1.067	0.000	67.994	0.006	69.067	4.034	0.001	229.130	0.041	232.505	476.477	8.942	
DVPTRAN2	DVPTRAN2	13	3.654	0.337	0.000	3.856.681	22.940.293	26.797.311	0.960	0.001	10.057.721	54.438.617	53.630.691	10.059.272	3.153	
DVPTRAN5	DVPTRAN5	19	5.505	5.274.288	0.000	899.568	0.000	6.173.856	34.673.568	0.001	2.630.515	0.001	35.387.559	98.882	2.212	
IVPREXX	IVPREXX	120	3.676	0.211	0.000	50.250	0.226	50.686	0.477	0.001	157.730	1.333	158.730	664.087	5.665	
IVTCV	IVTCV	152	4.334	4.120	0.000	676.556	0.000	680.675	36.271	0.001	2.115.017	0.001	2.125.728	626.884	1.283	
IVTNO	IVTNO	49	1.584	4.924	0.000	28.970	0.007	33.901	33.504	0.001	138.910	0.074	170.494	554.080	1.936	
JLMTRAN5	JLMTRAN5	65	5.510	0.677	0.000	18.501	0.000	19.177	2.039	0.001	46.609	0.001	48.341	154.631	2.157	
PART	PART	34	10.093	29.161	0.000	325.519	0.002	354.682	172.345	0.001	1.115.327	0.019	1.173.611	1.283.677	8.110	
Total		475	1.584	215.093	0.000	423.818	627.898	1.266.809	6.095.620	0.001	2.133.130	7.569.768	10.442.984	10.059.272	424.559	

Figure 59. Transit Analysis by Trancode report

IMS Program Switch reporting in IMS PA

An IMS Program Switch is an output message from a transaction with a destination of an SMB (transaction) rather than a response to an LTERM (terminal).

Typically, the program switch is used in one of two ways:

1. Single end-user transaction request, made up of multiple transactions that are processed serially, each performing their part of the overall business function, then finally delivering the response back to the end-user.
2. Long-running transaction (MPP or BMP) that continuously spawns new transactions to process (external) incoming requests. The MQ IMS trigger monitor is an example of this, although the monitor runs as a non-message driven BMP.

IMS PA transaction transit reporting is geared to support transactions that program switch, and form-based reports offer enhanced reporting capability.

The IMS PA IMS log transit engine “replays” the lifecycle of each transaction from its log record events for the purpose of performance analysis. IMS transactions in

the same program-switch group have a unique “originating tracking unit-of-work ID”. This allows transit reporting to group related program switch transactions. Transactions that are part of the same program switch group are sequenced together and not reported until all transactions in the group have completed. Form-based transit reports retain that grouping so that the entire program switch sequence can be analyzed together. An exception to this is that long-running program-switch sequences might cause IMS PA to exhaust virtual storage, in which case incomplete sequences are flushed (reported) to relieve the VS constraint, and the sequence will resume sometime later, albeit not adjacent to the previous sequence.

Specialized form fields that provide information and formatting services specifically for program switch sequences are:

ORGLTERM

Input LTERM of the originating transaction in the program switch sequence. Use ORGLTERM for Transit List-style reporting where you want to see the start of a program switch sequence, followed by the program switches in sequence.

- For the first transaction in a program switch sequence, ORGLTERM is the input LTERM.
- For subsequent transactions in the program switch sequence, ORGLTERM is blank to delineate program switch sequences.

ORGRAN

The transaction code of the originating transaction in the program switch sequence.

PARTRAN

The transaction code of the parent transaction in the program switch sequence.

PGMSWIT

The sequence number of the transaction in the program switch sequence. The number of program-program message switches to get to this input. (Typically, a hidden column in your report.)

SWITTIME

Program switch time.

A program switch occurs when one transaction calls another by inserting a message (destination is SMB) onto the message queue. Program switch time is the elapsed time from when the program switch message is eligible for processing to when it actually starts processing in a dependent message processing region. It is attributed to the program switch transaction not the originating transaction, and is analogous to input queue time for transactions coming into IMS from VTAM or OTMA.

P2P transactions are discrete transactions with their own units of recovery. Their processing eligibility depends on the type of IO PCB used to insert the message:

- For EXPRESS=YES IO PCB, the P2P transaction is immediately eligible for processing (asynchronously).
- Otherwise, the P2P transaction cannot start until the parent starts syncpoint phase 2 and transfers the message to its permanent (SMB) destination.

Program switch sequences can be reported as a group using the Log global option PROGRAMSWITCH(YES) (default), or transactions can be reported separately using PROGRAMSWITCH(NO).

Related reference:

“Report options” on page 86

To specify the options for an IMS log Form-based List report or extract, select **List** in the **Transaction Transit Reports (Form-based)** category in a Log Report Set.

“Report options” on page 94

To specify the options for an IMS log Form-based Summary report or extract, select **Summary** in the **Transaction Transit Reports (Form-based)** category in a Log Report Set.

Program Switch examples

The following form-based transit list reports show program switch examples.

The IMS PA commands used to generate the reports:

```
IMSPALOG      LIST(DESC('Transaction Transit Log'),
                DDNAME(LIST0001),
                SECGROUP,COMPLVL(1),STARTLVL(2),PRECISION(6),
                FIELDS(ORGLTERM,
                      PGMSWIT,
                      TRANCODE,
                      ORGTRAN,
                      PARTRAN,
                      STARTIMS(TIME),
                      PSTID,
                      DBCALLS,
                      CPUTIME,
                      LTERMOUT,
                      INPUTQ,
                      SWITTIME,
                      PROCESS,
                      OUTPUTQ,
                      TOTALTM,
                      RESPIMS,
                      ORGUOWID))
IMSPALOG      EXECUTE
```

Note that the sample report form **TRANLIST** provides this style of transit list reporting, effectively mimicking the “Transaction Transit Log report” on page 58, but with far superior coverage and precision. For more information on using the sample report form, see “TRANLIST: Transaction Transit Log report” on page 93.

Example 1: Single end-user transaction request

This example is a typical program switch sequence for a single end-user transaction request (see type 1 in “IMS Program Switch reporting in IMS PA” on page 111). Transaction TC11 is requested from TERM1. TC11 program switches to TC12 which in turn program switches to TC13. TC13 completes the program switch sequence and responds back to the originating LTERM. Observe the following:

- Each individual transaction is broken down into its transit time components. For the first transaction in a program switch sequence, input queue + processing + output queue = total IMS time. For subsequent transactions in a program switch sequence, program switch + processing + output queue = total IMS time.
- The program switch (transit set) sequence reports IMS response time, attributed to the first transaction TC11. Note that it is significantly more than the total time

for TC11. Response time is the elapsed time from when IMS receives the initial input message for the starting transaction TC11 to when the output message is sent back to the originating LTERM by the final transaction in the sequence TC13 (we know this because TC13 was the only transaction to issue an output message as shown in the Output LTERM column).

Note that response time is reported *only* when the input and output LTERMs are the same. That is, when the end-user entered a transaction request at the terminal and received a response back.

- We know that TC11 spawned TC12 which in turn spawned TC13 because the Program Switch number increases with each new level of program switch nesting.

Org LTERM	Prog Swit#	Trancode	Org Trancode	Parent Trancode	IMS Tran Start	PST	DB Call Count	CPU Time	Output LTERM	InputQ Time	PgmSwit Time	Process Time	OutputQ Time	Total Time	IMS Time	IMS Resp Time
LTERM1	0	TC11	TC11		15.28.58.707685	79	29	0.001634	-	0.000038	-	0.002016	-	0.002054		0.075057
	1	TC12	TC11	TC11	15.28.58.709563	79	33	0.003524	-	0.001244	0.001244	0.014745	-	0.015989	-	-
	2	TC13	TC11	TC12	15.28.58.717966	124	81	0.006605	LTERM1	0.000187	0.000187	0.064554	0.000035	0.064776	-	-

Figure 60. Program Switch for a single end-user transaction request

Example 2: Single end-user transaction request, but no output message

This example is similar to the first, except that no output message is issued, and hence response time cannot be calculated.

Org LTERM	Prog Swit#	Trancode	Org Trancode	Parent Trancode	IMS Tran Start	PST	DB Call Count	CPU Time	Output LTERM	InputQ Time	PgmSwit Time	Process Time	OutputQ Time	Total Time	IMS Time	IMS Resp Time
LTERM2	0	TC21	TC21		01.40.07.604295	27	22	0.002284	-	0.029112	-	0.013478	-	0.013567	-	-
	1	TC22	TC21	TC21	01.40.07.642408	23	16	0.007626	-	0.003586	0.000060	0.092511	-	0.092571	-	-
	2	TC23	TC21	TC22	01.40.07.730375	39	16	0.003417	-	0.007129	0.000083	0.020045	-	0.020128	-	-
	3	TC24	TC21	TC23	01.40.07.752355	22	1	0.001713	-	0.004335	0.000045	0.012395	-	0.012440	-	-

Figure 61. Program Switch for a single end-user transaction request, but no output message

Example 3: Long running transaction that continuously spawns transactions

This example is a typical long running transaction that continuously spawns transactions based on external requests (type 2 in “IMS Program Switch reporting in IMS PA” on page 111). For example, a message arrives on an MQ message queue. Observe the following:

- We know that TC31 spawned all the TC32 transactions because the Program Switch number stops at 1. That is, level 0 spawns all the level 1 transactions.

Org LTERM	Prog Swit#	Org Trancode	Parent Trancode	IMS Tran Start	PST	DB Call Count	CPU Time	Output LTERM	InputQ Time	PgmSwitc Time	Process Time	OutputQ Time	Total Time	IMS Time	IMS Resp Time
LTERMS	0	TC31	TC31	01.40.00.925694	45	0	0.002368	-	22.36779	-	0.032790	-	22.40073	-	-
	1	TC32	TC31	01.40.23.293632	20	0	0.000158	-	0.015618	0.015618	0.000098	-	0.015716	-	-
	1	TC32	TC31	01.40.23.293650	20	0	0.000225	-	0.015762	0.015762	0.000098	-	0.015860	-	-
	1	TC32	TC31	01.40.23.293672	20	0	0.000225	-	0.015898	0.015898	0.000112	-	0.016010	-	-
	1	TC32	TC31	01.40.23.323907	27	0	0.000695	-	0.000051	0.000051	0.020900	-	0.020951	-	-
	1	TC32	TC31	01.40.23.323936	27	0	0.000695	-	0.021013	0.021013	0.000120	-	0.021133	-	-
	1	TC32	TC31	01.40.23.323987	27	0	0.000695	-	0.021144	0.021144	0.000101	-	0.021245	-	-

Figure 62. Program Switch for a long running transaction that spawns new transactions to process requests

IMS Transaction Index

The IMS Transaction Index is a specialized extract file created by IMS Performance Analyzer batch reporting. Each record in the index represents an IMS transaction and contains cumulative information from the IMS log about that transaction.

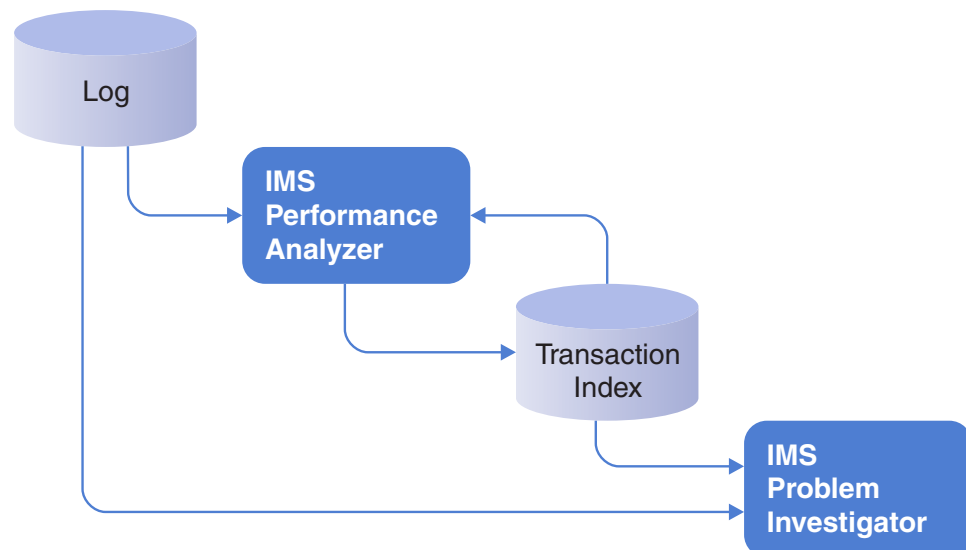


Figure 63. Creating and using the IMS Transaction Index

Uses of the IMS Transaction Index

You can use an IMS Transaction Index in the following ways: as input for IMS Performance Analyzer transit reporting; for display in the IMS Problem Investigator or Transaction Analysis Workbench log browser; and as input for your own reports.

- IMS Performance Analyzer (IMS PA) form-based transit reporting.
The IMS Transaction Index can replace the IMS log (SLDS) files as input for transit reporting. This significantly reduces the time and overhead of running IMS Performance Analyzer transit reports. It is recommended that you create the index once, either:
 - At the end of the day in preparation for the next day.
 - When the SLDS is created by the OLDS archive process for more timely analysis.

All subsequent transit report requests can use the index in place of the original IMS log files. The index will create reports in far less time because:

- The index is much smaller than the original log files, typically less than 10% in size.
- The IMS log records have already been interpreted, and all transaction report fields and performance metrics have been calculated and stored in the index.
- IMS Problem Investigator (IMS PI) or Transaction Analysis Workbench intelligent problem detection.

The IMS Transaction Index can be processed on its own or merged with the associated IMS log files in an interactive diagnosis session to provide improved levels of problem detection. For example, “Locate all transactions with response time greater than 1 second”.

- Generating your own reports using your favorite z/OS or PC-based reporting tool.

IMS Transaction Index record format and contents

The IMS Transaction Index record has the format of an IMS user log record, with a record code of X'CA01'. The record mapping is provided by macro IPILCA01 in the IMS Performance Analyzer macro library.

To review the contents of the index record, see “Displaying IMS Transaction Index record contents” on page 117 or macro IPILCA01. Alternatively, use IMS PA primary option menu option 10 **Report Forms** to create a new report form to view all the available transaction-level information that can be reported using form-based transit reporting.

The index record contains the information required to report all supported IMS Performance Analyzer report form fields, including:

1. Transaction identification
 - Transaction code, terminal, and other identifying names
 - Time stamp of when the transaction started or entered the system
 - All transaction types are comprehensively supported; including MPP, BMP, Fast Path, MSC (end-to-end), APPC (including CPI-CI), OTMA (including Connect and MQ)
2. Tracking tokens
 - Tracking, unit of work, OTMA, Connect and other identifying tokens
3. Event time stamps
4. Performance metrics
 - Transit and response time breakdown
 - Processing delays, including Commit Mode 0 and 1 delays incurred while waiting for client acknowledgement
 - Additional response time components, including Resume Tpipe elapsed time delays
 - ABEND and other processing failure indicators
5. Resource usage
 - CPU time
 - Full Function and Fast Path database calls
 - Database buffer, IO and locking
 - Fast Path buffer, VSO and contention
 - External subsystem

- Input and output message count and lengths

The inherent restrictions of form-based reporting still apply when using the IMS Transaction Index:

1. The type 07 application termination accounting record is required to provide resource usage estimates. In a WFI environment, these records may not be available in the log.
2. IMS V12+ type 56FA transaction-level accounting records are required for accurate and complete resource usage statistics.

Displaying IMS Transaction Index record contents

An IMS Transaction Index record contains all the important information taken from the original log records for the transaction. You can use IMS Problem Investigator to browse the contents of the index records which are processed in the same way as any other log record.

The following figure is an example of an IMS Problem Investigator formatted record display. It shows the formatted contents of all the fields in the IMS Transaction Index record from where you can zoom for more information about any field or switch to view the record contents in dump format.

```

BROWSE      JCH.WORKSHOP.INDEX.SORTED      Record 00000715 Line 00000000
Command ==>
Form ==> CA01 + _ Use Form in Filter      Scroll ==> CSR
Format ==> STD
***** Top of data *****
+0004 Code... CA01 Transaction
+03B8 STCK... BE8300F4C9322443      LSN.... 0000000000000028
      Date... 2012-03-16 Friday      Time... 01.10.56.568098.266

+0000 LL..... 03C8      ZZ..... 0000      Type..... CA
+0005 Subtype... 01      Vers..... 'IPI440'

+0078 ID..... Transaction Identification section
+0078 TranCode... 'ATMWDRAW' Program.... 'ATMPROG '
+0088 Userid..... 'NEWYORK ' ITerm..... 'NEWYORK '
+0098 LTerm..... 'NEWYORK ' LTermOut... 'NEWYORK '
+00A8 Terminal... 'NYATM001' LTermOvr... '
+00B8 TMember0... ' ParentTC... '
+00C8 FPRoutCd... '
+00D0 UTC..... IMS transaction start time (UTC)
+00D0 UTC..... 2012075F171056568088000C
+00DC ISO..... IMS transaction start time (local)
+00DC Date..... '2012-03-15'
+00E7 Time..... '17.10.56.568088'
+00F8 LogonTK.... 0000000000000000      OtmaSSN.... 00000000
+0104 CommitMd... ' SynchLvl... '

+0028 Base..... Transaction Tracking section
+0028 Org..... Originating Tracking Unit-of-Work (UOW) ID
+0028 OrgID..... 'ICDE ' OrgTK..... BE8300F4C92D4A23
+0038 Pro..... Processing Tracking Unit-of-Work (UOW) ID
+0038 ProID..... 'ICDE ' ProTK..... BE8300F4C92D4A23
+0106 RecToken... C9F9C4C6404040400000000300000000
+0116 IMSFE..... 'ICDE ' IMSID..... 'ICDF ' PSTID..... 0002
+0128 TrSeq#..... +1 TSSize..... +1 RegType.... 'MPP'
+0133 JobName.... 'ICDFMSG2' StepName... 'REGION '
+0143 DDname..... 'LICDE001' Class..... 0000 Priority... 08
+014E PgmSwit.... +0 OrgVRM..... 1210 ProVRM..... 1210

+0158 Transit.... Transaction Transit accounting section
+0158 InputQ..... 0.008634 Process.... 2.564080 OutputQ.... 0
+0170 OutputL.... 0.000038 OutputG.... 0.023201 TotalTm.... 2.572714
+0188 RespIMS.... 2.243167 SwitTime... 0 SchedTm.... 0.002622
+01A8 UORTTime... 2.566692 CM0Delay... 0 CM1Delay... 0
+01C0 OutRTIMS... 0 TotRTIMS... 0
+01D0 CPUtime.... 199.999949 WFitime.... 0 FPEMHIn.... 0
+01E8 FPEMHOut... 0 FPtermOt... 0 FPPh1Ph2... 0

+0200 Events..... Transaction Event Time section
+0200 T01..... 2012-03-15 17.10.56.568088
+0208 StartIMS... 2012-03-15 17.10.56.568088
+0210 T35In..... 2012-03-15 17.10.56.568088
+0218 T08..... 2012-03-15 17.10.56.574100
+0220 T5607..... 2012-03-15 17.10.56.574110
+0228 T31DLI..... 2012-03-15 17.10.56.576722
+0238 T37..... 2012-03-15 17.10.58.788038
+0240 T37Xfer.... 2012-03-15 17.10.58.802611
+0248 T5612..... 2012-03-15 17.10.59.140802
+0250 T07..... 2012-03-15 17.10.59.143494
+0258 T31DLInx... 2012-03-15 17.10.59.140802
+0260 T31Out1.... 2012-03-15 17.10.58.811255
+0268 T31Resp.... 2012-03-15 17.10.58.811255      Local..... +00:00

```

Figure 64. IMS PI: Analyze IMS Transaction Index record contents (part 1 of 2)


```

+0280 Calls..... DB call summary section
+0280 FFCalls.... +5          FFGets..... +2          FFUpdates... +3
+028C FFWaitS.... +0          FFGNs..... +0          FFGUs..... +2
+0298 FPCalls.... +0          FPGets..... +0          FPUpdates... +0
+02A4 FPWaitS.... +0          FPGNs..... +0          FPGUs..... +0

+02B0 TPSection..... Accounting section (07)
+02B0 TPMCNT..... +1
+02B4 TPACCT..... Accounting Statistics
+02B4 TPDGU..... +0          TPDGN..... +0          TPDGNP..... +0
+02C0 TPDGHU..... +2          TPDGHN..... +0          TPDGHNPN.... +0
+02CC TPDISRT.... +1          TPDDLET.... +1          TPDREPL.... +1
+02D8 TPCLCNT.... +5          TPMGU..... +2          TPMGN..... +0
+02E4 TPMISRT.... +1          TPMPURG.... +0          TPTSTNQ.... +0
+02F0 TPTSTWT.... +0          TPTSTDQ.... +0          TPQCONQ.... +0
+02FC TPQCOWT.... +0          TPQCODQ.... +0          TPSUPNQ.... +0
+0308 TPSUPWT.... +0          TPSUPDQ.... +0          TPXCNQ.... +0
+0314 TPEXCWT.... +0          TPEXCDQ.... +0          TPMCMD..... +0
+0320 TPMGCMD.... +0          TPMCHNG.... +0          TPMAUTH.... +0
+032C TPMSETO.... +0          TPSAPSB.... +0          TPSDPSB.... +0
+0338 TPSGMSG.... +0          TPSICMD.... +0          TPSRCMD.... +0
+0344 TPSCHKP.... +0          TPSXRST.... +0          TPSROLB.... +0
+0350 TPSROLS.... +0          TPSSETS.... +0          TPSSETU.... +0
+035C TPSINIT.... +0          TPSINQY.... +0          TPSLOG..... +0
+0368 TPDDEQ.... +0          TPVSAMR.... +0          TPVSAMW.... +0
+0374 TPOSAMR.... +0          TPOSAMW.... +0          TPTOTIO.... +0
+0380 TPESAF.... +0          TPFLD..... +0          TPPOS..... +0
+038C TPRLSE.... +0          TPXSAVE.... +0          TPXRSTR.... +0
+0398 TPXCOPY.... +0          TPTDBIO.... 0          TPTDBPL.... 0

+0048 Status..... Transaction Status section
+0048 CompLvl.... '5'          StartLvl... '1'          StaFlag1... DC
+004B StaFlag2... B0          StaFlag3... 40          StaFlag4... 00
+004E StaFlag5... 00          StaFlag6... 00          TACFlag1... D0
+0051 TACFlag2... FC          ErrFlag1... 00          ErrFlag2... 00
+0054 MSCFlag1... 40          SMQFlag1... B8          TypFlag1... 08
+0057 TypFlag2... 40          FPFlag1.... 00          FPFlag2.... 00
+005A ComHI..... '5'          ComLO..... '5'          CompCode... 00000000
+0060 RecCount... +1          MsgLIn..... +424        MsgLOut.... +407
+006C OutEnq..... +1          OutDeq..... +1          FPBALGct... +0

```

Figure 65. IMS PI: Analyze IMS Transaction Index record contents (part 2 of 2)

Creating an IMS Transaction Index

The IMS Transaction Index is requested from an IMS Performance Analyzer LOG report set and associated INDEX batch command.

Procedure

1. From the IMS Performance Analyzer primary option menu, select option 3 **Report Sets** and then define a new log report set or edit an existing one.
2. From the log report set edit menu, select **Transaction Index** in the form-based transit reports category.

EDIT

Report Set - SAMPLOG

Line 1 of 12

Command ==>

Scroll ==> CSR

Description . . . Sample Log Report Set

Enter "/" to select action.

** Reports **		Active
— + —	Options	Yes
+ —	Transaction Transit Reports	No
- —	Transaction Transit Reports (Form-based)	Yes
—	Transit Options	Yes
—	List	No
—	Summary	No
s —	Transaction Index	Yes
+ —	Resource Usage & Availability Reports	No
+ —	Fast Path Transit Reports	No
+ —	Fast Path Resource Usage Reports	No
+ —	Trace Reports	No
—	User-Written Reports	No
** End of Reports **		

Figure 66. IMS PA Log Report Set: Select Transaction Index

- Specify the name and disposition of the Transaction Index output data set. Optionally, select additional data sections to include in the index.

SAMPLOG - Transaction Index

Command ==> RUN

Specify the Transaction Index data set name and disposition.

Name: JCH.WORKSHOP.INDEX'

Disp: OLD

Optional Sections:

— ESAF (External Subsystems)

— Database Update Activity

Exception criteria for transactions:

— Abended

— Exceeded elapsed time threshold

— Processing . . 0.50 seconds (Time in dependent region)

— Total 1.00 seconds (Input Q + Processing + Output Q)

— Include all transactions in the program switch sequence

Selection Criteria:

Object Type	Inc/Exc	Object +	List	Validation	Warning
Transaction Code	—	—	—		
LTERM	—	—	—		
Line	—	—	—		
VTAM Node	—	—	—		
Class	—	—	—		
User ID	—	—	—		

Figure 67. IMS PA: Specify Transaction Index data set name

- Enter the RUN command to proceed with the request. When prompted, specify run-time options and press Enter to generate the JCL. The JCL is displayed in the ISPF editor.

5. Batch requests to create the IMS Transaction Index are submitted and processed in the same way as all other Report Set requests. For example, the following JCL generates the index file, writes it to data set JCH.WORKSHOP.INDEX, and also runs three additional reports:

```
//IMSPA    JOB ,NOTIFY=&SYSUID
/*
//IPI      EXEC PGM=IPIMAIN,PARM='V151'
//STEPLIB DD DSN=IMSPA.V440.SIPILINK,DISP=SHR
/* Input IMS log files
//LIZDE001 DD DISP=SHR,DSN=JCH.WORKSHOP.IZDE.SLDS
//LIZDF001 DD DISP=SHR,DSN=JCH.WORKSHOP.IZDF.SLDS
/* Transaction Index extract file
//IPITXOUT DD DSN=JCH.WORKSHOP.INDEX, 1
//          DISP=(NEW,CATLG), UNIT=SYSDA,SPACE=(TRK,(1,1),RLSE)
//TXRECAP  DD SYSOUT=* 2
//SYSPRINT DD SYSOUT=*
/* Report Set Command Input
//IPICMD   DD *
          IMSPALOG INDEX( 3
                        [ESAF,] 4
                        [DBUPDATE,]
                        [ABEND,] 5
                        [PROCESS(9999),] default 0.50 seconds
                        [TOTAL(9999),] default 1.00 seconds
                        [PGMSWI,]
                        [INCL(TRANCODE(list))|EXCL(TRANCODE(list)),] 6
                        [INCL(LTERM(list))|EXCL(LTERM(list)),]
                        [INCL(LINE(list))|EXCL(LINE(list)),]
                        [INCL(VTAMNODE(list))|EXCL(VTAMNODE(list)),]
                        [INCL(CLASS(list))|EXCL(CLASS(list)),]
                        [INCL(USERID(list))|EXCL(USERID(list))])
          IMSPALOG LIST,SUMMARY,IRUR 7
          IMSPALOG EXECUTE
/*
```

- 1** DDname IPITXOUT must be specified in the JCL to define the data set that will contain the IMS Transaction Index.
- 2** Optional: Specify DDname TXRECAP for the Recap report output. If not specified, TXRECAP is allocated automatically.
- 3** The INDEX batch command requests that the IMS Transaction Index is to be created.
- 4** Specify ESAF or DBUPDATE or both to request that the index include additional information for external subsystems or database update activity or both.
- 5** You can specify exception criteria so the index contains only problem transactions:
 - Specify ABEND to only include transactions that abended.
 - Specify one or both of the following options to only include transactions that exceed the specified elapsed time threshold (0.01 to 9999 seconds).
 - Specify PROCESS to only include transactions that have a processing elapsed time in the dependent region that exceeds the threshold (default 0.50 seconds).
 - Specify TOTAL to only include transactions that have a total transit time that exceeds the threshold (default 1.00 second).
 - Specify PGMSWI to include all transactions in the program switch sequence when at least one of them is an exception. This allows you to analyze the complete transaction set that resulted in the exception.

- 6** Specify selection criteria to filter the input file by including or excluding records based on transaction code, LTERM, line, VTAM node, class, or user ID.
 - 7** Optional additional report requests.
6. Check or change the JCL, then on the ISPF editor command line, enter SUB to submit the job.
 7. When the IMS Performance Analyzer batch job has completed successfully, the Recap report gives the name of the IMS Transaction Index data set and the number of records written.

```

                                IMS Performance Analyzer
                                Transaction Index

IPITXOUT Transaction Index completed
Data Set Name . . . . JCH.WORKSHOP.INDEX
Record count:
    In . . . . .                28
    Filtered . . . . .          27
    Exceptions . . . . .         3
        Abend . . . . .         1
        Process Time . . .       0
        Total time . . .         3
    Out . . . . .                4

```

8. The IMS Transaction Index is now ready to use.

Using the index for performance reporting

After creating an IMS Transaction Index, you can use it in place of the IMS log (SLDS) files for subsequent form-based transit report requests.

Procedure

Edit the report set JCL to refer to the IMS Transaction Index instead of the IMS log files.

For example, the following JCL shows the IMS log input files replaced by the IMS Transaction Index file (ddname LOGIN). The form-based SUMMARY and LIST report requests will use the index.

```

//IMSPA   JOB ,NOTIFY=&SYSUID
//*
//IPI     EXEC PGM=IPIMAIN,PARM='V151'
//STEPLIB DD DSN=IMSPA.V440.SIPILINK,DISP=SHR
//* IMS Transaction Index
//LOGIN   DD DISP=SHR,DSN=JCH.WORKSHOP.INDEX
//SYSPRINT DD SYSOUT=*
//* Report Set Command Input
//IPICMD  DD *
        IMSPALOG  SUMMARY(SECGROUP,PRECISION(6),
                        FIELDS(TRANCODE,TRANCNT,
                                INPUTQ,PROCESS,OUTPUTQ,TOTAL,CPU))
        IMSPALOG  LIST(SECGROUP,PRECISION(6),
                        FIELDS(LTERM,TRANCODE,STARTIMS,
                                INPUTQ,PROCESS,OUTPUTQ,TOTAL,CPU))
        IMSPALOG  EXECUTE
/*

```

The resulting reports will contain the same information as if they were created from the original IMS log files.

Note: The additional information for external subsystems or database update activity will only be available for reporting if the corresponding options (ESAF, DBUPDATE) were specified when the IMS Transaction Index was created.

Resource Usage and Availability reports

IMS PA presents detailed and summary information for analysis of the usage and availability of various IMS resources.

The resources include:

- Regions
- Transactions
- Programs
- Lines
- VTAM nodes
- Message queues
- Databases
- Buffer pools

Dashboard report

The Dashboard report provides a quick overview of critical system performance indicators, including transaction throughput and IMS system resources. It can highlight potential performance problems quickly, providing a springboard to other reports that provide more detailed information.

Log records: The report is derived from IMS log records 01, 03, 06, 07, 08, 0A, 11, 31, 32, 33, 34, 35, 38, 40, 45, 5901, 5903, 5911, 5916, 5936, 5937, 5938, and 72.

Report options

To specify the report options, select the Resource Usage and Availability **Dashboard** report in a Log Report Set.

The report output is written to the data set specified by the Report Output DDname. The default is DASH.

There are no other report-specific options. A report interval can be specified only at run-time to override the Global. Selection Criteria are not applicable to this report.

Report content

The Dashboard report provides a comprehensive health check of your IMS systems.

The Dashboard report consolidates summarized information from the following reports:

- Management Exception report, for MPP transaction response time information
- Fast Path Transit Analysis, for IFP transaction response time information
- Internal Resource Usage report, for Message Queue and OSAM/VSAM Buffer statistics

The Dashboard report contains four subreports:

1. Transaction Processing Analysis
2. Message Queue Pool Statistics
3. OSAM Buffer Pool Statistics
4. VSAM Buffer Pool Statistics

Transaction Processing Analysis:

The first part of the Dashboard report provides summary statistics of transaction transit time by each type of region.

IMS Performance Analyzer Dashboard					
Start : 02Jan2018 10:05:41:84		End : 08Feb2018 13:18:14:61		Interval : 891.12.32 (HHMM.MM.SS)	
----- Transaction Summary -----					
Type	Count	Input	Process	Output	Total
MPP	1288	9	240	0	249
STD	882	5	98	0	103
OTMA	264	25	835	0	861
MSC	142	1	17	0	17
MSC Send	142	0	18	0	18
BMP	6	0	16,037	0	16,037
STD	6	0	16,037	0	16,037
JBP	2	0	605	0	605
STD	2	0	605	0	605
IFP	105	0	6	0	7

Figure 68. Dashboard report: transaction transit time

The report fields are:

Type The region types are:

MPP All transactions processed by MPP regions.

JMP All transactions processed by JMP regions.

BMP All transactions processed by BMP regions.

JBP All transactions processed by JBP regions.

MSC Send

MSC transactions sent to a remote system for processing.

IFP All transactions processed by IFP regions.

DBCTL

All transactions processed by DBCTL regions.

ODB Transactions processed by open database regions.

Unknown

Transactions processed, but IMS PA was not able to determine the region type.

For region types MPP, JMP, BMP, and JBP, there are the following sub-types:

OTMA

Open Transaction Manager Access (OTMA) transactions.

APPC Implicit Advanced Program-to-Program Communication (APPC) transactions.

MSC Multiple Systems Coupling (MSC) transactions.

CPI-C Explicit Common Programming Interface - Communications (CPI-C) APPC transactions.

STD Transactions that do not fit into any of the previous categories, such as transactions whose input source is VTAM.

Count Number of transactions processed by that type of region.

Average Elapsed Time (msec)

The values are elapsed time average per transaction with millisecond precision. The Transaction Transit Time data fields are:

Input Input Queue time. If this is large, you could investigate the problem further by running the Transaction Exception report to look for any MPP transactions with very large input queue times that may skew the system-wide average. See “Transaction Exception report and extract” on page 70.

Process Transaction Processing time.

Output Output Queue time.

Total Total Transit time.

Message Queue Pool Statistics:

This part of the Dashboard report provides summary statistics of Message Queue Pool activity.

System IMS	Start : 27Aug2014 00.09.00.07	End : 27Aug2014 23.59.00.06	Interval : 23.50.00 (HHMM.MS)
----- Message Queue Pool Statistics -----			
Locates:	1,229,640	Reads : 260	IWAITs : 200
In Pool:	1,229,380	Writes: 1,899	I/O Errors: 0

Figure 69. Dashboard report: Message Queue Pool statistics

The Message Queue Pool statistics are:

Locates

Number of locate requests to the Message Queue Pool, calculated as:

Locate requests (STQLOC) + Locate and Alter requests (STQLAC)

In Pool

Number of locate requests satisfied in the pool, calculated as:

Locate requests (STQLOC) + Locate and Alter requests (STQLAC) - Reads (STQREAD) - Write (Total) (STQWRIT) + Writes for Purge (STQBFP)

Reads Number of Read requests to the Message Queue data sets, calculated as:

Reads (STQREAD)

Writes Number of Write requests to the Message Queue data sets, calculated as:

Write (Total) (STQWRIT)

IWAITs

Number of IWAITs, calculated as:

Waits for Purge Complete (STQPRWT) + Waits for Buffer (STQBUFWT) + Other DECB to Read Buffer (STQWTIN) + Other DECB to Write Buffer (STQWTOUT) + Conflicting ENQ-DEQ (STQWTQ)

I/O Errors

Number of I/O errors, calculated as:

Temporary I/O errors not retried (STQIOER)

OSAM Buffer Pool Statistics:

This part of the Dashboard report provides summary statistics of OSAM Buffer Pool activity.

----- OSAM Buffer Pool Statistics -----							
-ID-	Size	Count	Locates	In Pool	Read IO	Write IO	Waits
A1DD	512	4	70,844	70,840	4	0	1
B1DD	1,024	64	1,071	1,059	94	0	2
C1DD	2,048	4	0	0	0	0	0
D1DP	4,096	4	0	0	0	0	0
E2G3	26,624	256	6,244	5,904	851	710	8
F1DD	32,768	4	93,029	93,018	156	149	10

Figure 70. Dashboard report: OSAM Buffer Pool statistics

The OSAM Buffer Pool statistics are:

-ID- OSAM Buffer Pool ID (STDBPOID)

Size Buffer size (STDBBSIZ)

Count Number of Buffers (STDBNBUF)

Locates

Number of Locate calls, calculated as:

Locate calls (STDBLCTR)

In Pool

Number of Locate calls satisfied in the Pool, calculated as:

Locate calls-data in pool (STDBFIPL)

Read IO

Number of Read I/O requests, calculated as:

Read I/O requests (STDBRREQ)

Write IO

Number of Write I/O requests calculated as:

Writes for Buffer Steal (STDBBSTW) + Writes for Purge (STDBPRGW)

WAITs

Number of Waits for Buffers, calculated as:

Waits for Busy ID (STDBWBZI) + Waits for Busy Write (STDBWBZW) +
Waits for Busy Read (STDBWBZR) + Waits for Buffer Steal/Purge Owner
Release (STDBWRLO) + Waits for Buffer Steal no Buffers (STDBWNOB)

VSAM Buffer Pool Statistics:

This part of the Dashboard report provides summary statistics of VSAM Buffer Pool activity.

----- VSAM Buffer Pool Statistics -----								
-ID-	Size	Count	Retrieves	Updates	VSAM Calls	In Pool	Read IO	Write IO
DFLT/D	512	256	0	0	890	142	83	5
DFLT/D	1,024	450	412	20	1,338	560	30	26
DFLT/D	2,048	600	0	0	890	995	117	105
DFLT/D	4,096	800	6	1,315	2,211	4,171	3,978	7,630
DFLT/D	8,192	50	32	12	948	52	14	16
DFLT/D	32,768	8	0	0	890	0	0	0

Figure 71. Dashboard report: VSAM Buffer Pool statistics

The VSAM Buffer Pool statistics are:

-ID- Shared resource pool ID (STVBPOID), followed by the pool type (STVBPTY)

Size Buffer size (STVBBSIZ)

Count Number of Buffers (STVBNBUF)

Retrieves

Number of Retrieve calls, calculated as:

Retrieve by RBA (STVBRRA) + Retrieve by Key (STVBRKEY)

Updates

Number of Update calls, calculated as:

Logical records ISRTS/ESDS (STVBEIST) + Logical records ISRTS/KSDS (STVBKIST) + Logical records altered in subpool (STVBBALT)

VSAM Calls

Number of calls to VSAM, calculated as:

Background writes (STVBBGWR) + Sync calls (STVBSYNP) + VSAM GET calls (STVBVSMG) + VSAM search buffers calls (STVBSCHB)

In Pool

Number of VSAM calls satisfied in the Pool, calculated as:

Times VSAM found CI in pool (STVBVSMF)

Read IO

Number of Read I/O requests calculated as:

Reads from DASD (STVBVSMR)

Write IO

Number of Write I/O requests, calculated as:

Writes initiated by IMS (STVBUSRW) + Writes initiated by VSAM (STVBVSMW)

Management Exception report

The Management Exception report measures today's transaction performance against agreed benchmarks, such as service level agreements and benchmark averages.

Service level agreements are determined by Expectation Sets, where you set the response time thresholds for individual transactions or groups of transactions.

Benchmark averages are calculated against an Averages data set, where you save the transaction performance information from an IMS log file where acceptable transaction performance was observed.

Log records: This report is derived from IMS log records 01, 03, 06, 07, 08, 0A, 10, 24, 31, 32, 33, 34, 35, 38, 39, 40, 67.

Uses

Management Exception reporting of an IMS log file produces a report showing transaction response time and resource usage information. The report also highlights any transaction response time higher or lower than the benchmark Expectation or Average thresholds.

Management Exception reporting also optionally produces an Averages data set containing transaction response time information. A new averages data set can be used to reflect benchmarks from this run only, whereas an existing Averages data set can accumulate a rolling average with previous runs to assist with historical trend analysis and capacity planning.

The Management Exception report alerts managers to those situations needing attention. The information in the report provides clues to other IMS PA reports that can supply additional information.

For example:

- If input queue time, processing time, or output queue time are outside typical boundaries, you may want to look at the group of transaction transit time reports for more detail.
- If the CPU time is outside typical boundaries, the CPU Usage report can provide more information.
- Excessive database calls or waits can be investigated in the Database Update Activity report, the Internal Resource Usage reports, and the Database Trace.
- Excessive data communication calls suggest that you should look at the Message Queue Utilization report, Internal Resource Usage reports, or DC Queue Manager Trace.

Other management-style reports include "Transaction Exception report and extract" on page 70, "Transaction History File" on page 81, and "Transaction Transit Extract by Interval" on page 63.

Report options

To specify the report options, select the Resource Usage and Availability **Management Exception** report in a Log Report Set.

The following options can be specified:

- A Transaction Code Object List can be used to name specific transaction codes to be included in or excluded from the report. For example, the sample report (see Figure 72 on page 130) was produced by specifying a Transaction Code Object List which contained the transaction codes DSFFHR2L DSFFHR2M DSFFHR2N DSFFHR2O DSFFHR2P DSFFIT2A DSFFIT2B DSFFIT2C DSFFIT2D DSFFIT2E DSFFIT2F. All excluded transactions, by default, are grouped into a category identified by *OTHERS* in the **Trancode** column. Averages are produced for each of the report's selected transaction codes.
Optionally, you can request to exclude *OTHERS* from the report. In this case, transaction codes that are excluded by the selection criteria are not reported, and not included in the report subtotals and totals.
- Print all transactions, or only those outside specified boundaries.
- Print the input Averages Data Set.
- The number of queues used in processing the Management Exception report. Varying the number of queues may improve performance when you are doing high-volume processing.
- Omit messages from the processing queue after a specified *nnnn* minutes (deletion occurs at checkpoint record processing). This may improve performance when transactions are held on IMS message queues for a long time.
- A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

- The data set to contain the report output is specified by the Report Output DDname option.

Two types of auxiliary data sets can be used with the Management Exception report:

- The Expectation Set contains user-supplied **expected values** for comparison with the values that are to be gathered.
- The input Averages Data Set contains the accumulated **totals** and **averages** for information gathered in previous Management Exception report runs. The output Averages Data Set contains the accumulated **totals** and **averages** resulting from this Management Exception report run.

The Management Exception report can have two parts:

- Management Exception Summary, which contains system summary information on an exception basis.
- Error Conditions log, which is produced if certain types of errors are detected.

You can also obtain a print of the input Averages Data Set in the format of the Management Exception Summary report, showing only the **Average** line for each transaction code in the Averages Data Set. This print is produced independently of the input log data set; no log records are processed.

Report content: Management Exception Summary

This is an example of the Management Exception Summary report.

The report is ordered alphabetically by transaction code. For each transaction code, the following information is reported:

- Total transaction count
- Averages (per transaction) of:
 - Total time
 - Input queue time
 - Processing time
 - Output queue time
 - Approximate number of database calls
 - Approximate number of data communication calls
 - Approximate number of database waits (wait for PI enqueue)
 - CPU time
- Transactions per minute

Times are reported in seconds and milliseconds (**Sc.mil**).

If an Expectation Set or an Input Averages Data Set or both are present, a test is made to see if each of the averages for each transaction in the current run is within the user-defined expectations for that transaction. If all current averages for a transaction are within both sets of limits, the transaction will not be listed on the report. If any of the averages for the transaction are outside either of the two corresponding sets of limits, the report will contain a line item for the transaction, and the out-of-bounds averages will be reported. An average or expectation of zero is considered a nonexistent value, and no boundary test is made in such cases.

If neither the input Averages Data Set nor Expectation Set is specified, all averages for all transactions are produced and the report is no longer an *exception* report. This would be the case on your first run of the Management Exception report.

Start 27May2018 15.51.04.65			IMS Performance Analyzer Management Exception Summary					End 27May2018 15.51.23.04			Page	1
Trancode	Source of Information	Transact Count	Total Sc.mil	Input Q Sc.mil	Process Sc.mil	Output Q Sc.mil	DB Calls	DC Calls	DB Waits	CPU Time Sc.mil	Transact Per Min	
OTHERS	This Run	913	202	13	188					52	2,980.2	
	Expectation		150	5	120					50	2.0	
DSFFHR2L	This Run	7	131		128						22.8	
	Average	7	109		106						.0	
	Expectation				120						2.0	
DSFFHR2M	This Run	3	146	13	131				.0		9.8	
	Average	3	121		109				1.0		.0	
	Expectation			5	120						2.0	
DSFFHR2N	This Run	3			140						9.8	
	Average	3									.0	
	Expectation				120						2.0	
...												
DSFFIT2E	This Run	3	223	29	193		34.0		.0		9.8	
	Average	3	185						10.0		.0	
	Expectation		150	5	120		30.0				2.0	
DSFFIT2F	This Run	6	109	3	105		34.0			44	19.6	
	Average	6	91	4	87					103	.0	
	Expectation		120				30.0				2.0	
SYSTEM	This Run	50	130	6	122	1	20.8	3.6	.0	33	163.2	
	Average	50	108								.0	
	Expectation			5	120						2.0	

Figure 72. Management Exception report: Summary

Two characteristics of the report should be noted:

- The total transaction count (**Transact Count**) on the **Average** line is the total number of occurrences in the Averages Data Set for that transaction and is used for computing the averages for previous runs; it does not include the transaction occurrences for the current run.
- The **Transact Count** on the **This Run** line is not the same as the **Number of Responses** in the Transaction Transit Analysis report. **Number of Responses** is the number of completed transit sets. **Transact Count** is the number of transactions processed. If there is a program switch, two transactions may have to be processed to complete one transit set.

The report provides the following information:

Trancode

Transaction Code.

Two entries in the Trancode column have special meaning:

OTHERS

The accumulated values for all transaction codes excluded from the report. When you filter on TRANCODE, one report line with a Trancode of *OTHERS* is reported, accumulating the transactions that did not match the TRANCODE filter.

SYSTEM

The accumulated values for all transaction codes reported.

If you want to exclude *OTHERS* from the report (and as a consequence, from the final *SYSTEM* total), specify the NOOTHERS operand. For example:

```
IMSPALOG MGREX(NOOTHERS,...
```

Source of Information

The source of information that caused the report line to be printed:

This Run

The values reported are averages for the transactions that ran in the log input file.

Average

The values reported are the threshold values defined in the Expectation Set and Averages data set. Only exceptions to the thresholds are reported.

The Expectation Set defines thresholds for this Transaction Code based on a base Average. If any transaction statistical value exceeds the average value saved in the Averages data set by more than nn%, then an exception is reported. This is a useful method to verify that transaction response time is not exceeding a benchmark set of average values. For example, you can create an Averages data set for a log file where transaction response time is acceptable. Then each subsequent run against future log files can verify their results against the saved averages. For example, verify that they are not exceeded by more than 10%.

Expectation

The values reported are the threshold values defined in the Expectation Set. Only exceptions to the thresholds are reported.

The Expectation Set defines thresholds for this Transaction Code. If any transaction statistical value exceeds the value specified in the Expectation Set, then an exception is reported. This is a useful method to verify that transaction response time is not exceeding required service level goals.

Transact Count

The total number of transactions run.

The Transact Count on the This Run line is not the same as the Number of Responses in the Transaction Transit Analysis report. Transact Count is the number of transactions processed. Number of Responses is the number of completed transit sets. For example, if there is a program switch, two transactions (Transact) may have to be processed to complete one transit set (Response).

The transaction count on the Average line is the total number of occurrences in the Averages Data Set for that transaction and is used for computing the averages for previous runs; it does not include the transaction occurrences for the current run.

Total The average total elapsed time (milliseconds).

Input Q

The average input queue elapsed time (milliseconds).

For shared queue transactions, this is the sum of input queue times on the front and back-end systems.

Process

The average processing elapsed time (milliseconds).

Output Q

The average output queue elapsed time (milliseconds).

For shared queue transactions, this is the sum of output queue times on the back and front-end systems.

DB Calls

The average number of DB calls per transaction.

DC Calls

The average number of DC calls per transaction.

DB Waits

The average number of DB waits per transaction.

CPU Time

The average CPU time (milliseconds) per transaction.

The averages for the DB, DC, and CPU statistics are approximations derived from the 07 (applicaton schedule end) IMS log record. The totals from the 07 record are distributed *equally* among the transactions within a scheduling (regardless of their processing elapsed time).

Transact per Min

The transaction processing rate per minute.

Report content: Error Conditions Log

This is an example of the Error Conditions log.

Start 27May2018 10.00.00.00											IMS Performance Analyzer			Page	1
											Error Conditions				
Time	IMS	Error	Line/DBD	PTerm/DS	Volser	Cyl	Trk	Rec	RBA	Program	TC/UID	1st Log Rec	Last Log Rec		
10.19.27.40	IMM1		100	SGA10016							ETUU8501	925,185			
10.22.58.60	IMM3		100	R131015B							RGES	952,160			
Cod Error Text															
100 User Exit Security Violation															

Figure 73. Management Exception report: Error Conditions log

The report provides the following information:

Time The time of the record logging the error.

IMS The IMS subsystem ID.

Volser Volume serial number. For Program Abend or Backout Failure exception events, this column can also be Userid. In this case, the column heading is changed to **VI/UID**.

1st Log Rec

The sequence number in decimal format of the first (or only) record logging the error. The log sequence number can be used as the value of the NEGOF option to print the record with IMS utility DFSERA10.

Five types of error conditions are optionally reported:

- Program Abends
- Security Violations
- Backout Failures
- Database I/O Errors (VSAM only)
- Snap Trace

Program Abends:

Program abends are reported from the 07, 67FD, and 67FF type log records.

The first and last log sequence numbers of the type 67 records, containing the snap dump of the region having the error, are reported. The 67FD and 67FF records can be formatted using the DFSERA30 exit to DFSERA10 or IBM IMS Problem Investigator for z/OS. Certain pseudo-abends do not produce a 67 record. In this case, the time and log sequence number are from the 07 record and the number of the last sequence number is reported.

The **Program** and **Trancode** columns show the abending program and transaction code.

The **Error** column shows the type of abend and completion code.

- For an IMS user abend, the first four characters identify the type of abend, followed by the 4-digit completion code. The abend types are:
 - ABND** Region-Abend Condition
 - BACK** Backout Snap
 - DUMP** Exceptional Status Code - Dump Request
 - ESSD** ESAF (External Subsystem) Deadlock
 - PSAB** Pseudo-Abend Condition
 - SNAP** External/Internal Snap
- For an MVS™ system abend, the first five characters are SYSAB, followed by the 3-digit completion code.

Security Violations:

Security violations are reported from the type 10 log records.

The problem code appears in the **Error** column and is described under **Code Error Text** at the bottom of the Error Conditions log. If a problem code is not in the following list, the following message appears in place of a description:

XXX All other codes unknown

and a snap of the type 10 log record is written to IPIDIAGS under the error message:

IPI0042E Unknown reason code in type 10 record

Unknown error codes are SCERROR codes not defined in the IMS DFSLOG10 macro. They can result from unsupported return codes or ABENDs from RACF® security exits.

The problem code can be one of the following:

- 0 User rejected by DFSCCMD0
- 4 User not defined to RACF
- 8 Password not defined to User
- 12 Password Expired
- 16 New Password invalid
- 20 Group not defined to User
- 24 RACF Exit rejected /SIGN ON
- 28 User's access revoked
- 32 RACF not active
- 36 Access to group revoked
- 40 OID Card not supplied
- 44 OID Card invalid
- 48 Not authorized to TERM by RACF

52 Not authorized to APPL by RACF
 56 RACF Reason Code 56
 60 RACF Reason Code 60
 62 Req Password not present
 64 RACF Reason Code 64
 66 Invalid Password entered
 67 Terminal Security Violation
 68 Command Security Violation
 72 RACF Reason Code 72
 76 RACF Reason Code 76
 80 Terminal in conversation
 84 Terminal held in conversation
 88 Terminal in Present Mode
 92 Terminal in Response Mode
 96 Term not authorized to Conv
 100 User Exit Security Violation
 104 RACF Reason Code 104
 108 RACF Reason Code 108
 112 RACF Reason Code 112
 116 RACF Reason Code 116
 120 RACF Reason Code 120
 124 RACF Reason Code 124
 128 Syntax error in SIGN command
 132 RACF System error
 136 ICMD Userid not defined to RACF
 140 ICMD Userid not auth to command
 144 ICMD rejected by DFSCCMD0
 148 ICMD failed, DFSCCMD0 unavail
 149 MCS Userid not defined to RACF
 150 MCS Userid not auth to command
 151 MCS Cmd rejected by DFSCCMD0
 152 MCS Cmd failed, DFSCCMD0 unavail
 160 CMD Userid not defined to RACF
 161 CMD Userid not auth to command
 162 CMD rejected by DFSCCMD0
 163 CMD failed, DFSCCMD0 unavail
 432 RACF ABEND suppressed
 171 OM Userid not defined to RACF
 172 OM Userid not auth to command
 173 OM Cmd rejected by DFSCCMD0
 174 OM Cmd failed, DFSCCMD0 unavail
 65535 Rejected by default command

The time and sequence number of the type 10 log record appear in the **Time** and **1st Log Rec** columns respectively. Where applicable, the following also appear:

- Line number or VTAM node name in the **Line** column
- PTERM number in the **Pterm** column
- Transaction code or userid in the **TC/UID** column

Backout Failures:

Backout failures are reported from the 07 record. The time and sequence number of the record and the program name and transaction code are reported.

Database I/O Errors (VSAM Only):

Database errors are reported from the 24 type record and apply only to VSAM.

The reason code appearing in the **Error** column can be one of the following:

READ Read operation

WRITE Write operation

UNKNOWN

Cannot be determined

If the reason cannot be determined, a snap of the 24 log record is written to IPIDIAGS under the error message:

IPI0043E Unknown error code in type 24 record

The following information also appears:

- Database name in the **DBD** column
- Volume serial number in the **Volser** column
- Disk address (cylinder, track, record) in the **Cyl Trk Rec** column
- RBA in the **RBA** column

Snap Trace:

IMS internal errors are reported.

Transaction Resource Usage report

The Transaction Resource Usage report provides a comprehensive overview of transaction resource usage.

The resources include:

- Scheduling statistics, including WFI
- CPU usage
- DL/I call statistics
- Enqueue statistics
- DBCTL DB and I/O usage

Log records: The reports are derived from IMS log record 07 (Application Terminate Accounting).

Report options

To specify the report options, select **Transaction Resource Usage** from the **Resource Usage & Availability Reports** category in a Log Report Set.

You can request any of the following reports:

- List report detailing individual transaction resource usage.
- Summary report providing totals of all transaction statistics for each region type and for each transaction by region type. This is the default.
- DL/I Calls Summary report providing transaction averages of DB Calls, DC Calls and CPU per transaction message.

For the first two reports (List and Summary), you can optionally include any combination of the following:

- DB Calls
- DC Calls
- Other DLI Calls
- ENQ/DEQ Counts

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

Note: Since the type 07 Application Terminate Accounting log record does not contain the schedule start time, the record time stamp is used for record selection. Therefore all time references in the report relate to the 07 record time stamp rather than transaction start and end times.

The report output is written to the data sets specified by the Report Output DDname for each report. The default is TRANRESU for all three reports.

You can specify Selection Criteria to include or exclude from the report particular values for the following:

- Region ID (PST Number or Region Jobname)
- Transaction Code
- Program (PSB)
- IMS Subsystem ID

The following region types are supported:

MPP Message Processing Program.

Transactions may run in this region type without being rescheduled. These transactions are known as quick restart transactions. The Transaction Resource Usage report does not include quick restart statistics in MPP region reports, but reports on them separately under a region type of "Quick".

BMP Batch Message Processing.

DBCTL
Database Control.

CPI-C Common Programming Interface for Communications (APPC).

JMP Java message processing region

JBP Java batch processing region

Report content: List

This is an example of the Transaction Resource Usage List report. The report lists statistics for each selected transaction using the IMS Transaction Terminate Accounting Log Record (type 07).

It is similar in format to the Long Summary report with the exclusion of averages. The report provides additional transaction information such as Program name and Completion Codes.

This report is used to review the performance of individual transactions.

IMS Performance Analyzer													
IMS Transaction Resource Usage - List													
Tran Code: VJMPNP		CPU :	40	Msg Count:	1	Time: 10/04/2018		23:02:03:18		CC: U0777 DLOCK			
Program : VJMPANP		PrtY:	8	PST :	18	Jobname: M61CND03		Type: MPP		System: I61C			
* DB Call *	GU	GN	GNP	GHU	GHN	GHNP	ISRT	DLET	REPL	DEQ	Total		
	1	44	0	0	0	0	0	0	0	0	45		
* DC Call *	GU	GN	ISRT	PURG	Total								
	1	0	0	0	1								
Other DLI	CMD	GCMD	CHNG	AUTH	SETO	APSB	DPSB	GMSG	ICMD	RCMD			
	0	0	0	0	0	0	0	0	0	0			
	CHKP	XRST	ROLB	ROLS	SETS	SETU	INIT	INQY	LOG	Total			
	0	0	0	0	0	0	0	1	0	1			
* ENQ/DEQ *	***** Test *****		***** Queue Command *****		***** Update *****		***** Exclusive *****						
	ENQ Cnt	ENQ Wts	DEQ Cnt	ENQ Cnt	ENQ Wts	DEQ Cnt	ENQ Cnt	ENQ Wts	DEQ Cnt	ENQ Cnt	ENQ Wts	DEQ Cnt	Total
	0	0	0	0	0	0	0	0	0	1	0	1	2
=====													

Figure 74. Transaction Resource Usage report: List (basic)

IMS Performance Analyzer													
IMS Transaction Resource Usage - List													
Tran Code: ACMA		CPU :	7122	Msg Count:	592	Time: 05/06/2018		01:02:20:86					
Program : ACMP010		PrtY:	01	PST :	4	Jobname: IMW1MA1		Type: MPP		System: IMW1			
Wait For SUBQ6/Msg		SUBQ6 Accum											
Input 1165700		17629K											
* DB Call *	GU	GN	GNP	GHU	GHN	GHNP	ISRT	DLET	REPL	DEQ	Total		
	592	0	0	592	0	0	592	0	592	0	2368		
* DC Call *	GU	GN	ISRT	PURG	Total								
	593	0	592	0	1185								
Other DLI	CMD	GCMD	CHNG	AUTH	SETO	APSB	DPSB	GMSG	ICMD	RCMD			
	0	0	592	0	0	0	0	0	0	0			
	CHKP	XRST	ROLB	ROLS	SETS	SETU	INIT	INQY	LOG	Total			
	0	0	0	0	0	0	0	0	0	592			
* ENQ/DEQ *	***** Test *****		***** Queue Command *****		***** Update *****		***** Exclusive *****						
	ENQ Cnt	ENQ Wts	DEQ Cnt	ENQ Cnt	ENQ Wts	DEQ Cnt	ENQ Cnt	ENQ Wts	DEQ Cnt	ENQ Cnt	ENQ Wts	DEQ Cnt	Total
	0	0	0	0	0	0	0	0	0	592	0	0	592

Figure 75. Transaction Resource Usage report: List (with WFI statistics)

IMS Performance Analyzer													
IMS Transaction Resource Usage - List													
Tran Code:		CPU :	11	Msg Count:	0	Time: 01/08/2018	12:17:50:93						
Program : XN010		PrtY:	40	PST :	47	Jobname: CICST	Type: DBCTL	System: DD3ACIC1					
DBCTL	I/O Cnt		I/O Elp		Lock Elp								
	4		166		0								
* DB Call *	GU	GN	GNP	GHU	GHN	GHNP	ISRT	DLET	REPL	DEQ	Total		
	0	0	0	2	0	0	0	0	0	0	2		
* DC Call *	GU	GN	ISRT	PURG	Total								
	0	0	0	0	0								
Other DLI	CMD	GCMD	CHNG	AUTH	SETO	APSB	DPSB	GMSG	ICMD	RCMD			
	0	0	0	0	0	0	0	0	0	0			
	CHKP	XRST	ROLB	ROLS	SETS	SETU	INIT	INQY	LOG	Total			
	0	0	0	0	0	0	0	0	0	0			
* ENQ/DEQ *	***** Test *****	***** Queue Command *****	***** Update *****	***** Exclusive *****									
	ENQ Cnt	ENQ Wts	DEQ Cnt	ENQ Cnt	ENQ Wts	DEQ Cnt	ENQ Cnt	ENQ Wts	DEQ Cnt	ENQ Cnt	ENQ Wts	DEQ Cnt	Total
	0	0	0	0	0	0	0	0	0	0	0	0	0

Figure 76. Transaction Resource Usage report: List (with DBCTL statistics)

The Transaction Resource Usage List report is produced in log record sequence.

The report contains the following information:

Tran Code

Transaction Code.

CPU Transaction CPU time in milliseconds.

Msg Count

Number of messages processed by this Schedule.

Time Log record date and time.

CC Transaction System or User completion code and description.

Program

Name of transaction program.

Prtty Transaction priority in hexadecimal.

PST Partition Specification Table number.

Jobname

Job Name.

Type Processing region type: **MPP, Quick** (MPP Quick reschedule), **BMP, DBCTL, CPI-C, Java**.

System

IMS Subsystem ID.

Wait For Input

The WFI statistics are only displayed if they contain non-zero values.

SUBQ6/Msg

SUBQ 6 time in milliseconds for last message in the schedule.

SUBQ6 Accum

Accumulated SUBQ 6 time in milliseconds.

DBCTL

The DBCTL statistics are only displayed if the schedule was for a DBCTL thread.

I/O Cnt

DBCTL I/O count.

I/O Elp

DBCTL I/O elapsed time in milliseconds.

Lock Elp

DBCTL Lock elapsed time in milliseconds.

DB Call

This section is only included if you selected the report option **Include DB Calls**. It gives the count for each type of DB call (**GU, GN, GNP, GHU, GHN, GHNP, ISRT, DLET, REPL, DEQ**) and the **Total** DB calls.

DC Call

This section is only included if you selected the report option **Include DC Calls**. It gives the count for each type of DC call (**GU, GN, ISRT, PURG**) and the **Total** DC calls.

Other DLI

This section is only included if you selected the report option **Include Other DLI Calls**. It gives the count for each type of call and the total DLI calls.

CMD Number of IMS commands issued.

GCMD

Get command response call count.

CHNG Change alternate PCB call count.
AUTH Authorization call count.
SETO Set Options call count.
APSB Allocate PSB call count.
DPSB Deallocate PSB call count.
GMSG Get message call count.
ICMD Issue Command call count.
RCMD Retrieve Command call count.
CHKP Basic Checkpoint call count.
XRST Extended Restart call count.
ROLB Rollback call count.
ROLS Rollback to SETS/SETU call count.
SETS Set Backout Point call count.
SETU Set Backout Point Unconditionally call count.
INIT Initialize call count.
INQY Inquiry call count.
LOG Log call count.
Total Total DLI calls.

ENQ/DEQ

This section is only included if you selected the report option **Include ENQ/DEQ Counts**.

TEST

ENQ Cnt Test Enqueue call count.
ENQ Wts Number of waits on Test Enqueue calls.
DEQ Cnt Test Dequeue call count.

Queue Command

ENQ Cnt Queue Command Enqueue call count.
ENQ Wts Number of waits on Queue Command Enqueue calls.
DEQ Cnt Queue Command Dequeue call count.

Update

ENQ Cnt Update Enqueue call count.
ENQ Wts Number of waits on Update Enqueue calls.
DEQ Cnt Update Dequeue call count.

Exclusive

ENQ Cnt Exclusive Enqueue call count.
ENQ Wts Number of waits on Exclusive Enqueue calls.
DEQ Cnt Exclusive Dequeue call count.

Total Total Enqueue/Dequeue call count.

Report content: Long Summary

This example shows the Transaction Resource Usage Summary report. It is a two-part report generated using the IMS transaction terminate accounting record (log code 07). Each part consists of two sections, totals and call group statistics.

IMS Performance Analyzer														
IMS Transaction Resource Usage - Summary														
Report From: 19Mar2018 08:36:48:21				To: 19Mar2018 08:36:57:21				Elapsed= 0 Hrs 0 Mins 9.000.328 Secs						
Tran : Total				***** DLI Calls *****		*** Enqueues ***		* WFI *		*** Schedule		Distribution		****
Type : MPP	CPU	Sched	Trans	DB	DC	Other	Count	Wait	SUBQ6	Quick	=0	=1	>1	
Total	17790	1004	696	902	2264	1182	16	0	0	0	Sch	393	547	64
/Sched	17	1.0	0.7	0.9	2.3	1.2	0.0	0.0	0	0.0	Tra	0	547	149
/Tran	25	1.4	1.0	1.3	3.3	1.7	0.0	0.0	0	0	T/S	0	1	2
/Minute	17790	1004.0	696.0	902.0	2264.0	1182.0	16.0	0.0	0	0.0	S/M	393.0	547.0	64.0
% Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	0.00	0.00	0.00	%Sc	39.14	54.48	6.37
* DB Call *		GU	GN	GNP	GHU	GHN	GHNP	ISRT	DLET	REPL	DEQ			
Total	574	36	205	25	0	3	31	3	25	0				
/Tran	0.8	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
% DLI	13.20	0.83	4.71	0.57	0.00	0.07	0.71	0.07	0.57	0.00				
* DC Call *		GU	GN	ISRT	PURG									
Total	1287	182	731	64										
/Tran	1.8	0.3	1.1	0.1										
% DLI	29.60	4.19	16.81	1.47										
Other DLI		CMD	GCMD	CHNG	AUTH	SET0	APSB	DPSB	GMSG	ICMD	RCMD			
Total	0	0	74	0	0	0	0	0	0	0	0			
/Tran	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
% DLI	0.00	0.00	1.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
	CHKP	XRST	ROLB	ROLS	SETS	SETU	INIT	INQY	LOG					
Total	0	0	0	0	0	0	667	362	79					
/Tran	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.5	0.1					
% DLI	0.00	0.00	0.00	0.00	0.00	0.00	15.34	8.33	1.82					
* ENQ/DEQ *		***** Test *****		***** Queue Command *****		***** Update *****		***** Exclusive *****						
	ENQ	ENQ	DEQ	ENQ	ENQ	DEQ	ENQ	ENQ	DEQ	ENQ	ENQ	DEQ		
	Count	Waits	Count	Count	Waits	Count	Count	Waits	Count	Count	Waits	Count		
Total	0	0	0	0	0	0	0	0	0	16	0	0		
/Tran	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
% DB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.77	0.00	0.00		

Figure 77. Transaction Resource Usage report: Long Summary (with WFI statistics)

IMS Performance Analyzer												
IMS Transaction Resource Usage - Summary												
Report From: 21Jan2018 11:49:21:67				To: 21Jan2018 13:05:39:18				Elapsed= 1 Hrs 16 Mins 17.503.664 Secs				
Tran : XN010												
Type : DBCTL	CPU	Sched	Trans	***** DB	DLI Calls *****	DC	Other	*** Enqueues ***	Wait	***** I/O Cnt	DBCTL *****	I/O Elp Lck Elp
Total	146	96	0	256	0	0	0	1	0	15	422	0
/Sched	1	1.0	0.0	2.7	0.0	0.0	0.0	0.0	0.0	0.2	4	0
/Tran	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0
/Minute	1	1.3	0.0	3.4	0.0	0.0	0.0	0.0	0.0	0.2	5	0
% Total	100.00	100.00	0.00	100.00	0.00	0.00	0.00	100.00	0.00	100.00	100.00	0.00
* DB Call *												
	GU	GN	GNP	GHU	GHN	GHNP	ISRT	DLET	REPL	DEQ		
Total	0	0	0	154	0	101	1	0	0	0		
/Tran	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
% DLI	0.00	0.00	0.00	60.16	0.00	39.45	0.39	0.00	0.00	0.00		
* DC Call *												
	GU	GN	ISRT	PURG								
Total	0	0	0	0								
/Tran	0.0	0.0	0.0	0.0								
% DLI	0.00	0.00	0.00	0.00								
Other DLI												
	CMD	GCMD	CHNG	AUTH	SETO	APSB	DPSB	GMSG	ICMD	RCMD		
Total	0	0	0	0	0	0	0	0	0	0		
/Tran	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
% DLI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	CHKP	XRST	ROLB	ROLS	SETS	SETU	INIT	INQY	LOG			
Total	0	0	0	0	0	0	0	0	0			
/Tran	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
% DLI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
* ENQ/DEQ *												
***** Test *****	ENQ	ENQ	DEQ	***** Queue Command *****	***** DEQ *****	***** Update *****	***** Exclusive *****	***** ENQ *****	***** ENQ *****	***** DEQ *****	***** DEQ *****	
	Count	Waits	Count	ENQ Count	ENQ Waits	DEQ Count	ENQ Count	ENQ Waits	DEQ Count	ENQ Count	ENQ Waits	DEQ Count
Total	0	0	0	0	0	0	0	0	0	1	0	0
/Tran	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
% DB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.39	0.00	0.00

Figure 78. Transaction Resource Usage report: Long Summary (with DBCTL statistics)

The first part is a summary of statistics by region type (MPP, JMP, BMP, JBP, DBCTL, CPI-C) giving an overall view of region performance.

The second part is identical to the first, but gives a breakdown of the region summary statistics by transaction. For each region type, a summary report is generated for each transaction providing an overall view of transaction performance. The first section of the report provides totals for each call group and overall counts. It gives a total for each statistics field in the 07 records and includes averages per transaction, schedule and minute, as well as percentage of totals. The second section of the report provides detailed statistics for each call group. Each call group statistics are averaged by transaction and as a percentage of DLI or DB calls.

The Long Summary report prints summaries in transaction and region key order. That is, the reports are sorted by transaction code and region type in ascending order. Region summary reports have a transaction code of **Total** and are printed before the individual transaction summary reports.

The report contains the following information:

Report From

Time stamp of the first transaction record.

To Time stamp of the last transaction record.

Elapsed

The difference between the Report From and To.

Tran Transaction code, or PSB if the transaction code is blank, or "Total" for the region total report.

Type Transaction type: **MPP**, **JMP**, **BMP**, **JBP**, **DBCTL**, **CPI-C**.

The Summary section columns are:

CPU CPU time in milliseconds.

Sched Scheduled transaction count. Note that for an MPP (or JMP) region, this count is MPP (or JMP) schedules only. Quick Reschedules are not included, but are counted separately in the **Quick** column.

Trans Transaction (messages processed) count.

DLI Calls

DB Total number of database GU, GN, GNP, GHU, GHN, GHNP, ISRT, DLET, REPL and DEQ calls.

DC Total number of message queue GU, GN, ISTR, and PURG calls.

Other Total number of CMD, GCMD, message CHNG, message AUTH, message SETO, APSB, DPSB, GMSG, ICMD, RCMD, CHKP, XRST, ROLB, ROLS, SETS, SETU, INIT, INQY and LOG calls.

Enqueues

Count Number of Test Enqueues, Queue Commands, Update and Exclusive Enqueues made by each transaction.

Waits Number of waits on Test Enqueues, Queue Commands, Update and Exclusive Enqueues.

WFI SUBQ6

Wait For Input, accumulated SUBQ 6 time in milliseconds. SUBQ 6 statistics are always printed for MPP and BMP type transactions, whether zero or non-zero.

DBCTL

This section is only displayed if the transactions used a DBCTL thread.

I/O Cnt

DBCTL I/O count.

I/O Elp

DBCTL I/O elapsed time in milliseconds.

Lock Elp

DBCTL Lock elapsed time in milliseconds.

Quick Quick Reschedule transaction count. Only printed for MPP or JMP regions.

Schedule Distribution

This section is only for MPP/JMP and BMP/JBP regions. These statistics provide a summary schedule transaction distribution for all MPP/JMP and BMP/JBP schedules. MPP/JMP schedules do not include Quick Reschedules belonging to them. Each schedule contains from 0 to n transactions (messages). The number of messages in each schedule determines the distribution category it is added to:

=0 Schedules containing no transactions ("false schedules").

=1 Schedules containing a single transaction.

>1 Schedules containing more than one transaction.

The rows of statistics are:

Sch	Number of schedules for each of the distribution categories.
Tra	Number of transactions for each of the distribution categories. As a result, the value in column =0 will always be zero, and in column =1 will be equal to the number of schedules in the same column.
T/S	Number of Transactions per Schedule for each distribution category. As a result, the value in column =0 will always be zero, and in column =1 will always be 1.
S/M	Average number of schedules per minute for each of the distribution categories.
%Sc	Percentage of each distribution category based on the total number of schedules.

The rows of statistics for the Summary section are:

Total	Total amount of resource used.
/Sched	Amount of resource used per schedule.
/Tran	Amount of resource used per transaction. Omitted for Quick as this statistic is not meaningful for Quick Reschedules.
/Minute	Amount of resource used per minute.
%Total	The values in the column above as a percentage of total region values. The percentage of resource used across all regions.

Note:

1. JMP (Java™ message processing region) is similar to MPP (message processing program), and JBP (Java batch processing region) is similar to BMP (batch message processing program). Hence, what is described in this report for MPP can equally be said for JMP, and what is described for BMP can equally be said for JBP.
2. An MPP schedule is defined as the MPP schedule and all its associated Quick Reschedules. For example, an MPP schedule may be a single MPP schedule containing zero or messages, or include a number of Quick Reschedules. A schedule is deemed complete when the Application Terminate Accounting X'07' type DLRMESR (MPP) log record is received.
3. The MPP transaction count is the total number of MPP messages and Quick Reschedule messages, including incomplete schedules. However, when calculating **T/S** values, only transactions for completed MPP schedules are included. That is, if a group of Quick Reschedules does not have a completing MPP schedule, their message count is included in the **Tran** counts, but not in the **T/S** calculation. This is because IMS PA may receive an incomplete set of log records for the schedule that if included in the **T/S** calculation would distort the results.

The following sections are shown only if requested.

DB Section

This section is only included if you selected the report option **Include DB Calls**. It gives the count for each type of DB call (GU, GN, GNP, GHU, GHN, GHNP, ISRT, DLET, REPL, DEQ). For each of these, the report shows:

Totals Total for each call type.

/Tran Calls per transaction.
%DLI Percentage of DB calls across all regions.

DC Section

This section is only included if you selected the report option **Include DC Calls**. It gives the count for each type of DC call (GU, GN, ISRT, PURG) and the total DC calls. For each of these, the report shows:

Totals Total for each call type.

/Tran Calls per transaction.

%DLI Percentage of DB calls across all regions.

Other DLI Section

This section is only included if you selected the report option **Include Other DLI Calls**. It gives the count for each type of call: CMD, GCMD, CHNG, AUTH, SETO, APSB, DPSB, GMSG, ICMD, RCMD, CHKP, XRST, ROLB, ROLS, SETS, SETU, INIT, INQY, LOG. For a description of these counts, see "Other DLI" on page 138. For each of these, the report shows:

Totals Total for each call type.

/Tran Calls per transaction.

%DLI Percentage of DB calls across all regions.

ENQ/DEQ

This section is only included if you selected the report option **Include ENQ/DEQ Counts**. It shows the Test, Queue Command, Update and Exclusive Counts (ENQ Count, ENQ Wait and DEQ Count). Refer to "Report content: List" on page 136 for the description of these data fields. For each, we have:

Totals Total for each call type.

/Tran Calls per transaction.

%DLI Percentage of DB calls across all regions.

Report content: DL/I Calls Summary

This is an example of the Transaction Resource Usage DL/I Calls Summary report.

It lists the transaction code, the total number of messages for each transaction, CPU, DB and DC call averages per message for each transaction using the IMS Transaction Terminate Accounting Log Record (type 07). The report also provides a total line that includes the total number of messages for all selected transactions and the average CPU, DB & DC calls per message.

IMS Performance Analyzer																
IMS Transaction Resource Usage - DL/I Calls																
Report From: 08Dec2018 15:06:29:10			To: 08Dec2018 15:33:45:52			Elapsed= 0 Hrs 27 Mins 16.425.071 Secs										
***** D B C a l l s *****																
Trancode	Msg Cnt	CPU	GU	GN	GNP	D B GHU	C a l l s GHN	GHNP	ISRT	DLET	REPL	***** D C C a l l s *****	GU	GN	ISRT	PURG
MGM9JHM	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VGGDCIP	25	54	6.2	0.0	0.0	6.0	0.0	0.0	2.0	2.0	1.0	2.0	0.0	1.0	0.0	0.0
VGGDCMC	23	118	8.3	0.0	0.0	11.0	0.0	0.0	4.0	3.0	3.0	2.0	0.0	5.0	4.0	0.0
VGGDGTST1	290	32	4.2	0.0	0.0	2.0	0.0	0.0	1.5	1.5	0.5	2.0	0.0	1.0	0.0	0.0
VGGDMLX	26	42	1.0	0.0	0.0	2.0	3.4	0.0	4.4	3.4	0.0	2.0	0.0	0.0	0.0	0.0
VGGDOIIE	297	8	0.1	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0
VGGDPSTR	3	14	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
VGGDRMC	74	43	10.6	0.0	0.0	3.7	0.0	0.0	1.0	1.0	1.7	2.0	0.0	1.0	0.0	0.0
VGGDTLOG	56	16	3.7	0.0	0.0	1.5	0.0	0.0	1.5	1.5	0.0	1.5	0.0	1.0	0.0	0.0
VGGDTRAK	73	54	5.8	0.1	0.0	5.2	0.0	0.0	1.9	1.0	2.0	2.0	0.0	1.4	0.4	0.0
VGG022T1	319	1109	96.0	277.4	1.4	93.4	0.0	0.0	90.6	92.4	1.0	1.1	0.0	1.0	0.0	0.0
VGG023T1	156	23	5.6	0.0	0.2	3.6	0.0	0.0	1.4	1.0	1.4	1.0	0.0	1.2	0.2	0.0
VGMPNP	9	107	4.3	149.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	3.0
VGOIC01A	18	42	4.1	0.0	0.0	1.0	0.0	0.0	0.0	0.0	1.0	2.0	0.0	1.0	0.0	0.0
VGOIT07	3	14	2.0	9.0	0.0	9.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
VGOQ1WR2	10	1368	11.7	149.7	11.0	3.0	0.0	0.0	0.0	0.0	3.0	2.0	0.0	6.9	3.0	0.0
VGOQ2WR2	16	13320	10.6	4013.4	8438.4	3.0	0.0	0.0	0.0	0.0	3.0	1.6	0.0	3.0	3.0	0.0
YXCALARM	6	26	5.2	0.0	0.0	2.0	0.0	0.0	1.0	0.0	2.0	1.7	0.0	1.0	1.0	0.0
YXCANLD	1	12	1.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	2.0	0.0	1.0	0.0	0.0
YXCANL2	3	75	35.0	34.7	0.0	34.3	0.0	0.0	0.3	0.0	34.3	1.7	0.0	0.3	0.7	0.0
YXCAPER	186	19	8.1	0.0	0.0	2.0	0.0	0.0	1.0	1.0	0.4	1.7	0.0	1.0	0.0	0.0
YXMPCC1B	4	31	2.7	0.0	1.0	1.0	0.0	0.0	2.2	0.0	1.0	2.0	2.0	0.5	0.2	0.0
YXMPNP	13	70	1.7	80.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
YXOIC01A	5	44	6.8	0.0	0.0	1.0	0.0	0.0	0.0	0.0	1.0	1.6	0.0	1.0	0.0	0.0
YXQCAW2	15	626	34.5	168.9	0.0	3.0	0.0	0.0	0.0	0.0	3.0	1.3	0.0	7.2	1.0	0.0
Total	1631	384	22.8	97.6	83.1	20.1	0.1	0.0	18.8	18.8	0.8	1.5	0.0	1.0	0.2	0.0

Figure 79. Transaction Resource Usage report: DL/I Calls Summary

The DL/I Calls Summary report is sorted on Trancode in ascending sequence. The report fields are:

Trancode

Transaction code.

Msg Count

Total number of messages (transactions) processed.

CPU

Average CPU time in milliseconds.

DB Calls

The average number of calls for each type of DB call: GU, GN, GNP, GHU, GHN, GHNP, ISRT, DLET, REPL.

DC Calls

The average number of calls for each type of DC call: GU, GN, ISRT, PURG.

Resource Availability report

The Resource Availability report indicates the relative amount of time a specific resource is active, idle, or unavailable.

The following resources can be reported on:

- Regions
- Programs (PSBs)
- Transaction codes
- Databases
- Lines or VTAM nodes

Resource Availability reports can be generated for any combination of these resources in a single run.

Log records: This report is derived from IMS log records 01, 02, 07, 08, 20, 21, 24, 31, 34, 35, 36, 40, and 67.

Uses

Use the Resource Availability report to get availability information, as well as a summary of how frequently each resource is used. This information helps you plan for more efficient scheduling. This report also indicates the need for remedial action when unavailable times become significant. Hardware, software, and operational problems can also be recognized.

Report options

To specify the report options, select **Resource Availability** from the Resource Usage and Availability Reports in a Log Report Set.

The report can be requested for any or all of the following resources:

- Region
- Program (PSB)
- Transaction Code
- Database
- Line

By using Object Lists, you can specify that only certain values be included in or excluded from the report for:

- Region IDs (PST number or Message Region Job name)
- Programs (PSBs)
- Transaction Codes
- Databases
- Lines
- VTAM Nodes
- IMS Subsystem IDs

The results for excluded items are dropped completely. There is no "OTHERS" category.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The output data set for the report is controlled by specifying the Report Output DDname.

Report content

The Resource Availability report shows the relative amount of time each resource is in use (active), idle, or unavailable. The resources are reported by category: regions, programs (PSB), transaction codes, databases, lines (or VTAM nodes).

The IMS Subsystem ID is shown in the heading of all but the Line report as Line availability is only meaningful on a system (sysplex) wide basis.

In the upper left-hand corner of each report is the **Total IMS Up Time**. This is the time from the first time stamp or the first type 40 log record (checkpoint) to the

last time stamp or the last IMS checkpoint within the reporting period. The percentages on all reports are obtained by dividing the time for the resource by the Total IMS Up Time.

The meaning of the **In Use** (active), **Idle**, and **Unavailable** columns in the report is based on the resource; the meaning of these times depends on which resource is being examined. The columns are therefore described separately for each resource.

Reason codes can appear in the **Unavailable** column. The format of the reason codes is *reason code (count)*, where count is the number of times that reason code has occurred in the reporting period.

Some resources in a specific resource category may not appear in the report. For example, if a region is started before the start time of the report and is not stopped until after the stop time of the report (or after end-of-file), the region will not appear in the report. This should be acceptable because it is the problem areas within the time span of the report that are of primary interest, and these are reported.

The **Waiting for Input** column contains that part of the In Use time that a program scheduled in a region spends waiting for input, rather than processing a transaction. This appears on the Resource Availability reports for regions, programs, or transaction codes; it is not applicable to databases or lines.

When a Resource Availability report is requested by Line, VTAM node names are reported (instead of line number) for VTAM terminals. The VTAM Node Object List, if specified, is used in this case. If the Line and PTERM numbers are unavailable, question marks will appear instead.

A > symbol to the left of a resource name indicates the resource was still in use at the end of the report period.

Special meanings for transaction codes and program names are as follows:

BLANK

Batch program

UNDEFND*

Not defined in checkpoint records

Note: MSC links are reported in the Resource Availability report as Line/PTERMs. This is because MSC assigns line numbers to each MSC link after the real lines are defined. MSC messages are sent/received against their associated line/PTERM, which is really an MSC Link.

Start 14Jun2018 15.51.04.65

IMS Performance Analyzer
Resource Availability-IMS2

End 14Jun2018 15.51.23.04

Total IMS Up Time		18 (hh.mm.ss)							
Region		<-----In Use----->		<-----Idle----->		<--Unavailable-->		<--Waiting for Input-->	
		hh.mm.ss	Pct	hh.mm.ss	Pct	hh.mm.ss	Pct	hh.mm.ss.t	Pct
>	2 IMP11A1	14	76.8	4	23.3	0	.0	8.8	47.9
>	3 IMP11B1	15	81.1	3	18.9	0	.0	8.6	46.8
>	4 IMP11C1	15	79.9	3	20.1	0	.0	8.8	47.9
>	5 IMP11D1	15	80.9	3	19.1	0	.0	9.0	49.0
>	6 IMP11E1	15	80.9	3	19.1	0	.0	9.0	49.0
>	7 IMP11F1	15	81.2	3	18.8	0	.0	9.6	52.2
>	8 IMP11G1	15	80.2	3	19.8	0	.0	9.1	49.5
>	9 IMP11H1	15	79.9	3	20.1	0	.0	9.4	51.1
>	10 IMP11I1	15	81.2	3	18.9	0	.0	10.5	57.1
>	11 IMP11J1	15	81.1	3	18.9	0	.0	9.9	53.9
>	12 IMP11K1	15	81.2	3	18.8	0	.0	9.6	52.2
>	13 IMP11L1	15	80.8	3	19.3	0	.0	9.4	51.1
>	14 IMP11M1	15	80.8	3	19.2	0	.0	8.5	46.2
>	15 IMP11N1	15	81.1	3	19.0	0	.0	8.9	48.4
>	16 IMP11O1	15	80.2	3	19.8	0	.0	9.3	50.6
>	17 IMP11P1	15	80.9	3	19.2	0	.0	9.7	52.8

Program		<-----In Use----->		<-----Idle----->		<--Unavailable-->		<--Waiting for Input-->	
		hh.mm.ss	Pct	hh.mm.ss	Pct	hh.mm.ss	Pct	hh.mm.ss.t	
	DFSFD1A	3	17.1	15	82.9	0	.0	1.3	
	DFSFD1B	3	17.0	15	83.0	0	.0	2.4	
	DFSFD1C	3	15.0	16	85.0	0	.0	1.2	
	DFSFD1D	1	5.9	17	94.1	0	.0	0.9	
	DFSFD1E	3	18.9	15	81.1	0	.0	3.1	
	DFSFD1F	3	17.8	15	82.2	0	.0	2.5	
	DFSFD1H	2	11.5	16	88.5	0	.0	1.7	
	DFSFD1I	2	9.9	17	90.1	0	.0	1.4	
	DFSFD1J	2	10.5	16	89.5	0	.0	1.9	
>	DFSFD1K	1	3.1	18	96.9	0	.0		
	DFSFD1L	6	30.5	13	69.5	0	.0	4.0	
	DFSFD1M	0	.8	18	99.2	0	.0		
	DFSFD1N	4	20.9	15	79.1	0	.0	2.0	
	DFSFD1O	2	10.8	16	89.2	0	.0	1.3	
	DFSFD1P	1	6.7	17	93.3	0	.0	0.6	
	DFSFD1A	4	19.9	15	80.1	0	.0	2.8	
	DFSFD1B	3	16.5	15	83.5	0	.0	2.8	
>	DFSFD1C	4	21.2	14	78.8	0	.0	2.8	

Transact		<-----In Use----->		<-----Idle----->		<--Unavailable-->		<--Waiting for Input-->	
		hh.mm.ss	Pct	hh.mm.ss	Pct	hh.mm.ss	Pct	hh.mm.ss.t	
	DSFFD1A	3	17.1	15	82.9	0	.0	1.3	
	DSFFD1B	3	17.0	15	83.0	0	.0	2.4	
	DSFFD1C	3	15.0	16	85.0	0	.0	1.2	
	DSFFD1D	1	5.9	17	94.1	0	.0	0.9	
	DSFFD1E	3	18.9	15	81.1	0	.0	3.1	
	DSFFD1F	3	17.8	15	82.2	0	.0	2.5	
	DSFFD1H	2	11.5	16	88.5	0	.0	1.7	
	DSFFD1I	2	9.9	17	90.1	0	.0	1.4	
	DSFFD1J	2	10.5	16	89.5	0	.0	1.9	
>	DSFFD1K	1	3.1	18	96.9	0	.0		
	DSFFD1L	6	30.5	13	69.5	0	.0	4.0	
	DSFFD1M	0	.8	18	99.2	0	.0		
	DSFFD1N	4	20.9	15	79.1	0	.0	2.0	
	DSFFD1O	2	10.8	16	89.2	0	.0	1.3	
	DSFFD1P	1	6.7	17	93.3	0	.0	0.6	
	DSFFD1A	4	19.9	15	80.1	0	.0	2.8	
	DSFFD1B	3	16.5	15	83.5	0	.0	2.8	
>	DSFFD1C	4	21.2	14	78.8	0	.0	2.8	

Figure 80. Resource Availability report: regions, programs, transactions

Total IMS Up Time		4.38.10 (HH.MM.SS)					
		<-----In Use----->		<-----Idle----->		<--Unavailable-->	
Database	Data Set	hh.mm.ss	Pct	hh.mm.ss	Pct	hh.mm.ss	Pct
> DQIMSA	DQIMSA1	4.37.57	99.9	13	.1	0	.0
> DQS01A	DQS01A1	4.38.06	100.0	5	.0	0	.0
> DZIMSA	DZIMSA1	4.37.56	99.9	14	.1	0	.0

Line	PTERM	<-----In Use----->		<-----Idle----->		<--Unavailable-->	
		hh.mm.ss	Pct	hh.mm.ss	Pct	hh.mm.ss	Pct
DSW00003		5	28.4	13	71.6	0	.0
DSW00004		0	.5	18	99.5	0	.0
DSW00005		6	33.6	12	66.4	0	.0
DSW00006		8	43.4	10	56.6	0	.0
DSW00007		0	.0	18	100.0	0	.0
DSW00008		0	.3	18	99.7	0	.0
DSW00009		0	.2	18	99.8	0	.0
DSW00010		0	.1	18	99.9	0	.0
DSW00011		0	.1	18	99.9	0	.0
DSW00012		0	.3	18	99.7	0	.0
DSW00013		0	.3	18	99.7	0	.0
DSW00014		0	.2	18	99.8	0	.0
> DSW00015		15	81.2	3	18.8	0	.0
> DSW00016		9	51.6	9	48.4	0	.0
DSW00017		0	.2	18	99.8	0	.0
DSW00018		0	.2	18	99.8	0	.0
DSW00019		7	39.5	11	60.5	0	.0
DSW00020		3	16.9	15	83.1	0	.0

Figure 81. Resource Availability report: databases, lines (or VTAM nodes)

Region Times

The In Use, Idle, and Unavailable times have the following meanings for the Region report.

In Use

The time during which a program is scheduled into a region (region occupancy time). This is the sum of the times between the type 08 log record (program scheduled) and the type 07 log record (region freed due to program termination) for each program using the region.

Idle

The time during which a region has been started but no programs are using it. This is the sum of the times between the type 07 log record for one program and the type 08 log record for the next program.

Unavailable

The time during which the region is not yet started or when the region has been stopped by a command or because of an error. For each down-time entry, a reason code is printed to the right of the time. The reason codes are as follows:

NOST Region not started
STOP Region stopped by a command
BMP Region stopped because a BMP terminated
ABND Region stopped because an abend occurred

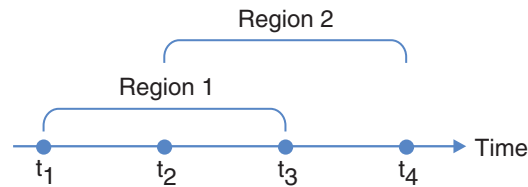
Program Times

The In Use, Idle, and Unavailable times have the following meanings for the Program report.

In Use

The time during which a program is processing transactions. For each

program, this is the time between its type 08 log record and its corresponding type 07 log record. If the program is running in two or more regions such that its running times overlap, the active time is the logical sum of the two running times. The following example shows four time intervals t1, t2, t3, t4. A program is running from t1 to t4 but concurrently in two regions from t2 to t3. In this example, the active time is the time from t1 to t4.



Idle The time during which the program is available but is not scheduled. This is the sum of the times from the type 07 log record (program termination) to the next type 08 log record for that program (program started).

Unavailable

The time during which the program is unavailable for scheduling. The program has been stopped by a command or by an abend. For each downtime entry, a reason code is printed to the right of the time. The reason codes are as follows:

STOP Program stopped by a command
sss System completion code for the abend
uuuu User completion code for the abend

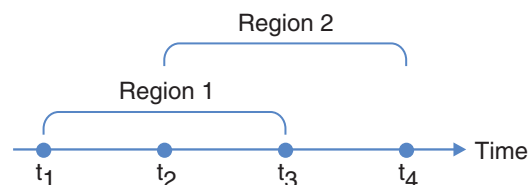
Note: If a backout occurs, backout times are also reported.

Transaction Times

The In Use, Idle, and Unavailable times have the following meanings for the Transaction report.

In Use

The time during which a transaction is being processed. For each transaction, this is the time between its type 08 log record and its corresponding type 07 log record. If the transaction is running in two or more regions such that its running times overlap, the active time is the logical sum of the two running times. The following example shows four time intervals t1, t2, t3, t4. A transaction is running from t1 to t4 but concurrently in two regions from t2 to t3. In this example, the active time is the time from t1 to t4.



Idle The time during which the transaction is available but is not scheduled. This is the sum of the times from the type 07 log record (transaction termination) to the next type 08 log record for that transaction (transaction started).

Unavailable

The time during which the transaction cannot be scheduled. The transaction has been stopped by a command or by an abend. For each downtime entry, a reason code is printed to the right of the time. The reason codes are as follows:

STOP Transaction stopped by a command
sss System completion code for the abend
uuuu User completion code for the abend

Note: If a backout occurs, backout times are also reported.

Database Times

This resource is subdivided into data sets within each database. The data sets are identified by DDname under each database name. The In Use, Idle, and Unavailable times have the following meanings for the Database report.

In Use

The data sets are open. This is the time, for each database, from the type 20 log record (database open) to the type 21 log record (database close).

Idle The time during which the data sets are closed (before the type 20 or after the type 21 log record) but the database is not stopped.

Unavailable

The time during which the database is stopped by a command or by a read/write error. For each downtime entry, a reason code is printed to the right of the time. The reason codes are as follows:

STOP Database stopped by a command
READ Read error occurred (VSAM only)
WRITE Write error occurred (VSAM only)
OERR Open error occurred

Line Times

The In Use, Idle, and Unavailable times have the following meanings for the Line report.

In Use

For response transactions, In Use is the time between the type 01 log record (first message segment received) and the type 36 log record (output transmission complete). This time includes queue times and processing times. For nonresponse transactions, In Use is the time from the type 01 log record to the type 35 log record (input transmission complete) and from the type 31 log record (output transmission started) to the type 36 log record. In this case, processing times and non-transmission queue times are not included. The line can be available even though a terminal is busy.

Idle The time during which the line is available but nothing is being transmitted. The line has not been stopped by a command or by an error.

Unavailable

The time during which an error stopped the line. The START and STOP commands are not supported; if the line is stopped by a command, this is not recorded in the log and so does not appear in the report. For each downtime entry, a reason code is printed to the right of the time. The reason codes are as follows:

READ Read error occurred
WRITE Write error occurred

Note: Unavailable time includes only those line read or write errors reported in the type 67 log record.

CPU Usage report and extract

The CPU Usage report gives statistics for CPU time and elapsed time during a specified period for regions, transactions, and programs. It can help you determine such things as who is using too much CPU time or, conversely, what programs or transactions, in which regions, are in a wait state too long.

With a single request, you can get up to five flavors of this report, with each one ordered by any combination of region, transaction, and program. In addition, an extract file can be produced ordered by region-transaction-program.

For log data from multiple IMS subsystems running in a sysplex, the region is shown by IMS subsystem ID. APPC (standard, modified, CPI-C) and OTMA transactions are reported.

Log records: This report is derived from IMS log records 07, 08, 0A, 31, 33, and 40.

Uses

The two columns of primary interest are the **Mean CPU Time** and the **Elapse/CPU Ratio**:

- From the mean CPU times, you can monitor the actual time required for each transaction. For a given program, the mean CPU times should be approximately the same across regions and from day to day; however, these mean times should be interpreted based on the number of transactions per scheduling, which is also reported. If the mean time begins to increase, the most likely reason is increased database activity. This could be a sign that databases need to be reorganized.
- The Elapse/CPU Ratio can indicate whether a program is spending more time in the wait state in one region than in another. This could be caused by a low priority or excessive page faults in one region. Your use of certain options (for example, the STIMER option) can bias these ratios.

The other columns in the report are useful to help indicate if an observed timing problem is common every time a program is scheduled or if it happens only occasionally.

The extract file is suitable for analysis by PC spreadsheet and graphing tools.

Report options

To specify the report options, select **CPU Usage** from the Resource Usage and Availability Reports in a Log Report Set.

Several reporting sequences are available for the CPU Usage report. These reporting sequences are controlled using any combination of the ordering operands REGN (region), TRAN (transaction code), and PROG (program).

For example:

- Specify only TRAN to produce a report ordered by transaction code.
- Specify a nested ordering of PROG-REGN-TRAN to produce a report ordered by transaction code within region within program.

Up to five nested orderings can be specified. Each one will produce a separate report sorted in the specified sequence. The extract file is produced in the order region-transaction-program.

Specify Selection Criteria to include or exclude particular regions, transactions codes, programs (PSBs) and IMS subsystems from the report. Region ID can be specified by PST number or by Message Region Job name. When programs or transaction codes are excluded, by default they are grouped into a category called *OTHERS* and included in the report subtotals and totals. When regions are excluded, their results are grouped into a category called XXXX. For example, if you specify a report ordered by transaction code within region, and include the transaction code TRAN12, the report will have for each region, two detail lines: one for TRAN12 transactions and one for all other transactions.

You can request to exclude "OTHERS" from the report. In this case, transaction codes and programs that are excluded by the selection criteria are not reported, and not included in the report subtotals and totals.

The attributes of the Processing Time (CPU) and Elapsed Time graphs are controlled by specifying Distributions. The sample Distributions \$IPDIST1 (CPU) and \$IPDIST2 (Elapsed) are provided and are the default if Distributions are not specified.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output data set is controlled by specifying the Report Output DDname.

To request the extract, specify an extract data set name. DDname CPURXTRO identifies the extract output file.

The extract file contains field headings as the first record in the file provided that option is selected on the Log Global Options panel.

The data fields are fixed length and separated by a blank or a comma depending on the delimiter specified on the Log Global Options panel.

Report content

The CPU Usage report gives statistics for CPU time and elapsed time during a specified period for regions, transactions, and programs.

The CPU times in the report are derived from the times recorded in the log records, which in turn depend on the value of the STIMER option. If STIMER=0, no times are recorded; hence none can be reported. If STIMER=1, only application processing time is recorded and reported. If STIMER=2, application processing time and DL/I time are recorded and reported. The time units are in milliseconds.

Start 04Jun2014 16.10.15.96

IMS Performance Analyzer
CPU Usage Report

End 04Jun2014 16.14.59.19

Region	Jobname	Observ Count	*****CPU Time (msecs)***** Total	Mean	SDev	Elapse /CPU Ratio	*****Elapse Time (msecs)***** Total	Mean	SDev	Trans /Obs
IM02	2 IM02ASU1	166	2,530	15	.37	9.82	24,846	150	3.59	.69
IM02	5 IM020LPB	3	213	71	.27	15.13	3,227	1,076	.59	.67
IM02	7 IM020LPA	6	189	32	.70	5.05	956	159	.99	.83
IM02	8	3	20	7	.71	158.21	3,172	1,057	1.33	.33
IM02	9 IM020LPE	3	46	15	.39	3.84	176	59	.30	1.00
IM02	10 IM020LPF	24	992	41	.92	61.58	61,078	2,545	1.86	.67
IM02	11	4	291	73	.60	170.05	49,553	12,388	.89	1.00
IM02	12 IM020LPJ	19	927	49	1.22	21.22	19,679	1,036	2.59	.53
:										
IM03	43 IM030LP6	3	130	43	1.09	49.20	6,398	2,133	1.40	.33
IM03	44	6	312	52	1.59	30.70	9,571	1,595	1.34	.67
IM03	46	14	641	46	.80	27.49	17,628	1,259	1.67	.71
IM03	47 IM030LP4	4	210	52	.98	59.22	12,435	3,109	1.66	.50
IM03	48 IM030LP5	3	30	10	.00	.83	25	8	.32	.00
Total		991	44,803	45	3.56	31.94	1,431,099	1,444	4.02	.72
Grand Total		991	44,803	45		31.94	1,431,099	1,444		718

- 1) Avg. No. of Transactions processed per checkpoint is N/A
2) Total No. of Transactions processed in report period is 718

Region	Program	Trancode	Observ Count	*****CPU Time (msecs)***** Total	Mean	SDev	Elapse /CPU Ratio	*****Elapse Time (msecs)***** Total	Mean	SDev	Trans /Obs
IM02ASU1	PIMMIDBP	TIMIDB	32	692	22	.36	5.85	4,044	126	1.02	.72
IM02ASU1	PIMMIDBP	TIMASM	36	483	13	.11	4.88	2,358	66	.50	.92
IM02ASU1	PIMMSELP	TIMASM	23	250	11	.21	3.80	950	41	.73	.70
IM02ASU1	PIMULUDP	TIMASU	75	1,104	15	.29	15.85	17,494	233	3.37	.56
Subtotal			166	2,530	15	.37	9.82	24,846	150	3.59	.69
:											
IM03	46 PIM3UPD3	TIMOP3	4	315	79	.52	42.65	13,446	3,361	.89	.75
IM03	46 PIM3UPD3	TIMOP3	1	10			.64	6			.00
IM03	46 PIM3UPD3	TIMOP3	4	208	52	.38	8.08	1,683	421	.48	1.00
IM03	46 PIMCMENU	TIMOQC	4	68	17	1.08	6.00	409	102	1.00	.50
IM03	46 PIMCMENU	TIMOQC	1	39			18.30	721			1.00
Subtotal			14	641	46	.80	25.37	16,266	1,162	1.83	.71
IM030LP4	PIM3MPAP	TIMOP3	1	54			7.13	387			1.00
IM030LP4	PIM3UPDA	TIMOP3	3	156	52	1.14	77.39	12,048	4,016	1.41	.33
Subtotal			4	210	52	.98	59.22	12,435	3,109	1.66	.50
IM030LP5	PIMEINQA	TIMQUE	3	30	10	.00	.83	25	8	.32	.00
Total			1,034	44,803	43	3.34	29.95	1,342,040	1,298	3.28	.69
Grand Total			1,034	44,803	43		29.95	1,342,040	1,298		718

- 1) Avg. No. of Transactions processed per checkpoint is N/A
2) Total No. of Transactions processed in report period is 718

Figure 82. CPU Usage report

Processing Time				Elapse Time			
Average	Std-Dev/Avg	Max Value		Average	Std-Dev/Avg	Max Value	
23	1.372	1521		155	1.129	5400	
Range	Count in	All Regions		Range	Count in	All Regions	
Sc Mil	Range	Excl CTL Reg		Sc Mil	Range	Excl CTL Reg	
To Maximum	7			To Maximum	291 *		
500	27			500	1245	*****	
250	34			250	2464	*****	
100	324 *			100	4941	*****	
50	1274	*****		50	0		
30	3540	*****		30	0		
20	2357	*****		20	0		
15	1744	*****		15	0		
10	1405	*****		10	0		
5	105			5	1876	*****	
-----				-----			
Total=	10,817	10	20 30 40 50%	Total=	10,817	10	20 30 40 50%

Figure 83. CPU Usage report: Distributions

The report and extract contain the following information:

Region - Jobname

The first section of the report provides a summary by region. Each region is identified by the IMS Subsystem ID and PST number. If the job name is available and is the same for all jobs for the region, the job name for the region is also shown.

Region - Program - Trancode

The leftmost one, two, or three columns contain the values of the ordering operands. The sample report is ordered on transaction code, within program, within region. The report shows subtotals by region then the total for all regions. The region job name is shown if it is available, otherwise the IMS Subsystem ID and PST number are shown. Regardless, if the report is ordered by region, it is always ordered by IMS Subsystem ID and PST number, not job name.

The Region PST ID is reported as XXX to identify the accumulation of dependent regions that were excluded from reporting. When you specify **Selection Criteria** to filter the regions to be reported, for example `INCLUDE(REGION(...))`, then each selected region is reported and all other regions are accumulated and reported as XXX.

A > symbol to the left of one of the ordering operands indicates that a transaction in that group was being processed either:

- At the time the report ended (defined by end-of-file, or by the Stop or To date and time)
- At the time of a prescan reset signal (defined by a jump backward in log sequence numbers)

As a result, the statistics for the group are not complete. This also means the transaction may have to be backed out if there is a system failure within the reporting period.

APPC transactions, known by their transaction code and program (PSB) name, are reported. All APPC transactions (Standard, Modified, CPI-C) are supported.

If the transaction code is not available in the log record, then the region type is substituted in the Trancode column. This will be one of *BMP*, *JBP*, or *DBCTL*.

Other special meanings for transaction codes and program names are as follows:

BLANK

Batch program

UNDEFND*

Not defined in checkpoint records

Observ Count

Contains a count of the number of observations in each ordering group. If the transaction code was one of the ordering operands, this column is a count of the number of messages (transactions) processed as recorded in the type 07 log record.

Note that there is a minimum increment of one for each type 07 log record encountered, even though the type 07 record can reflect zero messages (transactions) processed for abnormal terminations. If the transaction code was not one of the ordering operands, **Observ Count** is a count of the type 07 log records encountered.

CPU Time

Processing time in milliseconds.

Total Total processing (CPU) time.

Mean Average processing (CPU) time. If the **Observ Count** is 1, the value of this field is the same as the **Total**.

SDev The standard deviation CPU time. If the **Observ Count** is 1, the value of this field is zero (0). IMS PA calculates a normalized standard deviation equal to the true standard deviation divided by the mean.

Elapse/CPU Ratio

The ratio of the total elapsed time to the total CPU time.

Elapse Time

Elapsed time in milliseconds.

Total Total elapsed time.

Mean Average elapsed time. If the **Observ Count** is 1, the value of this field is the same as the **Total**.

SDev The standard deviation elapsed time. If the **Observ Count** is 1, the value of this field is zero (0).

Trans/Obs

Ratio of transactions processed to observation counts (**Observ Count**). In the sample report, the number of messages (transactions) processed is the exact count from the type 07 log record. A zero count is not forced to a one count, as in the **Observ Count** column. Because of this, a ratio of less than one can occur. This indicates that at least one program was scheduled whose attempt to process a message was abnormally terminated.

Total, CTL Task, and Grand Total

At the bottom of the report are:

- Totals or summaries (**Total**) of the regions
- Control region statistics (**CTL Task**)

- Grand totals or summaries (**Grand Total**)

The grand total shown at the bottom of the **Trans/Obs** column is the total number of transactions processed by the system in the report period. This includes transactions active at report start and end.

Processing Time and Elapse Time

Distribution graphs of the CPU time and elapsed time are shown on the second page of the sample report. These distributions are always based on the number of PSBs processed and not on transactions. Therefore, if transaction code is one of the ordering operands, the graphic distributions may not agree exactly with the tabular results in the main body of the report.

Extract file content

This is an example of the contents of the CPU Usage extract file.

Region	Trancode	Program	Obs_Count	CPU_Total	CPU_Mean	CPU_Dev	Elp/CPU	Elp_Total	Elp_Mean	Elp_Dev	Trans/Obs
IX23	1,	,	3,	30,	10,	.00,	152.22,	215125,	71708,	.97,	.00
IX23	2,	,	18,	2290,	127,	.61,	20.94,	47946,	2664,	1.65,	.89
MP230LPA,	,	,	14,	780,	56,	1.73,	13.51,	10539,	753,	2.84,	1.07
MP230LPC,	,	,	3,	338,	113,	.12,	148.04,	50093,	16698,	1.14,	1.67
IX23	1,*BLANK*	,PASUBMPA,	2,	20,	10,	.00,	342.08,	167276,	83638,	.99,	.00
IX23	1,TECAOB03,	PECAOB03,	1,	10,	10,	0,	772.49,	47849,	47849,	0,	.00
MP23ASU1,	IDB	,PASMIDBP,	65,	1728,	27,	.13,	9.29,	16042,	247,	1.08,	1.00
MP23ASU1,	IDB2	,PASMIDBP,	2,	44,	22,	.02,	6.22,	276,	138,	.09,	1.00
MP23ASU1,	TASBTREU,	PASBTREP,	2,	38,	19,	.24,	71.14,	2686,	1343,	.88,	1.00
,	,	,PAC3UTLP,	11,	409,	37,	.33,	119.64,	48965,	4451,	2.92,	1.00
,	,	,PASBTREP,	2,	38,	19,	.24,	71.14,	2686,	1343,	.88,	1.00
,	,	,PASMAS2P,	1,	122,	122,	0,	5.52,	674,	674,	0,	1.00
,	,	,PASMIDBP,	144,	2863,	20,	.34,	7.83,	22428,	156,	1.29,	1.00
,	,TTB0003I,	,	25,	1116,	45,	.34,	10.57,	11793,	472,	1.25,	1.00
,	,TTB0004I,	,	14,	355,	25,	.18,	9.43,	3349,	239,	.63,	1.00
,	,TTB0005I,	,	7,	177,	25,	.05,	10.93,	1936,	277,	.21,	1.00
,	,TTB0007I,	,	14,	483,	35,	.13,	11.71,	5658,	404,	.83,	1.00
,	,TTUMTUCP,	,	1,	26,	26,	0,	22.61,	586,	586,	0,	1.00
IX23	1,*BLANK*	,	2,	20,	10,	.00,	342.08,	167276,	83638,	.99,	.00
IX23	2,CL	,	2,	252,	126,	.04,	14.97,	3774,	1887,	.47,	1.00
MP23ASU1,	IDB	,	65,	1728,	27,	.13,	9.29,	16042,	247,	1.08,	1.00
MP23ASU1,	IDB2	,	2,	44,	22,	.02,	6.22,	276,	138,	.09,	1.00

Figure 84. Extract file content: CPU Usage

The attributes of the extract data set are RECFM=FB, LRECL=132.

The information in the record is the same as the CPU Usage report (see “Report content” on page 153) ordered by Region, Transaction Code, and Program. However, if only Region is specified, then the transaction and program columns will be blank.

The field headings are optionally included as the first record in the extract file depending on the extract options set in Log Global Options. The headings line up with the column data fields that they describe. The data fields are fixed length, and are separated by a blank or comma depending on the delimiter character specified in Log Global Options.

The extract data set can be used as input to other reporting and statistical analysis tools. Ensure that the delimiter character you specify is suitable for use by these tools.

Internal Resource Usage reports

The Internal Resource Usage reports provide statistics on the use of various IMS pools and resources. From these statistics, you can determine how they are being used and where inefficiencies exist.

Log records: The reports are derived from IMS log records 06, 07, 11, 31, 38, 40, 45.

The reports provide operating statistics for the following pools and resources:

Pools

- Message queue pool
- Message format buffer pool
- OSAM buffer pool
- VSAM buffer pool
- Variable pools:
 - DMB pool (DLDP)
 - PSB pool (DLMP)
 - PSB (DLI/SAS local) pool (DPSB)
 - PSB work pool (PSBW)
 - DMB work pool (DBWP)
 - EPCB pool (EPCB)
- Fixed pools
- Storage pool

Resources

- Program Isolation
- DL/I call
- Scheduler
- Latch manager
- Logger
- Dispatcher / Dynamic SAP
- Miscellaneous, which includes:
 - IMS version
 - Transaction counts
 - Receive Any buffer counts
- IRLM system
- IRLM subsystem
- RACF
- Virtual Storage usage
- IMODULE statistics
- EWLM statistics
- 64-bit Storage Manager statistics
- Fast Path 64-bit Buffer Manager statistics
- User Exit statistics
- Individual TCB statistics
- 64-bit Storage statistics

Report options

To specify the report options, select **Internal Resource Usage** from the Resource Usage and Availability Reports in a Log Report Set. You can select specific pools and resources (and their associated sets of statistics) to be included in or excluded from the report. If none are selected, all reports are produced by default.

At least two checkpoints are required to obtain reports. The minimum checkpoint time interval (**Minimum CHKP Interval**) option controls the printing intervals for this report. The default interval is zero. If no interval is specified, or it has a value of zero, one set of selected Internal Resource Usage reports is printed for the entire

time range. But if an interval greater than zero is specified, several sets of reports may be printed; these reports correspond to selected checkpoints. For example, assume an interval n was specified and that a set of reports was printed corresponding to a checkpoint at time t . The next set of reports would be printed corresponding to the first checkpoint encountered that has a time greater than $t+n$. On the other hand, no reports would be printed for checkpoints encountered between times t and $t+n$.

Alternatively, you can select to print the set of reports after each completed checkpoint.

Optionally, Fast Path transaction counts can be included in the Miscellaneous Statistics report.

You can report on particular IMS subsystems by specifying an IMS Subsystem ID Object List to include or exclude.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output data set is controlled by specifying the Report Output DDname.

Message Queue Pool Statistics

This is an example of the IRUR Message Queue Pool Statistics report.

The report is produced by IMS Subsystem ID which is shown in the report heading.

Message Queue Pool Statistics

Interval : 55 (HHMM.SS)

	Count	/Transact	/Second	
Locate calls from QMGR	77,357	12.95	1,408.82	
Record Release calls from QMGR	31,041	5.20	565.32	
Locate and Alter calls from QMGR	134,766	22.56	2,454.36	
Requests to Purge the Q pool	1	.00	.02	
Address to DRRN translation requests	0	.00	.00	
Total requests to QMGR not incl Translates	243,165	40.71	4,428.52	
Read requests	0	.00	.00	0.00% of I/O's 1
Write requests (Total)	7	.00	.13	2
Writes done by Purge	7	.00	.13	100.00% of I/O's 3
Writes done for Space	0	.00	.00	0.00% of I/O's
Total I/O requests	7	.00	.13	
Locate calls satisfied in Pool	212,123			100.00% of all Locate calls
Waits for Purge to complete	0	.00	.00	
Waits because no Buffer available	0	.00	.00	
Waits for other DECB to Read this Buffer	0	.00	.00	
Waits for other DECB to Write this Bfr	0	.00	.00	
Waits for conflicting Enq/Deq Buffer req	0	.00	.00	
Total IWAITs	0	.00	.00	
Temporary I/O Errors	0			
Buffer locked	0			
Buffers unlocked	0			
PCBs unchained from Buffers	0	.00	.00	
ID of highest Dummy Record assigned	69			
Calls to Queue Manager (Total)	131,522	22.02	2,395.28	
Calls to Reposition a Lost Buffer	0	.00	.00	
Calls to Enqueue a Message	15,143	2.54	275.78	
Calls to Dequeue one or more Messages	10,017	1.68	182.43	
Calls to Cancel Input or Output	5,638	.94	102.68	
Highest QBLKS Block Number ever used	451			
Highest SHMSG Block Number ever used	32			
Highest LGMSG Block Number ever used	526			
QBLKS upper threshold exceeded ?	N			
SHMSG upper threshold exceeded ?	N			
LGMSG upper threshold exceeded ?	N			
Size of Short Message record	480			
Size of Long Message record	2,400			
Initial count of Buffers	700			

Figure 85. IRUR: Message Queue Pool Statistics

This report provides information related to the activity and I/O associated with IMS message queues. This activity is a key indicator as to the performance of your IMS system. The report is similar to the Message Queue Pool report produced by the IMS Monitor. Refer to "Monitoring Message Queue Handling" in the *IMS Utilities Reference: System* for a description of the meaning of the fields and the uses for this report.

A key performance indicator for the Message Queue Pool is the percentage of Locate calls satisfied in the pool. A high percentage indicates that the Message Queue Pool is satisfying most requests without the need for I/O.

For shared queues:

- 1** Read requests (CQSREAD)
- 2** Write requests (CQSPUT)
- 3** The following statistics have no meaning for shared queues and can be ignored:
 - Writes done by purge (always 0)
 - Writes done for space

For shared queues only, the Message Queue Pool Statistics report has additional data at the end of the report as shown in Figure 86 on page 161.

Message Queue Pool Statistics

	Count	/Transact	/Second
Shared Queue Buffer Statistics:			
Total count of Buffers	560		
High Threshold for Buffers	448		
Low Threshold for Buffers	280		
Number of Buffer in use count	442		
HWM - Buf In Use Count since Chkpt	442		
# of times Buffers have Expanded	9		
Count of First Available Buffer	441		
HWM - Buf In Use Count since Restart	442		

Interval : 1.04 (HHHH.MM.SS)

Figure 86. IRUR: Message Queue Pool Statistics for shared queues

For shared queues, use this report to help you to tune the following DFSPBxxx parameters:

QBUF Initial number of message queue buffers allocated to the queue pool.

QBUFHITH

High threshold percentage for the message queue buffer.

QBUFLWTH

Low threshold percentage for the message queue buffer.

QBUFMAX

Maximum number of message queue buffers for the queue pool.

Message Format Buffer Pool Statistics

This is an example of the IRUR Message Format Buffer Pool Statistics report.

Message Format Buffer Pool Statistics

	Count	/Transact	/Second	
Prefetch requests	97,226	1.72	4.22	
Times prefetch was ignored	204	.00	.01	
Prefetches and block on immediate fetch queue	24			.02% of P/Fetches
Prefetches and block on free block queue	96,998			99.77% of P/Fetches
Immediate fetch requests	191,991	3.40	8.33	
I/O operations caused by immediate fetch	786	.01	.03	I/O's
I/fetches and block on free block queue	190,982			100.00% of I/Fetches
I/fetches and block on i/fetch queue	198			.10% of I/Fetches
Free block requests	191,966			
Times free block requests were ignored	0	.00	.00	
Free block reqs and block on i/fetch queue	191,966			
Requests to compress pool	0			
Times there was no dir entry for block	25			
I/O operations to directory	542	.01	.02	I/O's
I/O errors on read or point	0			
Blocks freed for lack of fetch req elements	29	.00	.00	
Immediate I/O requests waited due to maximum I/O	2			
Requests satisfied by index/dynamic directory	269			

Figure 87. IRUR: Message Format Buffer Pool Statistics

This report provides information related to the activity associated with message formatting. It is similar to the Message Format Buffer Pool report produced by the IMS Monitor. Refer to "Monitoring MFS Activity" in the *IMS Utilities Reference: System* for a description of the meaning of the fields and the uses for this report.

When message formatting occurs, the appropriate message blocks must reside in the message format buffer pool. If the blocks are not already in the buffer, I/O to

the active IMS.FORMATA/B library must occur. Block retrieval can involve a prior directory lookup, or be direct, using an index kept in the pool.

Prefetch and Immediate Fetch:

An MFS block pair often includes the names of the next expected block pair. IMS attempts to prefetch anticipated blocks. The prefetch routine checks to see if the anticipated block is in the pool but not currently in use (is on the free blocks queue). If it is there, IMS moves it to the bottom of the queue and marks it most recently used. If prefetch does not find the necessary block in the pool, nothing else happens at that time. When a message requires a block that is not in the pool, IMS does an immediate fetch of the block. Many of the counts reveal details of internal event management. When there is no directory entry for a block this implies extra directory lookup I/O. Delays caused by unavailable FRE entries are recorded as request-ignored counts.

A key performance indicator for FRE allocation are the Times free block requests were ignored and Blocks freed for lack of FREs counts. Ideally, these should be low.

Another key performance indicator is the percentage of Prefetch and Immediate fetch requests satisfied on the Free Block Queue. Ideally, these percentages should be high.

OSAM Buffer Pool Statistics

This is an example of the IRUR OSAM Buffer Pool Statistics report.

Enhanced OSAM Buffer Pool Statistics				Interval :	20.00 (HHMM.MM.SS)
	OS4K	Count	/Transact	/Second	
Subpool ID:	N/N				
Fix options: Prefix/Buffers					
Buffer Size		4,096			
Buffer count		20			
Locate-type calls		64,456	7.35	53.71	
Requests to create new blocks		0	.00	.00	
Buffer alter calls		554	.06	.46	
Purge calls		457	.05	.38	
Locate-type calls, data already in pool		57,137	6.51	47.61	88.64% of locate calls
Buffers searched by all locate-type calls		72,957	8.32	60.80	
Read I/O requests		7,317	.83	6.10	93.34% of OSAM I/O operations
Single block writes by buffer steal routine		0	.00	.00	.00% of OSAM I/O operations
Blocks written by purge		522	.06	.43	6.66% of OSAM I/O operations
Total count of OSAM I/O operations		7,839	.89	6.53	
Locate calls waited due to busy ID		0	.00	.00	
Locate calls waited due to busy write		0	.00	.00	
Locate calls waited due to busy read		0	.00	.00	
Buffer steal/purge waited for ownership releas		12	.00	.01	
Buffer steal requests waited for buffers		0	.00	.00	
Total I/O errors for this subpool		0	.00	.00	
Buffers locked due to write errors		0	.00	.00	
Blocks Read from CF		0	.00	.00	
Blocks expected but not Read		0	.00	.00	
Blocks written to CF (Prime)		0	.00	.00	
Blocks written to CF (Changed)		0	.00	.00	
Blocks not written; Storage Class full		0	.00	.00	
Blocks invalidated with XI		0	.00	.00	
XI Calls issued		0	.00	.00	
SB Immediate (Sync) Sequential Reads		0	.00	.00	
SB Anticipatory Reads		0	.00	.00	

Figure 88. IRUR: OSAM Buffer Pool Statistics

This report provides information related to the activity in each OSAM subpool. Subpools with no activity in the reporting period are not reported on. The final

report contains cumulative statistics for all of the OSAM buffer pools. This report is similar to the Database Buffer Pool report produced by the IMS DB Monitor. Refer to the *IMS Utilities Reference: Database Manager* for a description of the meaning of the fields and the uses for this report.

A key performance indicator for an OSAM Buffer Pool is the percentage of locate calls where the data was already in the buffer. A high percentage indicates that the OSAM Buffer Pool is satisfying most requests without the need for database I/O.

Note that when data sharing in IMS sysplex database environments, there needs to be a balance between maximizing the requests satisfied in the pool and minimizing the occurrence of buffer invalidation.

VSAM Buffer Pool Statistics

This is an example of the IRUR VSAM Buffer Pool Statistics report.

Enhanced VSAM Buffer Pool Statistics				Interval : 1.08.59 (HHMM.SS)	
	VS8K/D N/Y/Y	Count	/Transact	/Second	
Shared resource pool ID/type					
Fix option: index/block/data					
Buffer size		8,192			
Buffers in subpool		15			
HS buffers in subpool		75			
Write errors		0			
Largest number of write errors		0	.00	.00	
Retrieve by RBA calls		43,821	4.92	10.59	63.08% of retrieve calls
Retrieve by Key calls		25,653	2.88	6.20	36.92% of retrieve calls
Total retrieve calls		69,474	7.81	16.78	
Logical records inserted into ESDS		1	.00	.00	.07% of update requests
Logical records inserted into KSDS		7	.00	.00	.46% of update requests
Logical records altered in this subpool		1,524	.17	.37	99.48% of update requests
Total number of updates		1,532	.17	.37	
Nbr of background write requests		9	.00	.00	.01% of calls to VSAM
Nbr of Synch calls		624	.07	.15	.94% of calls to VSAM
Nbr of VSAM get calls		65,581	7.37	15.84	99.03% of calls to VSAM
Nbr of VSAM search buffer calls		7	.00	.00	.01% of calls to VSAM
Total Nbr of VSAM calls		66,221	7.44	16.00	
Nbr of times VSAM found CI in pool		54,853	6.16	13.25	83.63% of VSAM buffer requests added
Nbr of times VSAM read CI from DASD		10,738	1.21	2.59	94.19% of VSAM I/O operation
Nbr of writes initiated by IMS		606	.07	.15	5.32% of VSAM I/O operation
Nbr of writes initiated by VSAM		56	.01	.01	.49% of VSAM I/O operation
Total VSAM I/O operations		11,400	1.28	2.75	
Nbr of successful VSAM reads frm HS		4,218	.47	1.02	
Nbr of successful VSAM writes to HS		14,957	1.68	3.61	
Nbr of failed VSAM reads from HS		0	.00	.00	
Nbr of failed VSAM writes to HS		0	.00	.00	
Nbr of PLH waits		0	.00	.00	

Figure 89. IRUR: VSAM Buffer Pool Statistics

This report provides information related to the activity in each VSAM subpool. Subpools with no activity in the reporting period are not reported on. The final report contains cumulative statistics for all of the VSAM buffer pools. This report is similar to the VSAM Buffer Pool report produced by the IMS DB Monitor. Refer to the *IMS Utilities Reference: Database Manager* for a description of the meaning of the fields and the uses for this report.

A key performance indicator for an VSAM Buffer Pool is the number of times VSAM found the CI in the pool, rather than reading the CI from DASD.

Note that when data sharing in IMS sysplex database environments, there needs to be a balance between maximizing the requests satisfied in the pool and minimizing the occurrence of buffer invalidation.

Variable Pool Statistics

This is an example of the IRUR Variable Pool Statistics report.

Variable Pool Statistics		Count	/Transact	/Second	Interval :	55 (HHH.MM.SS)
<hr/>						
DMB Pool Statistics (DLDP)						
	Bytes in DMB Pool	245,760				
	Bytes allocated at End of Report	228,160				
	Maximum Bytes ever used	228,160				
PSB pool Statistics (DLMP)						
	Bytes in PSB Pool	6,144,000				
	Bytes allocated at End of Report	509,056				
	Maximum Bytes ever used	509,056				
PSB pool (DLI/SAS Local) Statistics (DPSB)						
	Bytes in PSB Pool	20,480,000				
	Bytes allocated at End of Report	2,594,208				
	Maximum Bytes ever used	2,594,208				
PSB Work Pool Statistics (PSBW)						
	Number of Bytes in Pool	921,600				
	Number of Bytes allocated at End of Report	260,000				
	Maximum Bytes ever used	276,016				
DMB Work Pool Statistics (DBWP)						
	Number of Bytes in Pool	184,320				
	Number of Bytes allocated at End of Report	264				
	Maximum Bytes ever used	6,584				
EPCB Pool Statistics (EPCB)						
	Bytes in EPCB Pool	614,400				
	Bytes allocated at End of Report	176,688				
	Maximum Bytes ever used	176,688				
MAIN Pool Statistics (WKAP)						
	Bytes in MAIN Pool	102,400				
	Bytes allocated at End of Report	0				
	Maximum Bytes ever used	7,888				

Figure 90. IRUR: Variable Pool Statistics

This report provides information as to the size and utilization of the various DMB and PSB pools. Shortages in these pools, particularly the DMB pool, can cause scheduling delays. Use this report to detect over or under specification of the pool sizes.

If you suspect that there is a problem with pool space shortages, then run the IMS Monitor for a short period of time.

The IMS PA Pool Space Failure Summary report (see Figure 214 on page 406) will show which storage pools failed, how many times they failed, and how much storage they required.

Application Scheduling Statistics

This is an example of the IRUR Application Scheduling Statistics report.

Scheduling Statistics

	Count /Transact /Second			Interval : 30.00 (HHH.MM.SS)
Program Conflicts	0	.00	.00	0.00% of all Conflicts
Database Intent Conflicts	0	.00	.00	0.00% of all Conflicts
Conflicts for Miscellaneous Reasons	4,285	.48	2.38	100.00% of all Conflicts
SMBs tried for Scheduling	8,404	.93	4.67	
Programs Scheduled	4,139	.46	2.30	
Total Conflicts	4,285	.48	2.38	50.99% of SMBS tried
Number of active BMPs	3			
Number of active MPPs	40			
PSB Pool Get Statistics				
Requests	0	.00	.00	
CSA PSB pool				
Space not immediately available	0	.00	.00	0.00% of PSB pool Get
PSBs cast out to make room for new PSB	0	.00	.00	0.00% of PSB pool Get
Failed	0	.00	.00	0.00% of PSB pool Get
DLI PSB pool				
Space not immediately available	0	.00	.00	0.00% of PSB pool Get
PSBs cast out to make room for new PSB	0	.00	.00	0.00% of PSB pool Get
Failed	0	.00	.00	0.00% of PSB pool Get
Space not immediately available in CSA and DLI	0	.00	.00	0.00% of PSB pool Get
Time getting PSB pool space with no PSB cast out	0.000	.00	.00	
Time getting PSB pool space with PSB cast out	0.000	.00	.00	
PSB Pool Free Statistics				
Requests	4,172	.46	2.32	
Time Freeing PSB pool space	0.013	.00	.00	
PSB Work Area Get Statistics				
Requests	4,139	.46	2.30	
Failed requests	0	.00	.00	0.00% of PSB Work Area pool Get
Time getting PSB work area pool space	0.028	.00	.00	
CQS Notify Statistics				
Notifies for local transactions	3,768	.42	2.09	
Notifies for remote transactions	1,311	.15	.73	
Time between transition exit dispatch and schedule of inform exit	0.288	.00	.00	
Time between schedule of inform exit and dispatch of inform exit	0.051	.00	.00	
Time between inform exit and enqueue of SMB onto TCT (Local) or call of router (Remote)	0.048	.00	.00	

Figure 91. IRUR: Scheduling Statistics

This report provides information relating to the various types of scheduling failures and scheduling activity during the report period.

The fields in the report are:

Program Conflicts

Number of SMBs not scheduled due to program conflicts. In addition to the count, this field shows the count per transaction and second. It also expressed as a percentage of total all conflicts.

Database Intent Conflict

Number of SMBs not scheduled due to intent conflict. In addition to the count, this field shows the count per transaction and second. It also expressed as a percentage of total all conflicts.

Conflicts for Miscellaneous Reasons

Number of SMBs not scheduled due to miscellaneous reasons. In addition to the count, this field shows the count per transaction and second. It is also expressed as a percentage of total conflicts.

The count is the value of SCDNMISC (macro ISCD) at system checkpoint time. Module DFSSMSC0 (the MPP REGION SCHEDULER) updates

SCDNMISC when it tries to schedule a transaction, but fails. The reasons for a miscellaneous schedule failure are varied, but the most common is when the TRANSACT PARLIM (PARALLEL SCHEDULING THRESHOLD) limit has been reached. This counter is a "bucket" for all schedule failures other than Program and Database Intent conflicts.

SMBs tried for Scheduling

Number of SMBs examined for Schedule. This number represents the total number of SMBs examined for schedule, including those not scheduled due to conflicts. In addition to the count, this field shows the count per transaction and second.

Programs Scheduled

Number of SMBs successfully scheduled. In addition to the count, this field shows the count per transaction and second. It also expressed as a percentage of total all conflicts.

Total Conflicts

Total number of conflicts. In addition to the count, this field shows the count per transaction and second. It also expressed as a percentage of total SMBs tried for scheduling.

Number of active BMPs

Number of active BMPs.

Number of active MPPs

Number of active MPPs.

PSB Pool Get Statistics

The PSB pool manager (DFSDDLMP0) collects detailed statistics on PSB pool and PSBW pool usage. Statistics include information on cast out processing (when an unused PSB is deleted from the pool to make room for a new PSB) and elapsed time values, so that performance problems caused by elongated PSB pool processing time can be analyzed. These values are reported after the basic scheduling statistics.

Get Requests

Total number of requests to get PSB pool space.

CSA PSB Pool

The CSA PSB Pool statistics are broken down into:

Space not immediately available

Number of times space was not immediately available in CSA PSB pool to satisfy the request. In addition to the count, this field shows the count per transaction and second. It is also expressed as a percentage of total Get Requests above.

PSBs cast out to make room for new PSB

Number of PSBs cast out (freed) to make room for new PSB in the CSA PSB pool. In addition to the count, this field shows the count per transaction and second. It is also expressed as a percentage of total Get Requests above.

Failed Number of times get for PSB pool space failed for CSA PSB pool. In addition to the count, this field shows the count per transaction and second. It is also expressed as a percentage of total Get Requests above.

DLI PSB Pool

The DLI PSB Pool statistics are broken down into:

Space not immediately available

Number of times space was not immediately available in DLI PSB pool to satisfy the request. In addition to the count, this field shows the count per transaction and second. It is also expressed as a percentage of total Get Requests above.

PSBs cast out to make room for new PSB

Number of PSBs cast out (freed) to make room for new PSB in the DLI PSB pool. In addition to the count, this field shows the count per transaction and second. It is also expressed as a percentage of total Get Requests above.

Failed Number of times get for PSB pool space failed for DLI PSB pool. In addition to the count, this field shows the count per transaction and second. It is also expressed as a percentage of total Get Requests above.

Space not immediately available in CSA and DLI

Number of times space was not immediately available in both CSA and DLI PSB pools. In addition to the count, this field shows the count per transaction and second. It is also expressed as a percentage of total Requests above.

Time getting PSB pool space with no PSB cast out

Cumulative time spent getting PSB pool space for calls when no PSB cast outs were needed.

Time getting PSB pool space with PSB cast out

Cumulative time spent getting PSB pool space for calls when PSB cast outs were needed to find the requested space.

PSB Pool Free Statistics

The PSB Pool Free Statistics are broken down into:

Free Requests

Number of requests to free PSB pool space.

Time freeing PSB pool space

Cumulative time spent freeing PSB pool space.

PSB Work Area Pool Get Statistics**Get Requests**

Total number of requests to get PSB work area pool space.

Failed Get Requests

Number of times get for PSB work area pool space failed. In addition to the count, this field shows the count per transaction and second. It is also expressed as a percentage of total Get Requests above.

Time getting PSB work area pool space

Cumulative time spent getting PSB work area pool space.

CQS Notify Statistics**Notifies for local transactions**

Number of CQS notifies for local transactions.

Notifies for remote transactions

Number of CQS notifies for remote transactions.

Time between transition exit dispatch and schedule of inform exit

Cumulative time between CQS structure list transition exit dispatch and CQS schedule of inform exit, in STCK units.

Time between schedule of inform exit and dispatch of inform exit

Cumulative time between CQS schedule of IMS inform exit and call of IMS inform exit (under SRB), in STCK units.

Time between inform exit and enqueue of SMB onto TCT (Local) or call of router (Remote)

Cumulative time between IMS inform exit and enqueue of SMB onto TCT (local) or call of router (remote), in STCK units.

Program Isolation Statistics

This is an example of the IRUR Program Isolation Statistics report.

Program Isolation Enqueue/Dequeue Statistics			Interval : 20.00 (HHMM.MS)	
	Count	/Transact	/Second	
Maximum Bytes Available	1,048,576			
Current Bytes used	65,536			
Calls to Search for Resource ID	74	.49	.28	
Synonyms Searched	0	.00	.00	
Maximum Synonyms Searched for a call	1			

Figure 92. IRUR: Program Isolation Statistics

The Program Isolation Enqueue/Dequeue Statistics report provides information about the size and usage of the PI Enqueue pool by the IMS Lock Manager.

If you suspect that there is a problem with PI enqueues waiting (queued), then run the IMS Monitor for a short period of time. The IMS PA Monitor “Enqueue/Dequeue Trace report” on page 407 lists all enqueue waits, the program waiting for the enqueue, and the program holding it.

A key performance indicator is the maximum bytes ever used. This can be compared against the PIMAX parameter setting to ensure that the PI Enqueue pool is never exhausted, thus avoiding U0775 ABENDs. The number and length of synonym searches cannot be controlled, as the hash table only has 256 entries. When PI decides that an RBA needs to be enqueued, it hashes the DMB number, DCB number, and RBA to produce a value in the range 0 to 255, which is then used to identify the hash table entry to address a QCB (Enqueued PI resource).

When using IRLM for lock management, this pool is not used for database locking. But you must still specify a minimal amount of enqueue/dequeue storage (a maximum of two isolated locks for each partition specification table, or PST). IMS uses this storage internally.

Latch Statistics

This is an example of the IRUR Latch Statistics report.

Latch Conflict Statistics										Interval :	4.21 (HHMM.MS.SS)
	Excl Grant	Shr Grant	Excl IWAIT	Shr IWAIT	Excl OWAIT	Shr OWAIT	Excl Busy	Shr Busy			Wait Time
DCSL	0	1081	0	0	0	0	0	502010	Tot		0
/Tran	.00	7.21	.00	.00	.00	.00	.00	3,346.73	Ave		0
/Sec	.00	4.14	.00	.00	.00	.00	.00	1926.28			
CONV	12	0	0	0	0	0	134	0	Tot		0
/Tran	.08	.00	.00	.00	.00	.00	.89	.00	Ave		0
/Sec	.04	.00	.00	.00	.00	.00	.51	.00			
TERM	10	0	0	0	0	0	616	0	Tot		0
/Tran	.07	.00	.00	.00	.00	.00	4.11	.00	Ave		0
/Sec	.03	.00	.00	.00	.00	.00	2.36	.00			
USER	10	0	0	0	0	0	150	0	Tot		0
/Tran	.07	.00	.00	.00	.00	.00	1.00	.00	Ave		0
/Sec	.03	.00	.00	.00	.00	.00	.57	.00			
SCHD	6	662	0	0	0	0	2	92855	Tot		0
/Tran	.04	4.41	.00	.00	.00	.00	.01	619.03	Ave		0
/Sec	.02	2.54	.00	.00	.00	.00	.00	356.29			
TCTB	902	0	0	0	0	0	87576	0	Tot		0
/Tran	6.01	.00	.00	.00	.00	.00	583.84	.00	Ave		0
/Sec	3.46	.00	.00	.00	.00	.00	336.04	.00			
APSB	0	192	0	0	0	0	0	60290	Tot		0
/Tran	.00	1.28	.00	.00	.00	.00	.00	401.93	Ave		0
/Sec	.00	.73	.00	.00	.00	.00	.00	231.34			
PDRB	384	0	0	0	0	0	60269	0	Tot		0
/Tran	2.56	.00	.00	.00	.00	.00	401.79	.00	Ave		0
/Sec	1.47	.00	.00	.00	.00	.00	231.26	.00			
PSBP	0	384	0	0	0	0	0	418	Tot		0
/Tran	.00	2.56	.00	.00	.00	.00	.00	2.79	Ave		0
/Sec	.00	1.47	.00	.00	.00	.00	.00	1.60			
DMBP	0	192	0	0	0	0	0	598	Tot		0
/Tran	.00	1.28	.00	.00	.00	.00	.00	3.99	Ave		0
/Sec	.00	.73	.00	.00	.00	.00	.00	2.29			
DMBB	116	18	0	0	0	0	17	0	Tot		0
/Tran	.77	.12	.00	.00	.00	.00	.11	.00	Ave		0
/Sec	.44	.06	.00	.00	.00	.00	.06	.00			
PDRP	39	0	0	0	0	0	118	0	Tot		0
/Tran	.26	.00	.00	.00	.00	.00	.79	.00	Ave		0
/Sec	.15	.00	.00	.00	.00	.00	.45	.00			
:											

Figure 93. IRUR: Latch Statistics

This report provides information regarding each IMS latch and the activity associated with that latch.

The following statistics are reported for each IMS latch:

Excl Grant

Exclusive latches granted

Shr Grant

Share latches granted

Excl IWAIT

Exclusive latch IWAIT count

Shr IWAIT

Share latch IWAIT count

Excl OWAIT

Exclusive latch OS wait count

Shr OWAIT

Share latch OS wait count

Excl Busy

Exclusive latch busy time

Shr Busy

Share latch busy time

Wait Time

Accumulated latch wait time (exclusive + shared)

The latches and their functions are as follows:

DISP System dispatcher, not used

CTXT	System PC table latch
DCSL	DC Checkpoint DC system latch, formerly part of DFSLATE0
LUML	DC LU 6.2 LUM serialization
CONV	DC conversation checkpoint, formerly part of DFSLATE0
TERM	DC terminal, added with ETO
LUBT	DC LU 6.2 LUB-TIB control block chain
LRLT	Log router latch
LBMP	Latch BMP/IRLM lock release
LERO	System LE runtime
DRSC	DRD resource
SCHD	TM scheduling (old block mover)
TCTB	TM TCT individual table latch
APSB	TM allocate PSB, block mover
PDRB	TM PDIR block, block mover
PSBP	TM PSB pool, block mover
DMBP	TM DMB pool, block mover
PSBB	TM PSB block, block mover
DMBB	TM DMB block, block mover
PDRP	TM PDIR pool, block mover
DBAU	TM DBRC authorization, block mover
DDRP	TM DDIR pool, block mover
DBLR	DB DFSDBLR0 module
SUBQ	TM subqueues
DDRB	TM DDIR block, block mover
DBBP	Used to serialize OSAM database buffer pool requests; formerly DFSFUNL0
DBSL	DB checkpoint; formerly DFSLATE0
USER	DC user ETO
DBLT	RSR sharing latch
CCTL	System DBCTL resource; formerly DFSFUNL0
VTCT	System CBTS VTCB pool ETO
VLQB	System CBTS LQB pool ETO
CBTS	All CBTS for control blocks that are used dynamically; formerly DFSFUNL0
XCNQ	DB, exclusive control of enqueue or dequeue; used for program isolation
BLKM	TM SMB LU 6.2 queue hash table
QMGR	System queue manager
QBSL	System queue buffer
SMGT	System storage management
DBLK	Used to free dependent-region control block storage
ACTL	Statistics logging; used to serialize the IMS monitor logging
LOGL	Logical logger; used to serialize IMS logging
QMGRDEST	Internal QMGR destination latch (Not applicable to DBCTL environments)
BLSER	Block Serialization latch (not applicable to DCCTL environments)
LREC	Latch for Serializing Log Record Creation

A key performance indicator is the number of LOGR contentions. If it is high, then this may indicate a problem with the allocation or I/O rate of the OLDS.

DL/I Call Statistics

This is an example of the DL/I Call Statistics report.

DL/I Call Statistics				Interval :	4.21 (HHH.MM.SS)
	Count	/Transact	/Second		
Programs that reached Termination	192	1.28	.74		
Transactions process by above Programs	150	1.00	.58		
DB GU calls	47	.31	.18	4.88% of DL/I calls	
DB GN calls	15	.10	.06	1.56% of DL/I calls	
DB GNP calls	33	.22	.13	3.42% of DL/I calls	
DB GHU calls	91	.61	.35	9.44% of DL/I calls	
DB GHN calls	0	.00	.00	0.00% of DL/I calls	
DB GHNP calls	0	.00	.00	0.00% of DL/I calls	
DB ISRT calls	58	.39	.22	6.02% of DL/I calls	
DB DLET calls	55	.37	.21	5.71% of DL/I calls	
DB REPL calls	36	.24	.14	3.73% of DL/I calls	
DB DEQ calls	0	.00	.00	0.00% of DL/I calls	
DB Total calls	335	2.23	1.29	34.75% of DL/I calls	
DC GU calls	166	1.11	.64	17.22% of DL/I calls	
DC GN calls	73	.49	.28	7.57% of DL/I calls	
DC ISRT calls	318	2.12	1.22	32.99% of DL/I calls	
DC PURG calls	0	.00	.00	0.00% of DL/I calls	
DC Total calls	557	3.71	2.14	57.78% of DL/I calls	
Test Enqueue requests	0	.00	.00	0.00% of DB calls	
Waits on Test Enqueues	0	.00	.00	0.00% of DB calls	
Test Dequeue requests	0	.00	.00	0.00% of DB calls	
User *Q Enqueue calls	0	.00	.00	0.00% of DB calls	
Waits on User *Q calls	0	.00	.00	0.00% of DB calls	
User *Q Dequeue requests	0	.00	.00	0.00% of DB calls	
Update Enqueue requests	0	.00	.00	0.00% of DB calls	
Waits on Update Enqueue requests	0	.00	.00	0.00% of DB calls	
Update Dequeue requests	0	.00	.00	0.00% of DB calls	
Exclusive Enqueue requests	38	.25	.15	11.34% of DB calls	
Waits on Exclusive Enqueue requests	0	.00	.00	0.00% of DB calls	
Exclusive Dequeue requests	2	.01	.01	0.60% of DB calls	
DL/I CHNG calls	11	.07	.04	1.14% of DL/I calls	
DL/I AUTH calls	0	.00	.00	0.00% of DL/I calls	
DL/I SETO calls	0	.00	.00	0.00% of DL/I calls	
DL/I APSB calls	0	.00	.00	0.00% of DL/I calls	
DL/I DPSB calls	0	.00	.00	0.00% of DL/I calls	
DL/I GMSG calls	0	.00	.00	0.00% of DL/I calls	
DL/I CHKP calls	0	.00	.00	0.00% of DL/I calls	
DL/I XRST calls	0	.00	.00	0.00% of DL/I calls	
DL/I ROLB calls	0	.00	.00	0.00% of DL/I calls	
DL/I ROLS calls	0	.00	.00	0.00% of DL/I calls	
DL/I SETS calls	0	.00	.00	0.00% of DL/I calls	
DL/I SETU calls	0	.00	.00	0.00% of DL/I calls	
DL/I INIT calls	0	.00	.00	0.00% of DL/I calls	
DL/I INQY calls	61	.41	.23	6.33% of DL/I calls	
DL/I LOG calls	0	.00	.00	0.00% of DL/I calls	
Total number of DL/I System Service calls	72	.48	.28	7.47% of DL/I calls	
DL/I CMD calls	0	.00	.00		
DL/I GCMD calls	0	.00	.00		
Internal Command calls	0	.00	.00		
Retrieve Command calls	0	.00	.00		

Figure 94. IRUR: DL/I Call Statistics

This report provides a count of all programs scheduled, transactions processed, and DL/I calls issued by call type.

Miscellaneous Statistics

This is an example of the IRUR Miscellaneous Statistics report. It provides information on the highest PST used, the highest and current number of conversations in use, transaction counts by transaction type (conversational, WFI, non-recoverable and response mode), RECANY buffer usage, IMS and statistics record versions, and the IMSPLEX name.

Miscellaneous Statistics		Interval :	3.44 (HHMM.MS.SS)
	Count /Transact	/Second	
Highest PST used	185		
Highest CCB ID used	0		
Maximum # of CCBs in use	0		
Number of Conversations started	0	.00	
Number of Conversational Transactions	61	.27	11.34% of all Transactions
Number of Wait-For-Input Transactions	1	.00	0.19% of all Transactions
Number of NonRecoverable Transactions	55	.25	10.22% of all Transactions
Number of Response-Mode Transactions	26	.12	4.83% of all Transactions
Number of Msg Queue Transactions	437	1.95	81.23% of all Transactions
Number of Fast Path Transactions	101	.45	18.77% of all Transactions
Total number of Transactions	538	2.41	
	Average	Minimum	Maximum
Number of RECANY Buffers used	0	0	0
Maximum number of RECANY Buffers used	0	0	1
Number of Statistics Intervals	1		
IMS Release Level	10.1.0		
Statistic records Version Level	0		
IMSPLEX name	CSLPLEX2		

Figure 95. IRUR: Miscellaneous Statistics with IMSPLEX name

The report items include:

Number of Conversations started

The number of Conversations started, calculated as the total number of type 11 records.

Transaction counts

The Transaction counts are for the number of transactions of each type that ran, calculated as the number of type 31 records for a GU to the SMB message queue.

Number of Conversational Transactions

Transactions defined with TRANSACT SPA

Number of Wait-For-Input Transactions

Transactions defined with TRANSACT WFI

Number of NonRecoverable Transactions

Transactions defined with TRANSACT INQUIRY=NONRECOV

Number of Response-Mode Transactions

Transactions defined with TRANSACT MSGTYPE=RESPONSE

Total number of Transactions

This total is used to calculate the percentage of all Transactions.

Number of RECANY Buffers used

The number of RECANY (Receive Any) buffers in use at the end of the checkpoint interval. Average, Minimum and Maximum values across all checkpoint intervals are reported.

Maximum number of RECANY Buffers used

The maximum number of RECANY (Receive Any) buffers used during the checkpoint interval. Average, Minimum and Maximum values across all checkpoint intervals are reported.

A key performance indicator is the number of RECANY buffers used by IMS to receive VTAM input messages. If the Number or Maximum number of RECANY buffers used is regularly high (equal to the RECA parameter in DFSPBxxx member

of IMS.PROCLIB), then this may indicate a shortage. The Storage Pool statistics for the RECA pool provides additional information on its storage usage.

Storage Pool Statistics

This is an example of the IRUR Storage Pool Statistics report.

Storage Pool Statistics		Count /Transact		/Second	Interval :	4.00 (HHMM.MS.SS)
DDIR	DMB Directory Entry					
	Subpool Number	231				
	Average # bytes allocated	152,944				
	Maximum # bytes allocated	152,944				
	Number of Getmains	0	.00	.00		
	Number of Freemains	0	.00	.00		
	Number of gets for this pool	0	.00	.00		
SMB	Scheduler Message Block					
	Subpool Number	231				
	Average # bytes allocated	112,400				
	Maximum # bytes allocated	112,400				
	Number of Getmains	0	.00	.00		
	Number of Freemains	0	.00	.00		
	Number of gets for this pool	0	.00	.00		
FNCB	FPE Notify Control Block					
	Subpool Number	231				
	Average # bytes allocated	24,576				
	Maximum # bytes allocated	24,576				
	Number of Getmains	0	.00	.00		
	Number of Freemains	0	.00	.00		
	Number of gets for this pool	42,251	7.10	176.13		
TCBT	TCB Table					
	Subpool Number	231				
	Average # bytes allocated	8,192				
	Maximum # bytes allocated	8,192				
	Number of Getmains	0	.00	.00		
	Number of Freemains	0	.00	.00		
	Number of gets for this pool	0	.00	.00		
IRLM	Parm Area Fixed CSA					
	Subpool Number	231				
	Average # bytes allocated	557,056				
	Maximum # bytes allocated	557,056				
	Number of Getmains	0	.00	.00		
	Number of Freemains	0	.00	.00		
	Number of gets for this pool	0	.00	.00		
BQEL	pool					
	Subpool Number	231				
	Average # bytes allocated	4,096				
	Maximum # bytes allocated	8,192				
	Number of Getmains	0	.00	.00		
	Number of Freemains	0	.00	.00		
	Number of gets for this pool	14,547	2.44	60.64		
BXQE	BCB Q elements					
	Subpool Number	231				
	Average # bytes allocated	114,688				
	Maximum # bytes allocated	114,688				
	Number of Getmains	0	.00	.00		
	Number of Freemains	0	.00	.00		
	Number of gets for this pool	321,312	53.98	1,339.41		

Figure 96. IRUR: Storage Pool Statistics

This report provides information about the various storage pools used by IMS. Pools not used in the reporting period are not reported on. For each pool, the following information is presented:

- Pool Identifier
- Description of the pool
- Average and maximum pool size
- Number of GETMAINS/FREEMAINS and GETs for the pool

Fixed Pool Usage Statistics

This is an example of the IRUR Fixed Pool Usage Statistics report.

Fixed Pool Usage Statistics

Interval : 1.08.59 (HHH.MM.SS)

Pool name	CIOP								
Pool size at end of period	266,360								
Maximum pool size	266,360								
Current # bytes in oversize blocks	0								
Maximum pool size since IMS restart	398,120								
Buffer size	264	520	1,032	2,056	4,104	8,200	16,392	32,776	OVERSIZE
Buffer count per primary block	64	32	32	32	16	8	4	4	0
Buffer count per secondary block	32	16	16	16	8	4	2	2	0
Max buffer count since init	14	8	6	3	2	1	0	2	0
Max # blocks since init	1	1	1	1	1	1	0	1	0
Initial alloc (yes/no)	YES	NO	NO	NO	NO	NO	NO	NO	NO
Average size requested	107	281	873	1,432	2,490	5,872	0	0	0
Get reqs for this buffer size	3,063	2,105	13	1,039	4	5	0	0	0
Get reqs this bufsize per second	1	1	>0.5	>0.5	>0.5	>0.5	0	0	0
# of times upper limit reached	0	0	0	0	0	0	0	0	0
# times larger buffer size used	0	0	0	0	0	0	0	0	0
Average block count	1	1	1	1	1	1	0	0	0
High block count	1	1	1	1	0	0	0	1	0
Low block ccount	0	0	0	0	0	0	0	0	0
Blocks allocated (expansion)	0	17	0	17	2	3	0	0	0
Blocks released (compression)	0	17	0	17	2	3	0	0	0
Average buffer count	7	1	5	1	1	1	0	0	0
High buffer count	10	4	4	1	0	0	0	2	0
Low buffer count	0	0	0	0	0	0	0	0	0
Page load invoked, no Iwait	3	0	4	0	0	3	0	0	0
Page load caused Iwait	0	0	0	0	0	0	0	0	0

Figure 97. IRUR: Fixed Pool Usage Statistics

This report provides information about the fixed pools used by IMS. A number of statistics are provided for each buffer size in the pool; these include size, high water marks, and a number of other performance related statistics associated with each buffer.

Dispatcher Statistics

This is an example of the Dispatcher Statistics report.

This report provides performance related information for the various IMS TCBs. A report is produced for each TCB. The information reported includes ITASK and dispatcher statistics, as well as real time, IMS busy time and CPU time.

Global Dispatcher Statistics		Interval :		4.21 (HHMM.MM.SS)
	Count	/Transact	/Second	
TCB Types	51			
Assigned dependent regions	5			
Total IMS ITASK Creates	3,920	26.13	15.04	
Total IMS ITASK Dispatches	16,368	109.12	62.81	
z/OS Processing statistics				
Online CPs	2			
Online zAAPs	0			
Online zIIPs	1			
Total online CPs	3			
CTL region TCB time (hh.mm.ss.ms)	0.231			
CTL region SRB time (hh.mm.ss.ms)	0.041			
DLI region TCB time (hh.mm.ss.ms)	0.057			
DLI region SRB time (hh.mm.ss.ms)	0.002			
CTL region enclave zIIP time	0.013			
CTL region non-enclave zIIP time	0.000			
CTL region zIIP time on CP	0.000			
DLI region enclave zIIP time	0.000			
DLI region non-enclave zIIP time	0.000			
DLI region zIIP time on CP	0.000			

Figure 98. IRUR: Dispatcher Statistics (Part 1 of 2)

Dispatcher Statistics			Interval : 4.21 (HHMM.MS.SS)	
	Count	/Transact	/Second	
TCB Name	LOG			
# TCBs this type	1			
Total ITASK Creates	729	4.86	2.80	
Total ITASK Dispatches	2,133	14.22	8.18	
Total Dispatcher Suspend	1,711	11.41	6.57	
Total Real Time for this TCB (hh.mm.ss.ms)	4.28.305			
IMS Busy Time/TCB (Non-Susp) (hh.mm.ss.ms)	0.023			.00% of IMS Real Time
CPU Time/TCB (hh.mm.ss.ms)	0.022			.00% of IMS Real Time
Total # wrong TCB ITASK terminations	0	.00	.00	
Total suspend backouts	0	.00	.00	
Cumulative count of ECBs on queues	77			
Maximum ECBs on queues since chkpt	3			
Time between RESUME and MVS disp of TCB	0.027			.01% of IMS Real Time
Maximum TCB resume time since chkpt	0.000			.00% of IMS Real Time
DBFSLEEP suspends	0	.00	.00	
TCB Name	CTL			
# TCBs this type	1			
Total ITASK Creates	1,912	12.75	7.34	
Total ITASK Dispatches	4,977	33.18	19.10	
Total Dispatcher Suspend	4,189	27.93	16.07	
Total Real Time for this TCB (hh.mm.ss.ms)	4.20.786			
IMS Busy Time/TCB (Non-Susp) (hh.mm.ss.ms)	0.123			.04% of IMS Real Time
CPU Time/TCB (hh.mm.ss.ms)	0.116			.04% of IMS Real Time
Total # wrong TCB ITASK terminations	0	.00	.00	
Total suspend backouts	5	.03	.02	
Cumulative count of ECBs on queues	670			
Maximum ECBs on queues since chkpt	3			
Time between RESUME and MVS disp of TCB	0.110			.04% of IMS Real Time
Maximum TCB resume time since chkpt	0.000			.00% of IMS Real Time
DBFSLEEP suspends	0	.00	.00	
TCB Name	MPP			
# TCBs this type	3			
Total ITASK Creates	0	.00	.00	
Total ITASK Dispatches	2,549	16.99	9.78	
Total Dispatcher Suspend	2,549	16.99	9.78	
Total Real Time for this TCB (hh.mm.ss.ms)	16.49.001			
IMS Busy Time/TCB (Non-Susp) (hh.mm.ss.ms)	2.718			.26% of IMS Real Time
CPU Time/TCB (hh.mm.ss.ms)	0.075			.00% of IMS Real Time
Total # wrong TCB ITASK terminations	0	.00	.00	
Total suspend backouts	1	.01	.00	
Cumulative count of ECBs on queues	0			
Maximum ECBs on queues since chkpt	0			
Time between RESUME and MVS disp of TCB	0.001			.00% of IMS Real Time
Maximum TCB resume time since chkpt	0.000			.00% of IMS Real Time
DBFSLEEP suspends	0	.00	.00	
TCB Name	RST			
# TCBs this type	1			
Total ITASK Creates	0	.00	.00	
Total ITASK Dispatches	13	.09	.05	
Total Dispatcher Suspend	13	.09	.05	
Total Real Time for this TCB (hh.mm.ss.ms)	4.20.610			
IMS Busy Time/TCB (Non-Susp) (hh.mm.ss.ms)	0.003			.00% of IMS Real Time
CPU Time/TCB (hh.mm.ss.ms)	0.002			.00% of IMS Real Time
Total # wrong TCB ITASK terminations	0	.00	.00	
Total suspend backouts	0	.00	.00	
Cumulative count of ECBs on queues	0			
Maximum ECBs on queues since chkpt	0			
Time between RESUME and MVS disp of TCB	0.006			.00% of IMS Real Time
Maximum TCB resume time since chkpt	0.000			.00% of IMS Real Time
DBFSLEEP suspends	0	.00	.00	
:				

Figure 99. IRUR: Dispatcher Statistics (Part 2 of 2)

Note: The TCBs from which these Statistics are gathered may be running concurrently with the module that builds the 450F record. Thus the various counts and times may be “fuzzy” with respect to one another, and should be used as general indicators only.

Dynamic SAP Statistics

This is an example of the IRUR Dynamic SAP Statistics report.

Dynamic SAP statistics		Interval : 4.21 (HHMM.MM.SS)		
TCB Name	ALM			
	Average	Minimum	Maximum	
Total # avail Non-Priv SAPs	18	18	18	
Total # avail Privileg SAPs	0	0	0	
# SAPs on Stage Queue	0	0	0	
Hi # SAPs asgn cur Contraction Interval	0	0	0	
Current SAP Generation	0	0	0	
Minimum # SAPs	18	18	18	
Generation Size	36	36	36	
	Count			
# Expands done	0			
# Contractions done	0			
# moves Stage to Free	0			
# times Upper Limit on SAPs	0			
# times in SD for SAPs	0			
# times Expansion failed	0			
	Average	Minimum	Maximum	
Total Non-Priv SD Waits	0	0	0	
High Non-Priv SD Waiters	0	0	0	
Total Priv SD Waits	0	0	0	
High Priv SD Waiters	0	0	0	
# Priv Disps during SD	0	0	0	
Hi # SAPs asgn cur Checkpoint Interval	0	0	0	
Hi # Priv asgn cur Checkpoint Interval	0	0	0	
Number of Statistics Intervals	1			

Dynamic SAP statistics		Interval : 4.21 (HHMM.MM.SS)		
TCB Name	CTL			
	Average	Minimum	Maximum	
Total # avail Non-Priv SAPs	41	41	41	
Total # avail Privileg SAPs	15	15	15	
# SAPs on Stage Queue	36	36	36	
Hi # SAPs asgn cur Contraction Interval	3	3	3	
Current SAP Generation	0	0	0	
Minimum # SAPs	5	5	5	
Generation Size	36	36	36	
	Count			
# Expands done	0			
# Contractions done	0			
# moves Stage to Free	0			
# times Upper Limit on SAPs	0			
# times in SD for SAPs	0			
# times Expansion failed	0			
	Average	Minimum	Maximum	
Total Non-Priv SD Waits	0	0	0	
High Non-Priv SD Waiters	0	0	0	
Total Priv SD Waits	0	0	0	
High Priv SD Waiters	0	0	0	
# Priv Disps during SD	0	0	0	
Hi # SAPs asgn cur Checkpoint Interval	3	3	3	
Hi # Priv asgn cur Checkpoint Interval	0	0	0	
Number of Statistics Intervals	1			

Figure 100. IRUR: Dynamic SAP Statistics

This report provides information on Dynamic SAPs (save area prefixes) that are used by communications ITASKs. Ideally, the number of waits for SAPs should be zero or close to zero. If not, it is recommended that you specify additional SAPs using the SAV= parameter.

Dynamic SAPs are acquired when needed and the pool of dynamic SAPs may need to be expanded at times. If this occurs, IMS checks to see if it can contract them again, if certain conditions are met. DFKDS20 does this monitoring. It is a timer driven module that examines the dynamic SAP activity every 10 minutes (the contraction interval).

Every time IMS goes through TASK CREATE in the IMS dispatcher and assigns a dynamic sap, IMS ups the count DSPDS_SAPS_ASGN, which represents the current number of dynamic SAPs. If this new value exceeds DSPDS_SAPS_HIGH (essentially the high water mark during this contraction interval), IMS updates the HIGH value to reflect the new high water mark.

When these tasks go through TASK TERMINATION in the IMS dispatcher, IMS places the freed SAPs on the SAP free queue to be re-used by subsequent TASK CREATEs. If DFSKDS20 determines that the SAPs in use are excessive, IMS places these terminated SAPs on the STAGING queue, where they will be released back to the system rather than being available for re-use by IMS (SAP contraction).

There may be cases where IMS, again, exhausts the SAP free queue and needs to dig into the staging queue to re-acquire more SAPs, which plays into the calculations of DFSKDS20.

When DFSKDS20 runs, it takes a look at three conditions to determine if dynamic SAP contraction can take place:

- No expansion requests occurred during the interval.
- No moves from the stage queue to the free queue occurred during the interval.
- The SAP high water mark (high # of SAPs in use at the same time) for the interval is less than the number of SAPs that would have to be in use in order to cause SAP expansion if the current generation of SAPs were released. That is, IMS won't initiate SAP contraction if, by releasing the current generation of SAPs, IMS would reduce the SAP pool to the point where IMS would have to expand it again.

If these are all true, a bit (DSPDS_REET_HIGH) is set to indicate that on the next pass through TASK CREATE, the high water mark should be reset to DSPDS_SAPS_ASGN (the current SAP dispatch count). DFSKDS10 actually does the releasing of the SAPs on the staging queue by request from DFSKDS20.

ST450F_CKHSAP will probably be higher than ST450_SAPSHIGH since the checkpoints reset CKHSAP. Unless these are occurring every 10 minutes or less, it seems logical to expect them to be higher.

Logger Statistics

The IRUR Logger Statistics report provides an analysis of the type x'4507' IMS logger statistics records.

Logger Statistics		Count /Transact		/Second	Interval :	55 (HHMM.MS.SS)
Logical Logger:	Records Written	268,367	44.93	4,887.50		
	Check Write requests	37,405	6.26	681.22		
	Waits for Writes	10,567	1.77	192.45		
	Buffer Waits: CHKPT Invokers	61	.01	1.11		
	Buffer Waits: Non-CHKPT Invokers	0	.00	.00		
	Buffer Waits: Transient	1	.00	.02		
Physical Logger:	AWE submitted on Wrt	2,852	.48	51.94		
	WADS EXCPVRs	9,780	1.64	178.11		
	4K Segment Writes initiated	31,052	5.20	565.52		
	OLDS Writes initiated	6,751	1.13	122.95		
	OLDS Reads initiated	193	.03	3.51		
	Internal Check Write requests	0	.00	.00		
	Cumulative WTWT Wait Time	45.693				
	OLDS Block Size	22,528				
	Log Buffers	100				
	Tracks on the WADS	225				
	WADS blocks/track	12				
	Cumulative primary WADS write I/O time	9.893		0.001012	Average per write	
	Cumulative secondary WADS write I/O time	0.000		0.000000	Average per write	
	Cumulative primary OLDS write I/O time	35.037		0.005190	Average per write	
	Cumulative secondary OLDS write I/O time	0.000		0.000000	Average per write	

Figure 101. IRUR: Logger Statistics (IMS V12)

Start 16Jan2018 14:18:19:85		IMS Performance Analyzer Internal Resource Usage - IFDE		End 16Jan2018 14:31:54:66	Page	20
Logger Statistics		Count /Transact		/Second	Interval :	13.35 (HHMM.MS.SS)
Logical Logger:	Records Written	9,595	47.03	11.78		
	Check Write requests	459	2.25	.56		
	Waits for Writes	604	2.96	.74		
	Buffer Waits: CHKPT Invokers	0	.00	.00		
	Buffer Waits: Non-CHKPT Invokers	9	.04	.01		
	Buffer Waits: Transient	0	.00	.00		
Physical Logger:	AWE submitted on Wrt	19	.09	.02		
	WTWT to CHKW conversions	460	2.25	.56		
	WADS EXCPVRs	866	4.25	1.06		
	4K Segment Writes initiated	2,106	10.32	2.58		
	OLDS Writes initiated	113	.55	.14		
	OLDS Reads initiated	2	.01	.00		
	Internal Check Write requests	1	.00	.00		
	Cumulative WTWT Wait Time	0.269				
	OLDS Block Size	22,528				
	Log Buffers	5				
	CIs on the WADS	180				
	Cumulative primary WADS write I/O time	0.322		0.000372	Average per write	
	Cumulative secondary WADS write I/O time	0.000		0.000000	Average per write	
	Cumulative primary OLDS write I/O time	0.062		0.000548	Average per write	
	Cumulative secondary OLDS write I/O time	0.060		0.000535	Average per write	
	Primary WADS maximum I/O time	0.006				
	Secondary WADS maximum I/O time	0.000				
	Primary OLDS maximum I/O time	0.004				
	Secondary OLDS maximum I/O time	0.004				
	Primary WADS maximum I/O timestamp	14:30:03.27				
	Secondary WADS maximum I/O timestamp	N/A				
	Primary OLDS maximum I/O timestamp	14:24:06.63				
	Secondary OLDS maximum I/O timestamp	14:24:06.63				
	Buffer waiters needing posting at checkpoint	0				
	Buffer waiters needing posting not at checkpoint	9				
	WADS encryption matrix	NNNNNNNNNN				

Figure 102. IRUR: Logger Statistics (IMS V15)

This report provides various statistics describing the performance of the IMS log and WADS. I/O counts and buffer wait counts can be used to see if any system performance problems are being caused by bad logger or WADS I/O times.

A key performance indicator is the number of Logical Logger Buffer waits for non-checkpoint invokers. A high value may indicate that the Log Buffer allocation may be too low.

The report contains the following information:

Logical Logger

The Logical Logger writes IMS log records to the Log buffers, in preparation for DASD I/O to the WADS and OLDS data sets.

Records Written

The number of IMS log records written to the log (ILOG FUNC=WRT). Refer to the “Log Information report” on page 310 to understand the type and frequency of the records written by this IMS subsystem.

Check Write requests

The number of check write (ILOG FUNC=CHKW) requests issued by IMS. A physical write to the WADS is forced for a previously written log record (ILOG FUNC=WRT). If the specified log record is not yet written, this request will write the buffer(s) then return to the caller.

Waits for Writes

The number of wait for write (ILOG FUNC=WTWT) requests issued by IMS. The current task or transaction waits until a previously written log record (ILOG FUNC=WRT) is physically written to the WADS. If the specified log record is not yet written, the requesting ITASK is put in IWAIT status until the record is written to the WADS.

Buffer Waits: CHKPT Invokers

The number of times the IMS system checkpoint process waited for a Log Buffer to become available before it could write its checkpoint (type x'40') log records. Delays in checkpoint processing can cause delays in transaction processing and scheduling.

Buffer Waits: Non-CHKPT Invokers

The number of times that normal IMS and transaction processing waited for a Log Buffer to become available. A high rate of buffer waits may indicate a shortage of Log buffers, and you may need to increase their allocation. Since IMS V12, Log buffers can be located in 64 bit storage. Therefore previous ECSA constraints are no longer an inhibitor to increasing the allocation. To increase the number of Log buffers, update the BUFNO= value in the OLDSDEF statement in the DFSVSMxx member of the IMS PROCLIB data set.

Buffer Waits: Transient

The number of times that IMS processing waited for a Log buffer to become available; for conditions other than “all buffers are in use”. Transient buffer waits are typically short in duration and are due to buffers being returned to the buffer free queue, or being scanned to find records in the buffers for reads. Transient buffer waits are not by themselves an indication of a log buffer shortage.

AWE submitted on WRT

The number of asynchronous work elements that were submitted as a result of all write log record requests (ILOG FUNC=WRT).

WTWT to CHKW conversions (V14+)

The number of times a wait for write request was converted to a check write request.

Physical Logger

The Physical Logger performs the physical I/O of the Log buffers to the DASD WADS and OLDS.

WADS EXCPVRs

The number of EXCPVR I/O operations to the WADS data set in order to write the log buffers.

4K Segment Writes initiated

The number of 4096 byte log buffer segments written to the WADS data set.

OLDS Writes initiated

The number of write I/O operations issued against the OLDS data sets.

OLDS Reads initiated

The number of read I/O operations issued against the OLDS data sets.

Internal Check Write requests

The number of internal check write (ILOG FUNC=CHKW) requests issued by IMS.

Cumulative WTWT Wait Time

The cumulative elapsed time that IMS system and transaction processing waited for wait-for-write requests (ILOG FUNC=WTWT) to complete.

OLDS Block Size

The physical block size of the OLDS data sets.

Log Buffers

The number of log buffers allocated, as specified in the BUFNO= value in the OLDSDEF statement in the DFSVSMxx member of the IMS PROCLIB data set.

Tracks on the WADS (V12-V14)

The number of physical tracks in the WADS data set. The maximum number of WADS tracks that are ever used is calculated using the formula (OLDS block size/WADS segment size + 1) x (number of OLDS buffers). In the report above, this calculation is $((22528/4096) + 1) \times (100) = 650$. Since the reported Tracks on the WADS value is 255, you may consider increasing it to 650.

WADS blocks/track (V12-V14)

The number of physical blocks per track in the WADS data set.

CI's on the WADS (V15+)

The number of control intervals in the WADS. Given that the size of each control interval is 4KB, the size of the WADS data set in kilobytes is CIs on the WADS x 4.

Cumulative primary WADS write I/O time

The total elapsed time for all write I/O operations to the primary WADS data set. The average elapsed time per WADS write request is also reported.

Cumulative secondary WADS write I/O time

The total elapsed time for all write I/O operations to the secondary WADS data set, if used.

Cumulative primary OLDS write I/O time

The total elapsed time for all write I/O operations to the primary OLDS data sets. The average elapsed time per OLDS write request is also reported.

Cumulative secondary OLDS write I/O time

The total elapsed time for all write I/O operations to the secondary OLDS data sets, if used.

Primary WADS maximum I/O time (V13+)

The maximum elapsed time of any write I/O operation to the primary WADS data set.

Secondary WADS maximum I/O time (V13+)

The maximum elapsed time of any write I/O operation to the secondary WADS data set.

Primary OLDS maximum I/O time (V13+)

The maximum elapsed time of any write I/O operation to the primary OLDS data set.

Secondary OLDS maximum I/O time (V13+)

The maximum elapsed time of any write I/O operation to the secondary OLDS data set.

Primary WADS maximum I/O timestamp (V14+)

The timestamp of the write I/O operation whose time is shown in Primary WADS maximum I/O time.

Secondary WADS maximum I/O timestamp (V14+)

The timestamp of the write I/O operation whose time is shown in Secondary WADS maximum I/O time.

Primary OLDS maximum I/O timestamp (V14+)

The timestamp of the write I/O operation whose time is shown in Primary OLDS maximum I/O time.

Secondary OLDS maximum I/O timestamp (V14+)

The timestamp of the write I/O operation whose time is shown in Secondary OLDS maximum I/O time.

Buffer waiters needing posting at checkpoint (V13+)

The number of times the physical logger found one or more programs waiting to POST at the completion of buffer I/O during checkpoint processing.

Note that the test for 'during checkpoint processing' is made at the time the buffer I/O completes, not at the time the ITASKs waited, so there can be some slight inconsistencies between the 'buffer waiter' fields and the logical logger buffer wait fields.

Buffer waiters needing posting not at checkpoint (V13+)

The number of times the physical logger found one or more programs waiting to POST at the completion of buffer I/O not during checkpoint processing.

WADS encryption matrix (V15+)

This field indicates whether the WADS data sets are encrypted. The matrix is a series of 10 values, where each value is either Y (encrypted) or N (not

encrypted). The first character indicates whether the first WADS is encrypted. The second character indicates whether the second WADS, if it exists, is encrypted, and so on. Regardless of how many WADS data sets are in use, the matrix is always 10 characters in length; that is, the matrix is not an indicator of how many WADS data sets are in use. For example, YYNNNNNNNN shows that the first WADS is encrypted; it shows that the second WADS, if it exists, is encrypted, and it shows that the other WADS, if they exist, are not encrypted.

IRLM System Statistics

This is an example of the IRUR IRLM System Statistics report.

Start 20May2018 12.56.49.21	IMS Performance Analyzer Internal Resource Usage - IMSA	End 20May2018 13.00.49.10	Page 64
IRLM System Statistics		Interval :	4.00 (HHMM.MS.SS)
	Count /Transact	/Second	
Total Global Lock requests	172,523	28.99	719.18
Child Locks Propagated	66,730	11.21	278.17
RH to RH Notify requests	5,363	.90	22.36
Lock requests	180,824	30.38	753.78
Unlock requests	133,829	22.48	557.88
Change requests	55,822	9.38	232.70
Synchronous Notify requests	5,363	.90	22.36
Asynchronous Notify requests	0	.00	.00
Verify requests	0	.00	.00
Purge requests	0	.00	.00
Query requests	0	.00	.00
Takeover requests	0	.00	.00
Suspend Exit counter	12,680	2.13	52.86
Resume Exit counter	12,680	2.13	52.86
Status Exit counter	0	.00	.00
Notify Exit counter	41,788	7.02	174.20
Deadlock Exit counter	7	.00	.03
Timeout Exit counter	0	.00	.00
Synchronously Propagated Locks	158,373	26.61	660.19
Synchronously Propagated Changes	0	.00	.00
Synchronously Propagated Unlocks	157,744	26.50	657.57
Asynchronously Propagated Locks	3,611	.61	15.05
Local Resource Contentions	798	.13	3.33
Global Resource Contentions	1,089	.18	4.54
Contentions granted OK by IRLM	3	.00	.01
False Contentions	1,655	.28	6.90
Identify requests	0		
Quit requests	0		
Total Local Deadlocks	0	.00	.00
Total Global Deadlocks	7	.00	.03
Timeout RLBs Purged	0		
CSA Highwater Mark	3,697,664		
Re-tryable ABENDs	0		
Non Re-tryable ABENDs	0		

Figure 103. IRUR: IRLM System Statistics

This report provides information on the performance of the IRLM system. Counts of the various IRLM activities, as well as buffer and CSA usage, deadlock frequency and VTAM sends are reported.

The 4522 IRLM System statistics contain information pertaining to this IRLM including total counts for all subsystems using this IRLM.

A key performance indicator is the ratio of Local and Global resource contentions to Lock requests. Ideally, this ratio should be low.

Another key performance indicator is the False Contentions count. A high value may indicate that the lock structure is too small.

Starting with z/OS V1.4, XES changed the ASYNC processing rules. XES can now force requests to go ASYNC for many reasons that have no relationship to Resource Contention on the HASH class. IRLM can no longer assume that if the request went ASYNC but didn't get to the contention exit, that it was a false contention. Therefore, ASYNC conversions can cause some report fields to be invalid, for example:

1. The False Contention count can be drastically inflated.
2. The Suspend/Resume counts can be inflated if the suspend would not have occurred normally.

IRLM Subsystem Statistics

This is an example of the IRUR IRLM Subsystem Statistics report.

Start 20May2018 12.56.49.21	IMS Performance Analyzer	End 20May2018 13.00.49.10	Page 63
	Internal Resource Usage - IMSA		
IRLM SubSystem Statistics			
	Count /Transact	Interval :	4.00 (HHMM.MS)
Total Global Lock requests	172,523 28.99	/Second	719.18
Child Locks Propagated	66,730 11.21		278.17
RH to RH Notify requests	5,363 .90		22.36
Lock requests	180,824 30.38		753.78
Unlock requests	133,829 22.48		557.88
Change requests	55,822 9.38		232.70
Synchronous Notify requests	5,363 .90		22.36
Asynchronous Notify requests	0 .00		.00
Verify requests	0 .00		.00
Purge requests	0 .00		.00
Query requests	0 .00		.00
Takeover requests	0 .00		.00
Suspend Exit counter	0 .00		.00
Resume Exit counter	0 .00		.00
Status Exit counter	0 .00		.00
Notify Exit counter	0 .00		.00
Deadlock Exit counter	0 .00		.00
Timeout Exit counter	0 .00		.00
Synchronously Propagated Locks	158,373 26.61		660.19
Synchronously Propagated Changes	0 .00		.00
Synchronously Propagated Unlocks	157,744 26.50		657.57
Asynchronously Propagated Locks	3,611 .61		15.05
Local Resource Contentions	0 .00		.00
Global Resource Contentions	0 .00		.00
Contentions granted OK by IRLM	0 .00		.00
False Contentions	0 .00		.00

Figure 104. IRUR: IRLM Subsystem Statistics

This report provides information on the performance of the IRLM that relates to a particular IMS subsystem. Counts of the various IRLM activities are reported as well as per transaction (/Transact) and per second (/Second) values.

The 4521 IRLM Subsystem statistics contain counters attributable to the IMS subsystem only.

The Exit and Contention counters, while recorded in the 4521 IRLM subsystem record and reported here, are not applicable for the Subsystem report.

RACF Statistics

This report provides information related to the performance of the RACF TCBs, such as counts of the various RACF activities, and the CPU and elapsed time used by these RACF activities.

This is an example of the IRUR RACF Statistics report

RACF Statistics										Interval : 5.32 (HHHH.MM.SS)		
TCB #	Verify Failed	Extract Failed	AWEs Proc.	IWAITS GETRDYQ	Count GETRDYQ	IWAITS Nowork	Signons Proc.	ITASK Disp.	Elapsed Time Sec.Mil	IMS Busy Time Sec.Mil	CPU Time Sec.Mil	
1	0	0	9	0	19	10	6	10	620.796	.008	.001	
2	0	0	0	0	0	0	0	0	.000	.000	.000	
3	0	0	0	0	0	0	0	0	.000	.000	.000	
4	0	0	0	0	0	0	0	0	.000	.000	.000	
5	75	0	75	0	150	75	75	75	1202.519	.033	.020	

Figure 105. IRUR: RACF Statistics

Virtual Storage Usage

This report provides information related to general storage use in the system and in the IMS control region.

The report has two sections: Entire System and IMS Control Region.

General Storage Statistics

Interval : 4.21 (HHHH.MM.SS)

```

Virtual Storage Stats (Entire System)
  Size of 24-bit CSA                      3,346,432
  Maximum allocated in 24-bit CSA         1,476,184
  Size of 31-bit CSA                      402,894,848
  Maximum allocated in 31-bit CSA         186,053,888
  Size of 24-bit SQA                      1,888,256
  Maximum allocated in 24-bit SQA         606,584
  Size of 31-bit SQA                      49,319,936
  Maximum allocated in 31-bit SQA         30,289,808
  Maximum virtual shared memory pages alloc 84,091,136
  Maximum shared memory objects allocated 19
  Maximum 64-bit common memory objects alloc 133
  Size of 64-bit common area (bytes)      7.0866960E+10
  Maximum bytes allocated in 64-bit common 1.7906532E+10
Real Storage Stats (Entire System)
  Real Frames
    System                               3,092,986
    System < 16M real                     4,094
    System 16M - 2G                       517,337
    All available frame queues             282,425
    Preferred below available frame queue  1,956
    Non-preferred below available frame queue 0
    Preferred above available frame queue  40,533
    Non-preferred above available frame queue 0
    Preferred high available frame queue   134,343
    Non-preferred high available frame queue 0
    Available quad frame groups            11,270
  Pages
    Currently fixed                       135,360
    Fixed < 16M                           527
    Fixed 16M - 2G                        29,919
    Paged in                              4,534,169
    Paged out                             8,945,643
    Common pages paged in                  356,664
    Common pages paged out                  33,246
    64-bit common pages backed in Real      34,443
    64-bit common pages backed in Aux       1,800
    64-bit common pages fixed in Real       1,828

```

Start 19Nov2013 14:27:21:64

IMS Performance Analyzer
Internal Resource Usage - IDDE

End 19Nov2013 14:31:42:25 Page 67

General Storage Statistics

Interval : 4.21 (HHHH.MM.SS)

```

Virtual Storage Stats (IMS Ctl Region)
  Size of 24-bit private                   9,412,608
  Limit of 24-bit private                  8,650,752
  Maximum allocated in 24-bit User private 2,154,496
  Maximum allocated in 24-bit Auth private 577,536
  Size of 31-bit private                  1,595,932,672
  Limit of 31-bit private                  67,108,864
  Maximum allocated in 31-bit User private 8,671,232
  Maximum allocated in 31-bit Auth private 18,972,672
  Address space memory limit (MB)         16,384
  Allocated from high VM for memory objects 2,487,222,272
  Allocated from high VM for shared objects 0
  Memory objects allocated                 12
  Shared memory objects allocated          0
  64-bit common objects allocated          2
  Bytes allocated in 64-bit common         2,148,532,224
  Source of MEMLIMIT (RAXLVMEMLIMS)      RAXLVAUTH
Real Storage Stats (IMS Ctl Region)
  Frames in use by this address space       3,935
  Pages fixed in this address space        617
  Pages explicitly fixed < 16M             85
  Pages explicitly fixed 16M - 2G          376

```

Figure 106. IRUR: Virtual Storage Usage

IMODULE Statistics

| This report provides information related to IMODULE services. Statistics are
| provided for IMODULE requests that obtained or deleted common storage.
| Statistics are also provided for IMODULE requests by call type.

This is an example of the IRUR IMODULE Statistics report.

IMODULE Summary Statistics

Interval : 4.21 (HHHH.MM.SS)

	Count	/Transact	/Second
Common Storage			
Common SP GETMAIN+GETSTOR requests	266	1.77	1.02
Cumulative common GETMAIN+GETSTOR size	477,112	3,180.75	1,830.75
Common SP LOAD requests	0	.00	.00
Cumulative common LOAD size	0		
Common SP DELETE requests	265	1.77	1.02
Cumulative common DELETE size	180,864		
DELETE SP=ALL requests	0	.00	.00
Common DELETE SP=ALL entities	0		
Cumulative common DELETE SP=ALL size	0		
Requests			
GETMAIN			
Total requests	1,019	6.79	3.91
Cumulative size	7,453,768	49,691.79	28,601.20
Errors	0	.00	.00
LOAD			
Total requests	10	.07	.04
Cumulative size	19,328	128.85	74.16
Errors	0	.00	.00
Count of times module found in CDE chain	0	.00	.00
LOCATE			
Total requests	16	.11	.06
Cumulative size	0	.00	.00
Errors	0	.00	.00
DELETE			
Total requests	1,008	6.72	3.87
Cumulative size	712,792	4,751.95	2,735.09
Errors	0	.00	.00
Directed LOAD			
Total requests	0	.00	.00
Cumulative size	0	.00	.00
Errors	0	.00	.00
GETSTOR			
Total requests	122	.81	.47
Cumulative size	432,144	2,880.96	1,658.20
Errors	0	.00	.00
FREESTOR			
Total requests	121	.81	.46
Cumulative size	398,552	2,657.01	1,529.30
Errors	0	.00	.00

Start 19Nov2013 14:27:21:64

IMS Performance Analyzer
Internal Resource Usage - IDDE

End 19Nov2013 14:31:42:25 Page 69

STE Statistics

Interval : 4.21 (HHHH.MM.SS)

	Count	/Transact	/Second
CTL Common			
Number of allocated STEs	541		
Number of bytes tracked - 24-bit storage	35,288		
Number of bytes tracked - 31-bit storage	2,361,632		
Number of bytes tracked - 64-bit storage	0		
STE enqueue failures	0	.00	.00
STE dequeue failures	0	.00	.00
CTL Private			
Number of allocated STEs	202		
Number of bytes tracked - 24-bit storage	10,504		
Number of bytes tracked - 31-bit storage	915,688		
Number of bytes tracked - 64-bit storage	0		
STE enqueue failures	0	.00	.00
STE dequeue failures	0	.00	.00
DLI Common			
Number of allocated STEs	1		
Number of bytes tracked - 24-bit storage	0		
Number of bytes tracked - 31-bit storage	1,368		
Number of bytes tracked - 64-bit storage	0		
STE enqueue failures	0	.00	.00
STE dequeue failures	0	.00	.00
DLI Private			
Number of allocated STEs	10		
Number of bytes tracked - 24-bit storage	352		
Number of bytes tracked - 31-bit storage	69,888		
Number of bytes tracked - 64-bit storage	0		
STE enqueue failures	0	.00	.00
STE dequeue failures	0	.00	.00

Figure 107. IRUR: IMODULE Statistics

EWLM Statistics

This report provides information on Enterprise Workload Manager™ (EWLM) statistics.

This is an example of the IRUR EWLM Statistics report.

Enterprise Workload Manager Statistics	Count	/Transact	/Second	Interval :	1.50.44 (HHMM.MS)
Table entries created	0	.00	.00		
Timed out table entries	0	.00	.00		
Table entries currently active	0	.00	.00		
Active entries in overflow table	0	.00	.00		
Failed table entry lookups	0	.00	.00		
Failed allocate calls	0	.00	.00		
Highwater mark	3,823,289,284				

Figure 108. IRUR: EWLM Statistics

64-bit Cache Statistics

This report provides information about the various 64-bit storage cache pools used by IMS.

This is an example of the IRUR 64-bit Cache Statistics report.

64-bit Cache Manager Statistics	Interval :	55 (HHMM.MS)
Pool Name	ACBIN64	
Pool Size (MAXPOOLSIZE)	1,073,741,824	
Percentage of pool in use	0	
Active buffers in pool	594	
Total buffers in pool	604	
FIND calls	0	
Successful DFS4SMFN calls	0	
Unsuccessful DFS4SMFN calls	0	
DFS4SMAD calls	0	
Deletes (DFS4SMDE and castout)	0	
Name of largest buffer	PROG0E9D	
Length of largest buffer	53,248	
Name of smallest buffer	PROGHRAA	
Length of smallest buffer	256	

Figure 109. IRUR: 64-bit Cache Statistics

Fast Path 64-bit Buffer Statistics

This report provides information about the various 64-bit Fast Path storage pools used by IMS.

This is an example of the IRUR Fast Path 64-bit Buffer Statistic report.

Fast Path 64-bit Buffer Manager Statistics

Interval : 55 (HHMM.MM.SS)

General Information

	Available	Used	Unknown	Total
Common subpool buffers	472	4	0	476
System subpool buffers	75	92	0	167
Total subpool buffers	547	96	0	643
Total ECSA used for buffers	790,528			
Total ECSA used for DMHR	305,984			
Total ECSA used for other control	8,080			
Total ECSA used	1,109,732			
Total 64-bit storage used	1,835,008			
Total EPVT used for buffers	0			
Total EPVT used for DMHR	0			
Total EPVT used for other control	2,340			
Total EPVT used	3,144			

System Pools

Subpool name	DBFS0001	DBFS0002	DBFS0003	DBFS0004	DBFS0005
Buffer size	512	1,024	2,048	4,096	8,192
Number of times waited for buffer	0	0	0	0	0
Number of buffers	32	8	8	103	72
Number of buffers available	31	6	7	17	72
Number of buffers in use	1	2	1	86	1
Number of buffers in unknown status	0	0	0	0	0
Maximum number of buffers used	2	3	3	88	1
Buffer storage in base section	16,384	8,192	16,384	421,888	65,536
DMHR storage in base section	14,336	3,584	3,584	46,144	3,584
Buffer storage in extents	0	0	0	0	262,144
DMHR storage in extents	0	0	0	0	14,336
Total ECSA used	31,312	12,368	20,560	468,624	347,920
Total EPVT used	156	156	156	156	780
Total 64-bit used	0	0	0	0	0

Fast Path 64-bit Buffer Manager Statistics

Common Pools

Subpool name	DBFC0001	DBFC0002	DBFC0003	DBFC0004	DBFC0005
Buffer size	512	1,024	2,048	4,096	8,192
Number of times waited for buffer	0	0	0	0	0
Number of buffers	32	32	16	396	16
Number of buffers available	32	32	14	396	16
Number of buffers in use	0	2	2	0	0
Number of buffers in unknown status	0	0	0	0	0
Maximum number of buffers used	7	2	3	1	1
Buffer storage in base section	16,384	16,384	32,768	1,622,016	131,072
DMHR storage in base section	14,336	7,168	7,168	177,408	7,168
Buffer storage in extents	0	16,384	0	0	0
DMHR storage in extents	0	7,168	0	0	0
Total ECSA used	14,928	15,360	7,760	178,000	7,760
Total EPVT used	156	312	156	156	156
Total 64-bit used	16,384	32,768	32,768	1,622,016	131,072

Figure 110. IRUR: Fast Path 64-bit Buffer Statistics

User Exit Statistics

This report, introduced with IMS V12, provides statistics for User Exit modules.

This is an example of the IRUR User Exit Statistics report.

User Exit Statistics	Count	/Transact	/Second	Interval :	1.04 (HHMM.MM.SS)
User Exit type: RESTART					
User Exit name	IEFBR14				
Active instances	0				
Number of calls	1				
Elapsed time in this user exit module	0.000				
Last load timestamp	10:35:33.51				
Size in bytes of exit module	8				
User Exit type: INITTERM					
User Exit name	IEFBR14				
Active instances	0				
Number of calls	0				
Elapsed time in this user exit module	0.000				
Last load timestamp	10:35:33.54				
Size in bytes of exit module	8				
User Exit type: ICQSEVNT					
User Exit name	IEFBR14				
Active instances	0				
Number of calls	0				
Elapsed time in this user exit module	0.000				
Last load timestamp	10:35:33.53				
Size in bytes of exit module	8				

Figure 111. IRUR: User Exit Statistics report

Individual TCB Statistics

Some IMS TCB types have multiple TCBs and, for some of these types such as OIM and ALM, it is useful to see details of individual TCBs.

For TCB types with multiple TCBs, IMS writes a 4518 record for each TCB, in addition to the cumulative statistics for the TCB type in the 450F. This report provides details of the individual TCBs.

This is an example of the IRUR Individual TCB Statistics report.

Individual TCB Statistics

Interval : 28.09 (HHHH.MM.SS)

	Count	/Transact	/Second	
TCB Name & ASID	RRS - 089C			
TCB Address	008854F8			
Total ITASK Creates	1	.00	.00	
Total ITASK Dispatches	1	.00	.00	
Total Dispatcher Suspends	1	.00	.00	
Total Real Time for this TCB (hh.mm.ss.ms)	0.003			
IMS Busy Time/TCB (Non-Susp) (hh.mm.ss.ms)	0.003			99.97% of IMS Real Time
CPU Time/TCB (hh.mm.ss.ms)	0.000			18.87% of IMS Real Time
Total # wrong TCB ITASK terminations	0	.00	.00	
Total suspend backouts	0	.00	.00	
Cumulative count of ECBs on queues	0			
Maximum ECBs on queues since chkpt	0			
Time between RESUME and MVS disp of TCB	0.000			.00% of IMS Real Time
Maximum TCB resume time since chkpt	0.000			.00% of IMS Real Time
DBFSLEEP suspends	0	.00	.00	
TCB Name & ASID	OIM - 089C			
TCB Address	00874438			
Total ITASK Creates	1,279	3.21	.76	
Total ITASK Dispatches	3,969	9.95	2.35	
Total Dispatcher Suspends	2,648	6.64	1.57	
Total Real Time for this TCB (hh.mm.ss.ms)	25.49.354			
IMS Busy Time/TCB (Non-Susp) (hh.mm.ss.ms)	0.128			.00% of IMS Real Time
CPU Time/TCB (hh.mm.ss.ms)	0.110			.00% of IMS Real Time
Total # wrong TCB ITASK terminations	0	.00	.00	
Total suspend backouts	0	.00	.00	
Cumulative count of ECBs on queues	13,452			
Maximum ECBs on queues since chkpt	109			
Time between RESUME and MVS disp of TCB	0.140			.00% of IMS Real Time
Maximum TCB resume time since chkpt	0.010			.00% of IMS Real Time
DBFSLEEP suspends	0	.00	.00	

Individual TCB Dynamic SAP Statistics

Interval : 28.09 (HHHH.MM.SS)

TCB Name	OIM			
	Average	Minimum	Maximum	
Total # avail Non-Priv SAPs	18	18	18	
Total # avail Privilege SAPs	0	0	0	
# SAPs on Stage Queue	0	0	0	
Hi # SAPs asgn cur Contraction Interval	0	0	1	
Current SAP Generation	0	0	0	
Minimum # SAPs	18	18	18	
Generation Size	36	36	36	
	Count			
# Expands done	0			
# Contractions done	0			
# moves Stage to Free	0			
# times Upper Limit on SAPs	0			
# times in SD for SAPs	0			
# times Expansion failed	0			
	Average	Minimum	Maximum	
Total Non-Priv SD Waits	0	0	0	
High Non-Priv SD Waiters	0	0	0	
Total Priv SD Waits	0	0	0	
High Priv SD Waiters	0	0	0	
# Priv Disps during SD	0	0	0	
Hi # SAPs asgn cur Checkpoint Interval	0	0	1	
Hi # Priv asgn cur Checkpoint Interval	0	0	0	
Number of Statistics Intervals	2			

Figure 112. IRUR: Individual TCB Statistics

64-bit Storage Statistics

IMS V14 has a 64-bit storage manager that helps reduce below-the-bar storage constraints. This report provides information about the size and usage of the 64-bit storage pool.

This is an example of the IRUR 64-bit Storage Statistics report.

64-bit Storage Manager Statistics

Interval : 28.09 (HHH.MM.SS)

Pool Name	OPTLAYER00							
Buffer allocation size	256							
Block size	262,144							
Object size in 1Mb increments	1							
Current pool size (1M incr)	1							
Max pool size (1M incr) since Init	1							
Max pool size (1M incr) since Ckpt	1							
Current # of secondary segments	0							
# of new secondary segments since Init	0							
# of allocated oversize segments	0							
# of new oversize segments since Init	0							
Total size of oversize segments (1M incr)	0							
Length of pool header blocks	66,032							
Total buffer area size (in bytes)	524,288							
Buffer Size	248	504	1,016	2,040	4,088	8,184	16,376	32,760
# of buffers in a block	1,024	512	256	128	64	32	16	8
# blocks on BSE allocated block chain	0	0	0	0	0	0	0	0
# blks on BSE compression pending queue	0	0	0	0	0	0	0	0
Current # of in-use buffers	0	0	0	0	0	0	0	0
Max in-use buffer count since Init	0	0	0	0	0	0	0	0
Max in-use buffer count since last Ckpt	0	0	0	0	0	0	0	0
Max in-use block count since Init	0	0	0	0	0	0	0	0
Max in-use block count since last Ckpt	0	0	0	0	0	0	0	0
# of times larger buff size used	0	0	0	0	0	0	0	0
# of times this buff used for smaller	0	0	0	0	0	0	0	0
# of requests satisfied by this size	0	0	0	0	0	0	0	0
Total Get requests for buffer size	0	0	0	0	0	0	0	0
Total Get requests last compression cycle	0	0	0	0	0	0	0	0
Buffer Size	65,528	131,064	262,136					
# of buffers in a block	4	2	1					
# blocks on BSE allocated block chain	0	0	0					
# blks on BSE compression pending queue	0	0	0					
Current # of in-use buffers	0	0	0					
Max in-use buffer count since Init	0	0	0					
Max in-use buffer count since last Ckpt	0	0	0					
Max in-use block count since Init	0	0	0					
Max in-use block count since last Ckpt	0	0	0					
# of times larger buff size used	0	0	0					
# of times this buff used for smaller	0	0	0					
# of requests satisfied by this size	0	0	0					
Total Get requests for buffer size	0	0	0					
Total Get requests last compression cycle	0	0	0					

Figure 113. IRUR: 64-bit Storage Statistics

MSC Link Statistics report

The MSC Link Statistics report contains information on the use of MSC links from the X'4513' log record.

You can request one or both of the following reports:

General Statistics

Summary information on the overall usage of each MSC link.

Send/Receive Statistics

Summary information for each MSC link with a more detailed breakdown of Send and Receive traffic.

Log records: This report is derived from IMS log record 4513.

Uses

The MSC Link Statistics report can help you validate and tune MSC links bandwidth.

Report options

To specify the report options, select **MSC Link Statistics** from the Resource Usage and Availability Reports in a Log Report Set.

You can select to show general statistics for overall usage of each link, or a breakdown of Send and Receive statistics for each link, or both. If you select none, then both reports are produced by default.

To obtain meaningful reports, the log must contain at least two checkpoints. You can select to print the set of reports after each completed checkpoint. If this option is not selected, then one set of reports is produced for the entire time range.

You can report on particular IMS subsystems by specifying an IMS Subsystem ID Object List to include or exclude.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output data set is controlled by specifying the Report Output DDname.

The format of the report command is:

```
IMSPALOG      MSCLSTAT(
               [DDNAME(ddname),]          default MSCLSTAT
               [PRINTAT(INTERVAL),]
               [GENERAL,]
               [SENDRECV,]
               [FROM(date,time),]
               [TO(date,time),]
               [INCL(IMSID(list))|EXCL(IMSID(list))])
```

Report content

This is an example of the MSC Link Statistics report.

Start 08Jul2008 13.17.00.70

IMS Performance Analyzer
MSC Link Statistics - IAD3

End 08Jul2008 13.35.50.88 Page 1

General Statistics (times in microseconds)

Link Name	Link Number	Start time for statistics	Number ITASK Dispatches	Total ITASK Proc Time	Min ITASK Proc Time	Max ITASK Proc Time	Interval : 18.50 (HHH.MM.SS) Log Check Writes	Log Check Writes IO
MSCLK34M	1	2008-07-08-13.17.00.995221	63	265.35E+01	0.052960	891.746944	22	11
MSCLK3	2	2008-07-08-13.17.00.995489	5	0	0	0	0	0
MSCLK36M	3	2008-07-08-13.17.00.995566	55	439.79E+01	0.048960	126.81E+01	30	15
MSCLK6	4	2008-07-08-13.17.00.995836	5	0	0	0	0	0
MSCLK34A	5	2008-07-08-13.17.00.996920	6	172.937344	0.112480	172.824864	0	0
MSCLK3B	6	2008-07-08-13.17.00.997350	5	0	0	0	0	0
MSCLK36C	7	2008-07-08-13.17.00.998188	6	118.715424	0.101664	118.613760	0	0
MSCLKC	8	2008-07-08-13.17.00.998526	5	0	0	0	0	0
Total			150	734.31E+01	0	126.81E+01	52	26

Send/Receive Statistics (times in microseconds)

Link Name	Link Number	Number of Msgs	Total Bytes	QMGR/SHQ Calls	Message Size	QMGR/SHQ Call Time	I/O Time	Interval : 18.50 (HHH.MM.SS)
MSCLK34M Send	1	11	6,054	44	513	0.005440	0 Min	
					559	6.406624	0 Max	
					6,054	35.483840	0 Total	
	1	11	6,517	33	550	3.225803	0 Average	
					573	0.012992	0 Min	
					599	891.057888	0 Max	
MSCLK36M Send	3	15	6,885	45	6,517	164.90E+01	0 Total	
					592	149.910545	0 Average	
					459	0.005344	0 Min	
	3	15	7,395	30	459	12.856096	0 Max	
					6,885	74.780544	0 Total	
					459	4.985369	0 Average	
MSCLK36M Recv	3	15	7,395	30	493	0.065728	0 Min	
					493	126.74E+01	0 Max	
					7,395	316.39E+01	0 Total	
					493	210.927434	0 Average	

Figure 114. MSC Link Statistics report

The **General Statistics** report contains the following information:

Link Name

Link name.

Link Number

Link number.

Start time for statistics

Start date and local time for the statistics in the format YYYY-MM-DD HH:MM:SS.thmiju. For option RESET,CHKPT, this will be the last IMS checkpoint time. For option NORESET,CHKPT, this will be when the last UPDATE MSLINK START STATISTICS OPTION(RESET) command was issued. Refer to IMS Command Reference, Volume 2.

Number ITASK Dispatches

Total number of ITASK dispatches.

Total ITASK Proc Time

Total ITASK process time, in microseconds.

Min ITASK Proc Time

Low ITASK process time, in microseconds.

Max ITASK Proc Time

High ITASK process time, in microseconds.

Log Check Writes

Total number of log check writes.

Log Check Writes IO

Total number of log check writes with I/O.

The **Send Statistics** are:

Link Name

Link name.

Link Number

Link number.

Number of Msgs

Total number of messages sent.

Total Bytes

Total number of bytes sent.

QMGR/SHQ Calls

Total number of message get-related calls to QMGR or shared queues.
Includes GU, GN, and DEQ calls.

Message Size

Low, high, total, and average number of message bytes sent.

QMGR/SHQ Call Time

Low, high, total, and average send GU/GN time, in microseconds.

I/O Time

Low, high, total, and average send I/O time, in microseconds.

The **Receive Statistics** are:

Link Name

Link name.

Link Number

Link number.

Number of Msgs

Total number of messages received.

Total Bytes

Total number of bytes received.

QMGR/SHQ Calls

Total number of message put-related calls to QMGR or shared queues.
Includes ISRT and ENQ calls.

Message Size

Low, high, total, and average number of message bytes received.

QMGR/SHQ Call Time

Low, high, total, and average receive ISRT/ENQ time, in microseconds.

I/O Time

Low, high, total, and average receive I/O time, in microseconds.

Message Queue Utilization report

The Message Queue Utilization report contains information on the use of message queues.

This information can help you:

- Balance the I/O between long and short message data sets

- Adjust record and buffer sizes for the most efficient use of these two data sets

Thus this report helps you reduce storage and minimize I/O.

Log records: This report is derived from IMS log records 01, 03, 34, 40.

Uses

Ideally, all messages short enough for the short message data set are written to it; all other messages short enough for the long message data set are written there. There should be very few messages too long for the record size of the long message data set. The Message Queue Utilization report shows you how closely these ideals were approached.

If a significant number of short messages are written to the long message data set, you may want to increase the short message queue record size. If a significant number of long messages are written to the short message data set, then you may want to decrease the short message queue record size. On the other hand, these anomalies are often the result of large variations in the sizes of output responses. If this is the case, you may be able to exercise some control over input scheduling. Also, the ratio of long message record size to short message record size can be deduced from the record sizes shown. For I/O balancing, this same ratio should apply to the number of messages written to the short and to the long message data sets. If too many records are written to one or the other data set, I/O operations may not be well balanced. You can make adjustments by changing buffer sizes for the message data sets.

MFS messages are directed according to expanded, external message sizes, not internal sizes. For these messages, average record size has meaning only for message switches and program switches.

To fully utilize the information in this report, you should be familiar with the IMS algorithm for calculating the length of messages that are assigned to the short or long message queue data sets. See the MSGQUEUE macro. The message length is determined by a combination of factors, not just the length of the message text. The message prefix and any applicable segment extensions including system, security, WLM, MSC, APPC, OTMA also contribute to the message length.

Report options

To specify the report options, select **Message Queue Utilization** from the Resource Usage and Availability Reports in a Log Report Set.

The **Record Size Interval** option specifies the record size interval, in bytes, to be reported on each line of this report.

To report only messages that are enqueued in message data sets, select the **Report Only Enqueued Messages** option. This allows you to more accurately dissect the use of message queues so you can better adjust the sizes of these data sets.

To report individual records, not complete messages, select the **Record length (not message)** option. This option may be used for shared queues where OBJAVGSZ is determined based on individual records, not complete messages which may span multiple records.

Specify an **Object List** to include or exclude particular IMS subsystems from the report.

Specify a **Report Interval** for the reduced data file after the Global (or Runtime) report interval is effected.

Specify the **Report Output DDname** to control the report output data set.

Report content

The Message Queue Utilization report is produced by IMS Subsystem ID (displayed in the heading) and is ordered by message interval size. It reports on message queue records that result from input transactions, message switches, program switches, and output messages.

You can specify the size of the interval that is to be reported. Each row of the report contains information about all messages whose lengths are within the interval size for that row. Interval sizes are not printed if there were no messages in those sizes.

A major subdivision in the report is indicated by two horizontal lines:

- All report entries above the first line are for messages short enough to fit into the short message queue.
- All entries between the two lines are for messages too long for the short message queue but short enough for the long message queue.
- The entries below the lower line are for messages too long for either queue; these messages have to be split and inserted into one or the other or both queues.

Start 04Jun2018 15.08.21.87					IMS Performance Analyzer										End 04Jun2018 17.32.56.58					Page		1	
Message Queue Utilization-IMSA																							
Msg Length Interval	Msg Avg Length	Input Count	Transaction ShMsg	LgMsg	-Message Switch-- Count	ShMsg	LgMsg	-Program Switch-- Count	ShMsg	LgMsg	-Output Message-- Count	ShMsg	LgMsg	-----Totals----- Count			ShMsg	LgMsg	Pct	Acc Pct			
00000-00009	0	-	-	-	-	-	-	-	-	-	84	-	-	84	-	-	-	0	0				
00440-00449	446	37733	27245	10488	-	-	-	11379	9731	1648	11732	5339	6393	60844	42315	18529	46	46					
00450-00459	459	63	63	-	-	-	-	1207	1207	-	-	-	-	1270	1270	-	1	47					
00460-00469	468	1	1	-	-	-	-	1409	1409	-	-	-	-	1410	1410	-	1	48					
⋮																							
00680-00689	688	91	89	2	2	2	-	327	323	4	1127	1114	13	1547	1528	19	1	57					
⋮																							
01110-01119	1113	65	65	-	-	-	-	10	10	-	506	506	-	581	581	-	0	75					
01120-01129	1126	-	-	-	-	-	-	2	2	-	251	251	-	253	253	-	0	75					
01130-01139	1135	255	255	-	-	-	-	3	3	-	219	219	-	477	477	-	0	75					
01140-01149	1146	-	-	-	-	-	-	1090	-	1090	19	-	19	1109	-	1109	1	76					
01150-01159	1151	-	-	-	-	-	-	-	-	-	441	-	441	441	-	441	0	77					
01160-01169	1165	32	-	32	-	-	-	4	-	4	732	-	732	768	-	768	1	77					
01170-01179	1177	18	-	18	-	-	-	-	-	-	69	-	69	87	-	87	0	77					
⋮																							
05570-05579	5570	-	-	-	-	-	-	-	-	-	1157	-	2314	1157	-	2314	1	100					
05740-05749	5748	-	-	-	-	-	-	-	-	-	2	-	4	2	-	4	0	100					
05900-05909	5906	-	-	-	-	-	-	-	-	-	39	-	78	39	-	78	0	100					
06130-06139	6130	-	-	-	-	-	-	-	-	-	1	-	2	1	-	2	0	100					
⋮																							
1482C-1482C	1482C	-	-	-	-	-	-	-	-	-	2	-	78	2	-	78	0	100					
1540C-1540C	1540C	-	-	-	-	-	-	-	-	-	2	-	82	2	-	82	0	100					
1597C-1597C	1597C	-	-	-	-	-	-	-	-	-	1	-	42	1	-	42	0	100					
Total																							
1060		49333	35572	13773	5	5	-	23072	19672	3400	61046	25117	38860	133K	80366	56033	-/-	-/-	-/-				
168 cancelled msg(s) encountered																							
Length of longest SHMSG record is 1139																							
Length of shortest LGMSG record is 5695																							

Figure 115. Message Queue Utilization report

The **ShMsg** and **LgMsg** values indicate the number of “slots” used in the queues to accommodate the messages, whereas the **Count** is the number of messages.

For message lengths greater than 99999, the length reported is the actual length divided by 100 with a C appended. For message counts greater than 999999, the count reported is the actual count divided by 1000 with a K appended.

The length of the longest SHMSG record, and the length of the shortest LGMSG record is displayed at the bottom of the report. For actual SHMSG and LGMSG sizes, see “Message Queue Pool Statistics” on page 159.

MQUR can be used to help you set MSG data set LRECLs, but it takes some analysis. See “Message Queue Utilization report” on page 196 for a useful introduction to the MQUR report that may help with the tuning of SHMSG/LGMSG data set record sizes. Also, one statistic from the MQUR report we use for tuning is the Accumulated Percentage (the last column on the right hand side of the report). This statistic (Acc Per) indicates the percentage of messages that are of this length or less.

Seek out the 50% line in the report. This report line indicates that 50% of the messages are this length or less and 50% are this length or more. This is the balance point, so if you wanted to balance SH and LG messages evenly, you would set the SHMSG LRECL to the average record length as reported at this 50% mark.

You may also decide that the LGMSG LRECL needs to cater for 95% of long messages (or whatever percentage you want to aim for). So look at the 95% line because its average record length is the LGMSG LRECL that will achieve this.

In well tuned IMS systems, there is usually very little SHMSG/LGMSG data set I/O (see the IRUR "Message Queue Pool Statistics" on page 159 report), so changing LRECL settings may not improve performance. However, one gain that tuning LRECL can provide is in the area of Logging. If LGMSG LRECL is too small, then IMS must split the message into multiple records and each record is written to the log, causing additional logging overhead and larger log files.

Database Update Activity report and extract

The Database Update Activity report summarizes Full Function Database update activity. It can help you determine the cost of database calls.

This report indicates the number of purge writes at sync point time to a database and provides a count of actual updates made to each database in the time period being reported. The report can optionally be written to an extract data set. Reports can be generated in Format 1 or Format 2. Reports generated in Format 2 provide a faster, more concise breakdown of database update activity. Format 2 is the recommended report option.

The Database Update Activity report shows:

- Number of blocks updated
- Number of physical segments changed by Insert, Delete, and Replace calls (Get calls are not reported because they are not recorded on the log)
- Number of database Open calls
- Time of the first and last updates to each database
- Databases being updated when the report ended and which, therefore, need to be backed out if system failure occurred during the reporting period

If your database is a HALDB, you can also report on specific HALDB partitions because the name of the partition is found on the database name field of the various records used in this report.

Log records: This report is derived from IMS log records 07, 20, 21, 31, 40, 41, 50.

Uses

Your Database Administrator will probably want to receive this report daily as several useful things are reported. The number of blocks updated gives the minimum possible number of writes caused by DL/I update calls. The actual number of DL/I calls may be somewhat larger than the number of blocks updated, which means that some blocks were updated more than once before a physical I/O occurred. Conversely, the number of DL/I calls could also be smaller than the number of blocks updated, as is the case with path calls.

You want the actual number of blocks updated to be as close as possible to the ideal number. To help make these determinations, list the VSAM index or use the Pool Statistics reported in the Internal Resource Usage reports to get the actual number of physical writes to compare with the minimum (ideal) number of blocks updated in this report. The actual number of physical writes may be greater than the number of blocks updated because of space writes (or VSAM background writes) or because several index levels must be changed for an update. The former

case usually means that the buffer pool sizes are too small or that VSAM background writes are creating a write bottleneck while trying to relieve read bottlenecks. Taking fewer sync points could help.

There should be one database open operation for each DDname. If this number is greater than one, it probably means one of the following:

- The DMB buffers are too small
- A close occurred (for example, dump or recovery)
- An error occurred

A glance at the time ranges for the first and last updates for each database can tell you which databases are used most often. It can also tell you the time range of interest if you need to do a backout or want to look elsewhere for related information.

The extract data set is suitable for analysis by PC spreadsheet and graphing tools.

Report options

To specify the report options, select **Database Update Activity** from the Resource Usage and Availability Reports in a Log Report Set.

Reports can be generated in Format 1 or Format 2. Format 2 provides a faster, more concise breakdown of database update activity and is the recommended report option.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

Optionally, the report can be ordered by Program name within Database name. The report output data set is controlled by specifying the Report Output DDname. Selection Criteria can be specified to include or exclude specific Databases and IMS Subsystems from the report.

To request the extract, specify an extract data set name. DDname DBUAXTRO identifies the extract output file. The extract file contains field headings as the first record in the file provided that option is selected on the Log Global Options panel. The data fields are fixed length and separated by a blank or a comma depending on the delimiter specified on the Log Global Options panel.

Report content (FORMAT1)

Database Update Activity reports generated using the FORMAT1 (default) operand can be ordered by Database name (the default) or by Program name within Database name.

Start 14Jun2014 10.15.00.00 IMS Performance Analyzer End 14Jun2014 10.16.00.00
Data Base Update Activity-IMSW

Database	DDname	Blocks Updated	** Generated Inserts	Update Deletes	Counts ** Replaces	DB Open Calls	****First Update**** Date Time	*****Last Update***** Date Time
DATTENT	DBURAX	2	0	8	0	0	14Jun2014 10.15.03.90	14Jun2014 10.15.39.40
DBURAX		0	0	0	0	0		
DCOMPTE		2	2	0	5	0	14Jun2014 10.15.03.90	14Jun2014 10.15.19.80
		2	4	0	0	0	14Jun2014 10.15.03.90	14Jun2014 10.15.19.80
DECHTXT		32	64	0	17	0	14Jun2014 10.15.00.50	14Jun2014 10.15.56.90
DHISTOR		1	5	0	0	0	14Jun2014 10.15.03.70	14Jun2014 10.15.03.70
		1	1	0	0	0	14Jun2014 10.15.03.70	14Jun2014 10.15.03.70
DIDXATT		2?	0	2	0	0	14Jun2014 10.15.03.90	14Jun2014 10.15.39.40
DIDXCON		1?	1	1	0	0	14Jun2014 10.15.03.70	14Jun2014 10.15.03.70
DIDXNOM		1?	0	0	2	0	14Jun2014 10.15.39.40	14Jun2014 10.15.39.40
DMATQSD	DMATQSD	0	0	0	0	0		
DMATQSI	DMATQSI	0	0	0	0	0		
DMEMOIR		61	82	0	14	0	14Jun2014 10.15.01.20	14Jun2014 10.15.59.70
DRECRSS	DRECRSS	0	0	0	0	0		
DRPETAT	DRPETAT	0	0	0	0	0		
	DRPETAT2	0	0	0	0	0		
DRPJOB	DRPJOB	0	0	0	0	0		
	DRPJOB2	0	0	0	0	0		
DSAISIE		4?	3	0	1	0	14Jun2014 10.15.07.40	14Jun2014 10.15.39.70
DSOCIET		7	3	2	21	0	14Jun2014 10.15.03.70	14Jun2014 10.15.41.10
		1	1	0	0	0	14Jun2014 10.15.03.70	14Jun2014 10.15.03.70
DSOCTXT		2	4	0	0	0	14Jun2014 10.15.39.10	14Jun2014 10.15.39.20
DSTBUR		2?	1	0	1	0	14Jun2014 10.15.02.90	14Jun2014 10.15.02.90
Total		121	171	13	61	0		

Figure 116. Database Update Activity report: FORMAT1 operand, ordered by Database (default)

Start 12Jul2014 05.47.12.73 IMS Performance Analyzer End 12Jul2014 11.02.17.78
Database Update Activity-IMS

Database	Program	DDname	Blocks Updated	** Generated Inserts	Update Deletes	Counts ** Replaces	DB Open Calls	****First Update**** Date Time	*****Last Update***** Date Time
QDBINDXD	KDSCPDD	QDBINDXD	0	0	0	0	1		
QDBINDXX	KDSCPDD	QDBINDXX	0	0	0	0	1		
QDINDEXD	KDSCPDD	QDINDEXD	0	0	0	0	1		
QDINDEXX	KDSCPDD	QDINDEXX	0	0	0	0	1		
QESUEOKD	KDSCPDD	QESUEOKD	0	0	0	0	1		
QGJIGTXD	KDSCPHH	QGJIGTXD	48	141	21	0	1	12Jul2014 08.55.19.68	12Jul2014 10.57.59.93
QGJIGTXX	KDSCPHH	QGJIGTXX	69?	48	21	0	1	12Jul2014 08.55.19.68	12Jul2014 10.57.59.93
QGKAITRD	KDSCPFF		136	372	0	0	0	12Jul2014 09.03.20.45	12Jul2014 10.48.54.86
	KDSCPHH	QGKAITRD	33	84	0	0	1	12Jul2014 08.55.17.91	12Jul2014 10.57.59.93
QGKAITRX	KDSCPFF		128?	134	0	0	0	12Jul2014 09.03.20.45	12Jul2014 10.48.54.86
	KDSCPHH	QGKAITRX	29?	29	0	0	1	12Jul2014 08.55.17.91	12Jul2014 10.57.59.93
QGKAKEID	KDSCPFF		4	8	0	1	0	12Jul2014 09.44.36.75	12Jul2014 10.28.38.72
	KDSCPHH	QGKAKEID	28	0	0	28	1	12Jul2014 08.55.17.91	12Jul2014 10.57.59.93

Figure 117. Database Update Activity report: FORMAT1 operand, ordered by Database and Program

The report is produced by IMS Subsystem ID and contains the following information:

Database

Database name.

Program

Program name. Breakdown by program name within database name is only reported if requested by specifying DBUPDATE (PROGRAM).

DDname A > symbol to the left of a DDname means that the program updating that database had not terminated at log termination or at IMS PA reset. (Reset occurs at a discontinuity in log sequence numbers.) So for those databases, there might have been more activity if the programs had been able to terminate normally. If a system failure occurs during the reporting period, these are the data sets to be backed out.

Blocks Updated

The number of physical database blocks updated includes pointers and bit maps, as well as data.

In some cases, the block counts are not entirely correct. Correct block counts require either an open (type 20) record or a close (type 21) record, and they require nonkeyed data sets. But the open record may have occurred before the report start time and, therefore, is unavailable. With keyed updates to KSDS data sets, keys cannot be related to blocks. Also, several index levels may also require updating. And for indexed or HISAM databases using OSAM (not VSAM), the relative record numbers (RRNs) for overflow writes to the OSAM data set cannot be translated into block identification without the blocking factors from the open or close records. In these cases, the reported number of blocks updated is actually the number of records updated, and the reported number has a question mark (?) appended to it; this denotes records, rather than blocks, updated.

The Blocks Updated count includes purge writes (at sync points). There may have been other write operations. For example, space writes occur between checkpoints when buffers need to be flushed.

Generated Update Counts

The number of physical segments changed by ISRT, DLET and REPL calls.

The number of physical segments changed by replaces, inserts, and deletes is not necessarily the same as the number of DL/I calls issued by the application program. For example, a single path call may generate several replace calls.

Another example is when replacing a concatenated segment, two physical segments might be changed. In addition, indexes, pointers, and bit maps are frequently updated as well as data. This is shown in the following figure where a single path call (ISRT) by an application updates a database (DBD1) and its index (DBD2) in such a way that three physical segments are updated and six blocks are written. The three segments updated are a DBD1 root segment and a dependent segment, and a DBD2 index segment. Updating the root segment causes three blocks to be written: the root segment, the PTF pointer and the bit map. Updating the dependent segment causes one block to be written. Updating the index causes two blocks to be written: the index chain and the pointer.

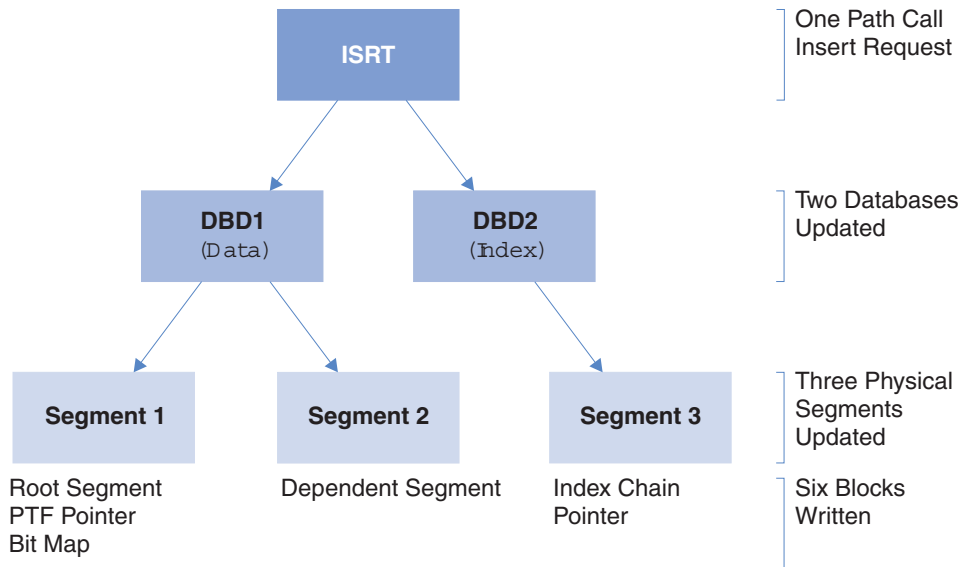


Figure 118. Generated Update Counts: a single path call can result in multiple segment updates

DB Open Calls

The number of database Open calls.

First Update

The date and time of the first update to the database. The date format for the report is *DDMMYYYY*. The date format for the extract is *YYYY/MM/DD*.

Last Update

The date and time of the last update to the database. The date format for the report is *DDMMYYYY*. The date format for the extract is *YYYY/MM/DD*.

Report content (FORMAT2)

Database Update Activity reports generated using the FORMAT2 (recommended) operand can be ordered by Database name (the default) or by Program name within Database name.

Start 06Dec2014 11:11:19:45			IMS Performance Analyzer Database Update Activity-IMS1							End 06Dec2014 11:12:27:74 Page 1			
Database	Program	Proc	5050 Total	Updates	ISRT	DLET	REPL	ROLx	New Block	Free Space	5052 Insert	5051 Problem	20 Open/ 24 Error
CUALTA1		APPL	267	DLI I/O	267 184	267 67	0 117	0	0	67	16	0	0 0
CUALTA2		APPL	353	DLI I/O	353 242	353 88	0 154	0	1	88	22	0	0 0
CUALTA3		APPL	360	DLI I/O	360 246	321 81	39 165	0	0	93	18	0	0 0
CUALTA4		APPL	146	DLI I/O	146 99	146 36	0 63	0	2	36	9	0	0 0
CUALTB1		APPL	336	DLI I/O	336 230	310 78	26 152	0	0	86	18	0	0 0
CUALTB2		APPL	179	DLI I/O	179 123	166 42	13 81	0	0	46	9	0	0 0
		B/O	8	DLI I/O	8 5	8 0	0 5	0	0	3	0	0	0 0
		:											
Total		APPL	102,688	DLI I/O	100,308 71,557	71,457 31,235	9,476 0	19,713 40,322	338	1,632	16,130	219	0 0
		B/O	720	DLI I/O	720 455	558 0	78 0	84 455	0	6	78	0	0 0
										108			0

Figure 119. Database Update Activity report: FORMAT2 operand

Database	Program	Proc	5050 Total	Updates	ISRT	DLET	REPL	ROLx	New Block	Free Space	5052 Insert	5051 Problem	20 Open/ 24 Error
DI21PART	CEXSPGM	APPL	36	DLI	36	9	18	9	0		9	0	0
				I/O	27	9	0	18	0	0			0
	CEXTPGM	APPL	76	DLI	76	19	38	19	0		19	0	2
				I/O	57	19	0	38	0	0			0
	CEXTPGM	B/O	10	DLI	10	4	4	2	0		2	0	0
				I/O	8	0	0	8	0	0			0
	DFSSAM04	APPL	29	DLI	29	19	10	0	0		3	0	0
				I/O	18	4	0	14	0	0			0
	MQATPGM	APPL	8	DLI	8	2	4	2	0		2	0	0
				I/O	6	2	0	4	0	0			0
	Total	APPL	149	DLI	149	49	70	30	0		33	0	2
				I/O	108	34	0	74	0	0			0
	Total	B/O	10	DLI	10	4	4	2	0		2	0	0
				I/O	8	0	0	8	0	0			0
IVPDB1	DFSIVP1	APPL	20	DLI	20	11	8	1	0		0	0	1
				I/O	14	3	0	11	0	6			0
IVPDB1I	DFSIVP1	APPL	6	DLI	6	3	3	0	0		3	0	1
				I/O	3	3	0	0	0	0			0
IVPDB2	DFSIVP2	APPL	16	DLI	16	9	6	1	0		0	0	0
				I/O	10	3	0	7	0	6			0
	DFSIVP3	APPL	32	DLI	32	18	12	2	0		0	0	1
				I/O	20	6	0	14	0	12			0
	DFSIVP35	APPL	32	DLI	32	18	12	2	0		0	0	0
				I/O	20	6	0	14	0	12			0
	Total	APPL	80	DLI	80	45	30	5	0		0	0	1
				I/O	50	15	0	35	0	30			0
Total	APPL		255	DLI	255	108	111	36	0		36	0	5
				I/O	175	55	0	120	0	36			0
	B/O		10	DLI	10	4	4	2	0		2	0	0
				I/O	8	0	0	8	0	0			0

Figure 120. Database Update Activity report: *FORMAT2* with *PROGRAM* operand

The report contains the following information:

Database

Database name.

Program

Program name. Use the PROGRAM batch operand to report a breakdown by program name within the database name. If there are two or more programs for the database then the database total (*Total*) is reported.

Proc Processing taking place when record was written. Can be one of:

APPL Record written during application processing.

B/O Record written during Transaction Backout.

OLR Record written during online recovery.

5050 Total

The total number of 5050 (Database Update) records (sum of the ISRT, DLET, REPL, and ROLx columns).

Updates

The total number of block updates.

- For DLI application calls, this value is the sum of the ISRT, DELT, and REPL columns minus the ROLx column.
- For Physical I/O, this value is the sum of the ISRT, DELT, and REPL columns.

ISRT/DELT/REPL

The number of physical segments changed by ISRT, DELT and REPL calls.

ROLx The number of rollbacks.

New Block

The number of requests to create new blocks.

Free Space

The number of changes to free space elements.

5052 Insert

The number of 5052 (Database Update prior to KSDS insert) records.

5051 Problem

The number of 5051 (Database Update – prior action was unsuccessful) records.

20 Open

The number of 20 (Database Open) records (row above).

24 Error

The number of 24 (Database Error) records (row below).

Extract file content

This is an example of the contents of the Database Update Activity extract file.

IMSID	,Database,DDname	,Blk_Updt	,Inserts	,Deletes	,Replaces	,Opens	,1st_Date	,1st_Time	,Last_Date	,Last_Time
IX23	,DACACDB,GACACDB,	122,	0,	0,	122,	1,	2018/02/02,16.06.21.19,	2018/02/02,16.13.40.80		
IX23	,DACACCIA,GACACCIA,	0,	0,	0,	0,	1,	,	,	,	,
IX23	,DACACCIB,GACACCIB,	0,	0,	0,	0,	1,	,	,	,	,
IX23	,DACACCIC,GACACCIC,	0,	0,	0,	0,	1,	,	,	,	,
IX23	,DACACCID,GACACCID,	0,	0,	0,	0,	1,	,	,	,	,
IX23	,DACERRDB,GACERRDB,	5,	5,	0,	0,	1,	2018/02/02,16.10.52.98,	2018/02/02,16.12.29.68		
IX23	,DACIDLDB,GACIDLDB,	32,	64,	0,	0,	1,	2018/02/02,16.06.50.99,	2018/02/02,16.13.29.86		
IX23	,DACTBLDB,GACTBLDB,	9,	3,	6,	0,	1,	2018/02/02,16.09.49.14,	2018/02/02,16.13.14.10		
IX23	,DACTREDB,GACTREDB,	2,	4,	0,	0,	1,	2018/02/02,16.03.22.53,	2018/02/02,16.13.29.68		
IX23	,DACTREIA,GACTREIA,	2,	2,	0,	0,	1,	2018/02/02,16.03.22.53,	2018/02/02,16.13.29.68		

Figure 121. Extract file content: Database Update Activity

The attributes of the extract data set are RECFM=FB, LRECL=132.

The information in the record is the same as the Database Update Activity report (see “Report content (FORMAT1)” on page 201).

The field headings are optionally included as the first record in the extract file depending on the extract options set in Log Global Options. The headings line up with the column data fields that they describe. The data fields are fixed length, and are separated by a blank or comma depending on the delimiter character specified in Log Global Options.

The extract data set can be used as input to other reporting and statistical analysis tools. Ensure that the delimiter character you specify is suitable for use by these tools.

Region Histogram report

The Region Histogram report is a graphic display of region activity. It shows the times a region is active or idle and the patterns of transaction scheduling in each region.

Log records: This report is derived from IMS log records 03, 07, 08, 40.

Uses

The Region Histogram report highlights parallel scheduling issues. It lets you see which transactions are scheduled into which regions and when. You can quickly tell whether some regions are heavily scheduled while others are relatively idle. You can also tell which transactions are waiting on which other transactions.

Report options

To specify the report options, select **Region Histogram** from the Resource Usage and Availability Reports in a Log Report Set.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output data set is controlled by specifying the Report Output DDname.

A Region ID Object List can be specified to include specific regions in the report. Region ID may be specified by PST number or Message Region Job name. If not specified, the default is to include the first 13 regions encountered in the log records processed for the report.

An IMS Subsystem ID Object List can be specified. The included regions then apply to each included IMS subsystem.

Report content

The Region Histogram is a graphical report of region activity showing when the regions are active or idle, and allows a comparison of the patterns of transaction scheduling in each region.

The column to the far left is the time of day.

Each region is represented by a column in the report. The column heading is the job name for the region if it is known and is the same for all jobs for the region; otherwise the region ID number is shown. In the following example, only region 7 shows the name (MSG7).

In the region columns, there are transaction codes; the transaction code indicates that the transaction was scheduled into that region at the indicated time. For example, transaction TSIN03 was scheduled into region 2 at 10:15:37. Transaction end time is indicated by printing a number when the program ends that gives message priority (first digit, hexadecimal), class (second to fourth digit, decimal), and number of messages de-queued by the transaction (sixth to eighth digit, decimal shown as 1-999 or if >999, then 1K to 99K).

Only as many columns are printed as there are regions active, up to a maximum of 13.

Two types of characters are used in the columns. The asterisks (*) indicate regions not started, and the dashes (-) indicate regions started but not scheduled.

The second column in the report, after the time, is the checkpoint column; it indicates when an IMS checkpoint began and ended.

*CLEANUP indicates backout activity started after an abend.

Question marks (??) indicate the message class was not available in the log record.

RGN STOP appears when the region is stopped.

The following example shows that seven regions are active. At time 10:15:39, transaction TINT06 was scheduled in region 1. At time 10:15:40, the transaction ended; the histogram indicates 1 message was processed by the transaction with a priority of 5 and message class 03. Region 1 is then briefly idle before transaction TBUR04 is scheduled at 10:15:41; the transaction ends within the second after processing 1 message with a priority of 3 and message class 03.

Start 27May2014 10.15.00.00		IMS Performance Analyzer R E G I O N H I S T O G R A M						
		Schedule start shows TranCode. Termination shows Priority(HEX), Message Class(DEC) and Transactions processed(DEC)						
Time	Ckpt	1	2	3	4	5	6	MSG7
HH.MM.SST								
10.15.37		3 3 2	-----	-----	-----	3 3 1	TPRF06	-----
.	.	-----	-----	TINT03	TINT06	1 1 1	-----	*****
.	.	-----	TSIN03	4 1 105	3 1	TBUR04	-----	*****
.	.	-----	-----	-----	-----	3 3 1	-----	*****
10.15.38		-----	3 1 1	-----	-----	-----	-----	*****
.	.	-----	TSIN03	-----	-----	-----	-----	*****
.	.	-----	3 1 1	TSIN03	-----	-----	TINT02	*****
.	.	TSAI01	TSIN03	3 1 1	-----	-----	4 1 1	TMIN00
.	.	1 5 1	3 1 1	TPRF03	TBUR04	-----	1 6 1	*****
.	.	-----	TPRF06	2 1 1	3 3 1	-----	TREP03	*****
10.15.39		-----	1 1 1	TINT03	-----	-----	1 1 1	*****
.	.	-----	TPRF03	4 1 1	-----	-----	TREP03	*****
.	.	-----	2 1 1	TINT02	-----	TSAI01	1 1 1	*****
.	.	TINT06	TREP03	4 1 1	TBUR04	1 5 1	TSIN03	*****
.	.	-----	1 1 1	-----	3 3 1	-----	-----	*****
10.15.40		5 3 1	TSIN03	TPRF01	-----	-----	3 1 1	*****
.	.	-----	3 1 1	2 1 1	-----	TBUR04	-----	*****
.	.	-----	-----	TMSG01	-----	3 3 1	TPRF03	*****
.	.	-----	-----	4 1 1	-----	-----	2 1 1	*****
10.15.41		-----	TINT03	TPRF03	-----	-----	-----	*****
.	.	-----	4 1 1	2 1 1	-----	-----	TMSG01	*****
.	.	-----	-----	-----	TINT06	-----	4 1 1	*****
.	.	TBUR04	-----	-----	5 3 1	-----	-----	*****
.	.	3 3 1	-----	-----	-----	-----	-----	*****
10.15.42		-----	TSIN03	-----	-----	TBUR04	-----	*****
.	.	-----	3 1 1	-----	-----	-----	-----	*****
.	.	-----	-----	-----	-----	-----	TMIN00	*****
.	.	-----	-----	-----	-----	-----	1 6 1	*****
10.15.43		-----	-----	TSIN03	-----	3 3 5	-----	*****
.	.	-----	-----	-----	TBUR04	3 3 1	-----	*****
.	.	-----	-----	3 1 1	TINT06	-----	-----	*****
.	.	TSII01	-----	-----	5 3 1	-----	-----	*****
.	.	3 3 1	-----	-----	-----	-----	-----	*****
10.15.44		-----	-----	-----	TSII01	TINT06	TSIN03	*****
.	.	TBUR04	-----	-----	5 3 1	3 1 1	-----	*****
.	.	-----	TINT03	-----	3 3 1	TMATYY	-----	*****
.	.	3 3 1	4 1 1	TPHQ05	TMATBNMY	1 5 1	-----	*****
.	.	-----	-----	1 1 1	1 5 1	TBUR04	-----	*****
.	.	-----	-----	-----	-----	3 3 1	-----	*****
10.15.45		TINT06	-----	-----	TBUR04	-----	-----	*****
.	.	5 3 1	-----	-----	3 3 3	TBUR04	TINT03	*****

Figure 122. Region Histogram (Log) report

Region Jobname is not available until the X'07' termination record. When the Log Histogram Report is selected by Region Jobname, the first instance is shown by reporting schedule end with information from the X'07' record. This is shown in the following example where *.**,** appears in the Time column. Message class shows ??? as it is not available in the X'07' record.

IMS Performance Analyzer
REGION HISTOGRAM

Generate state show transfer termination shows PPI reg(hex), message size(byte) and Transfers processed(byte)															
Time	Ckpt	1													
HH.MM.SST															
9.58.05	QM081X11	*****	*****	*****	*****	-----	*****		*****	*****					-----
9.58.05	8 39 0	*****	*****	*****	*****	-----	*****		*****	*****	8 4 2				
9.58.05	-----	*****	*****	*****	*****	-----	*****		*****	*****	AP003X12	8 4 1			-----
9.58.05	-----	*****	*****	*****	*****	IQESAX14	*****		*****	*****		PL744X14			
9.58.05	-----	*****	*****	*****	*****	*****	*****		*****	*****		8 4 1			
9.58.05	EW406X14	*****	*****	*****	*****	*****	*****	8 4 1	*****	*****		WA174X14			
9.58.05	8 39 0	*****	*****	*****	*****	*****	*****	-----	*****	*****					-----
9.58.05	EW406X15	*****	*****	*****	*****	*****	*****	HW101Q1J	*****	*****					-----
9.58.05	*****	*****	*****	*****	*****	*****	*****	8 4 0	*****	*****					-----
..*				WA548Q15											
9.58.05		*****	*****	B??? 9	*****	8 26 1	*****	PL744X14	*****	*****	8 4 1				-----
9.58.05		*****	*****	-----	*****	-----	*****		*****	*****	WU109X12				-----
9.58.05		*****	*****	-----	*****	-----	*****		*****	*****	8 4 0				-----
9.58.05		*****	*****	-----	*****	-----	*****		*****	*****	WA419X15	8 4 1			-----
9.58.05		*****	*****	-----	*****	-----	*****	8 4 2	*****	*****		PL744X11			
9.58.05		*****	*****	-----	*****	-----	*****	QT052X12	*****	*****					
9.58.06		*****	*****	-----	*****	-----	*****	8 4 1	*****	*****					
9.58.06		*****	*****	-----	*****	-----	*****	QM325X14	*****	*****					
9.58.06		*****	*****	-----	*****	-----	*****	8 4 1	*****	*****					
9.58.06		*****	*****	-----	*****	-----	*****	WU109X1J	*****	*****					
9.58.06		*****	*****	-----	*****	-----	*****	8 4 0	*****	*****					
9.58.06		*****	*****	-----	*****	-----	*****	QM325X12	*****	*****	8 4 1				
9.58.06		*****	*****	-----	*****	-----	*****		*****	*****	WU105X12				
9.58.06		*****	*****	-----	*****	-----	*****		*****	*****	8 4 1				
9.58.06		*****	*****	-----	*****	-----	*****		*****	*****	JT001X14	8 4 4			
9.58.06		*****	*****	-----	*****	-----	*****		*****	*****		WU105X11			
9.58.06		*****	*****	-----	*****	-----	*****		*****	*****		8 4 0			
9.58.06		*****	*****	-----	*****	-----	*****		*****	*****	8 4 1	PL744X12			
9.58.06		*****	*****	-----	*****	-----	*****		*****	*****	WA552Q11	8 4 5			
9.58.06		*****	*****	-----	*****	-----	*****		*****	*****	8 4 1	PL744X12			
9.58.06		*****	*****	-----	*****	-----	*****		*****	*****	VM003X11	8 4 0			

Heading: The heading line of each page of the histogram contains the following:

 $1, 2, 3, \dots, nnnn$

IMS region number, up to a maximum of 13 regions.

Detail: For each time interval, the activity (or inactivity) of each region is presented. If multiple events for a region occur in the time interval, a detail line is printed for each event. Checkpoints are noted in the far right-hand column of the report.

Activity (or inactivity) in each region for each time interval is shown as follows:

Region inactive

A row of dashes (-----) is shown.

Schedule start

The transaction code of the transaction for which the region is scheduled is shown. Example:

DRC@TR04

Region active

Blank rows represent time intervals in which the region is active.

Schedule end

The number of messages enqueued at the time of schedule end (MPR schedule start) time is shown on the left; this value excludes primed messages and, therefore, may be zero. The number on the right is CPU time. If the average CPU time per transaction for the transactions processed during this schedule exceeds the value specified on the **CPU/Transaction Limit** option on the Region Histogram panel, an asterisk * is appended. Example:

2 3*

Deadlock event

A deadlocked pair of enqueue requests detected by IMS and recorded by the IMS monitor is indicated for each region involved by DDLCKW (requestor) or DDLCKL (loser).

If all activity is identical to previous time intervals, Same to next line is shown, as controlled by the **Duplicate Line Limit** option specified on the Region Histogram panel.

OSAM Sequential Buffering report

The OSAM Sequential Buffering report provides statistics on the usage of OSAM sequential buffers, by buffer pool and by PSB.

The report has three sections:

1. Sequential Buffering Summary for Region: A one-page summary of buffer pool status and activity.
2. SB Detail Statistics: A three-part report for each buffer pool.
3. OSAM SB Program Summary: A summary of activity by PSB.

Log records: This report is derived from IMS log record 09.

Uses

You should use the OSAM Sequential Buffering report to determine whether sequential buffering is providing a benefit to each application that uses it.

Report options

To specify the report options, select **OSAM Sequential Buffering** from the Resource Usage and Availability Reports in a Log Report Set. Sections 1 and 2 of the report are produced by selecting the Activity Log option. Section 3 of the report is produced by selecting the Program (PSB) Summary option.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output data set is controlled by specifying the Report Output DDname.

Records can be included in or excluded from the report based on Program (PSB) name, Database name, and IMS Subsystem ID.

Report content

The OSAM Sequential Buffering report has three sections: Activity Log Summary, Activity Log Detail, and Program Summary. From this report, you can determine if the application benefited from the use of sequential buffering (SB).

The contents of the sections 1 and 2 of the report are described in *IMS Version 12 System Utilities* (SC19-3023). Section 3 presents the information from Part A of section 2, formatted as one line per PSB.

The IMS Subsystem ID precedes each entry.

Start 04Jun2018 07.51.04.22	IMS Performance Analyzer	Page	1
<u>OSAM SB Activity Log</u>			
04Jun2018 07.51.04.22	Sequential Buffering Summary for Region		
IMS Id	IMSA		
Jobname	IMSREG01		
Pgm	IMSPGM01		
PSB	IMSPSB01		
SBONLINE Control card provided: Yes			
/STOP SB in effect: No			
DFSSBUX0 disallowed usage of SB: No			
DFSSBUX0 requested conditional SB activation: Yes			
At least one SB= keyword in PSB: Yes			
At least one SBPARM Control stmt for application: Yes			
DFS2352W Some SB Control Blocks could not be Getmained			
DFS2353W Some SB Buffers could not be Getmained			
DFS2354W MAXSB= limit exceeded			
DFS2355W Some buffers or blocks could not be page-fixed			
DFS2356W IOSB or ITASK Blocks could not be acquired			
Number of search requests issued by OSAM BH:			
Search	75,174		
Number of Read I/O:			
Random Read	56,947		
Sequential Read	7,254		
Number of blocks read:			
Total number of Blocks read	311,670		
Number of Blocks read at random	56,947	Pct of Total:	18.27
Number of Blocks read sequentially	254,723	Pct of Total:	81.72
Percent read per search request	85.40		
Number of Sequential I/O errors	2		

Figure 124. OSAM Sequential Buffering report: SB Summary for Region

The OSAM Sequential Buffering Summary report shows why sequential buffering was or was not used. It tells you whether:

- A SBONLINE control card was provided in DFSVSMxx (this applies only to IMS™ DC environments).
- A /STOP SB command was in effect when the application program started (this applies only to IMS DC environments).
- The SB Initialization Exit Routine (DFSSBUX0) disallowed use of SB. The SB Initialization Exit Routine (DFSSBUX0) requested conditional activation of SB by default.
- At least one SB= keyword was provided during PSBGEN.
- The //DFSCTL file contained at least one SBPARM control statement that applied to the application program. SBPARM control cards have been read. If the answer is Yes, the following statistics indicate what SBPARM keywords were used. This can be helpful in determining why sequential buffering was or was not used for the application program.
- At least one PSB= keyword was specified on an SBPARM control card and it matched the PSB used by the application. At least one DB= keyword was

specified on an SBPARM control card where the PSB matched or was not specified, and the database matched one used by the application.

- At least one PCB= keyword was specified on an SBPARM control card where the PSB and DB matched or were not specified, and the PCB name matched one used by the application.
- At least one DD= keyword was specified on an SBPARM control card where the PSB, DB, and PSB matched or were not specified, and the DD name matched one used by the application.
- Whether SBPARM control cards have been read. If the answer is "yes," the following statistics indicate what SBPARM keywords were used. This is helpful in determining why sequential buffering was or was not used for the application program.
- At least one PSB= keyword was specified on a SBPARM control card and it matched the PSB used by the application.

The report also shows:

Number of search requests issued by OSAM BH

How many times the OSAM buffer handler asked the SB buffer handler to search the SB buffer pools for a specific OSAM block. The value in this field is equal to the number of OSAM random read I/O operations that would have been issued without SB.

Number of Read I/O

The number of OSAM random and sequential read I/O operations it took to satisfy requests made by the application program. The sum of these two numbers is the total number of OSAM read I/O operations issued on behalf of the application. You can subtract this sum from the Number of search requests issued by OSAM BH field to calculate how many read I/O operations you saved by using SB.

Number of blocks read

How many OSAM data set blocks were read to satisfy requests from the application program. It shows you:

- The total number of blocks read
- The number and percentage of blocks read with a random read
- The number and percentage of blocks read with a sequential read

If the percentage of blocks read with a sequential read is high, SB probably helped reduce the elapsed time of the application program.

Percent read per search request

The number of read I/O operations issued by the SB buffer handler expressed as a percentage of the number of times the OSAM buffer handler asked the SB buffer handler to search for a block. A low percentage indicates that many of the search requests were satisfied without issuing an I/O operation. Therefore, a low number in this field shows that SB probably helped reduce the elapsed time of the application program.

Number of Sequential I/O errors

The number of sequential reads that resulted in I/O errors. When an I/O error is detected during a sequential read, IMS increments this field and marks the 10 SB buffers involved in the read as invalid. Then IMS issues a random read for the block that was requested by the OSAM buffer handler.

04Jun2018 07.51.04.23 *** SB Detail Statistics (Part A) ***

```

IMS Id      IMSA
Jobname     IMSREG01
Pgm         IMSPGM01
PSB         IMSPSB01
DB          IMSDBD01
PCB         IMSPCB01
DB-PCB Number      1
DSG-CB Number      1
DD           IMSDD01
DB-ORG        HDAM
DD-Type       *PSDATA

Number of Bufsets      12

COMPARE-OPTION is active

** Number of search requests issued by OSAM BH:
  Search                      134
** Number of Read I/O:
  Total                      252
  Random Read                127
  Synchronous Sequential Read    12
  Overlapped Sequential Read    113
** Number of Blocks read:
  Total                    1,627
  Random Read              127   Pct of Total:  7.80
  Synchronous Sequential Read    144   Pct of Total:  8.85
  Overlapped Sequential Read    1,356   Pct of Total: 83.34
** Average I/O Wait Times (millisec):
  Random Read                .44
  Synchronous Sequential Read    2.66
  Overlapped Sequential Read    .07

```

Figure 125. OSAM Sequential Buffering report: SB Detail Statistics (Part 1 of 3)

*** SB Detail Statistics: Reference Statistics (Part B) ***

```

** References in Buffer-Sets:
  Ratio                      .12
** References in Random SRAN CBs:
  Ratio                      .03
** Random SRAN CBs which have been converted:
  Number                      12
  Pct of stolen Random SRAN    3.23

***** Distribution of references in Buffer-Sets *****
Reference count  Nbr of occurrences  Pct of occurrences  Accumul. Pct
0                34                2.85              2.85
1                127               10.65             13.50
2                176               14.76             28.27
3                165               13.84             42.11
4                254               21.30             63.42
5                128               10.73             74.16
6                76                6.37             80.53
7                187               15.68             96.22
8                26                2.18             98.40
9                12                1.00             99.41
=> 10            7                 .58             100.00

***** Distribution of references in Random SRAN CBs *****
Reference count  Nbr of occurrences  Pct of occurrences  Accumul. Pct
0                2                 .53                .53
1                17               4.58               5.12
2                45              12.12              17.25

```

Figure 126. OSAM Sequential Buffering report: SB Detail Statistics (Part 2 of 3)

*** SB Detail Statistics: Internal Counters and Values (Part C) ***

```

** Deactivations:
    Number of SB-deactivation          5
    Number of Monitoring-deactivation   3

** Results of Evaluation of Sequentiality:
    Number of Positive Results         5
    Number of Negative Results         2

** Results of Evaluation of Activity Rate:
    Number of Positive Results         6
    Number of Negative Results         3

** Number of Random Read:
    During Sequential Buffering phases 125
    During "Monitoring-only" phases    1
    While not monitoring Reference Pattern 1

** Number Random Reads with Sequential Reference Pattern:
    Access to invalid buffers          2
    Access at Data Set end             1

** Number of Buffering positions:      45

** Internal SB-algorithm values:
    SDSGBPTR: Blocks per track         12
    SDSGNBRB: Blocks per Bufset        12
    SDSGSCST: Relative Seq I/O costs   3.54
    SDSGTUNE: Tune                     32
    SDSGSINB: Size of Neighborhood     32,756
    SDSGTHR1: Threshold Current+1       6
    SDSGTHR2: Threshold Overlap         5
    SDSGTHR3: Threshold Neighb         5
    SDSGTHRN: Threshold New Pos        8
    SDSGTHRO: Threshold New Pos+1      9

```

Figure 127. OSAM Sequential Buffering report: SB Detail Statistics (Part 3 of 3)

PSB Name	Search Requests	** Read Random	IO Counts Seq	** Total	***** Block Random	Read Pct	Counts Seq	***** Pct	Pct of Search	Read per Request	Sequential IO Errors
IMSPSB00	75,174	56,947	7,254	311,670	56,947	18.27	254,723	81.72	85.40		2
IMSPSB01	150,348	113,894	14,508	623,340	113,894	18.27	509,446	81.72	85.40		4
IMSPSB02	150,348	113,894	14,508	623,340	113,894	18.27	509,446	81.72	85.40		4

Figure 128. OSAM Sequential Buffering report: SB Program Summary

Deadlock report

The Deadlock report provides a comprehensive list of deadlock events, similar to DFSERA30. In addition the report summarizes deadlock activity.

The report shows at a glance:

- The frequency of each losing transaction/database combination
- The associated winning transaction/database combinations

The information provided is a useful aid for tuning applications and adjusting scheduling parameters to avoid this expensive overhead. Deadlocks involving DB2 are also reported.

Log records: This report is derived from the 67FF SNAP Trace log record that meet the following criteria:

- Terminated with Abend Code U0777
- DEADLOCK elements, including EXTERNAL deadlock elements

Uses

The Deadlock report is used to analyze IMS and DB2 deadlock events. The IMS Deadlock report includes detailed information on the resource and resource blockers for each deadlock and includes details such as number of resources, call type, and Lock name. DB2 (External) Deadlocks show deadlock information as recorded in the log record.

The IMS Deadlock List report can be used to analyze why the deadlocks occurred, including the resources and transactions involved. This information will assist the user in minimizing the number of deadlocks and improving the performance of their IMS systems. The deadlock entries in this report are listed in log record sequence.

The IMS Deadlock Summary report provides a summary of all IMS deadlocks showing details of Losing Programs (transactions requesting a resource and failing due to deadlock) and Winning Programs (transactions holding the resource and continuing after deadlock resolution) for each database. This report can be used to identify databases and transactions or jobs, that are most prone to deadlocks. It can be used in conjunction with the List report to identify and minimize the cause of deadlocks. The Summary report is sorted by Losing Program and shows the associated Winning Programs. It includes the Deadlock count for each Losing Program and the Wait count for each Winning Program.

Report options

To specify the report options, select the **Deadlock** report from the Resource Usage and Availability Reports in a Log Report Set.

You can request a List report or Summary report or both. The default is the **Summary** report.

Specify a **Report Interval** for the reduced data file after the Global (or Runtime) report interval is effected.

Specify the **Report Output DDname** to control the report output data set. The default is DEADLOCK, but you can separate the List and Summary report output by specifying a different DDname for each.

Selection Criteria are not applicable to this report.

Report content: IMS Deadlock List

The IMS Deadlock List report provides a list of deadlocks based on 67FF log records (U0777 pseudo abends). The report shows details of all resources implicated in the deadlock.

The List report is presented by lock name and begins with lock 1 of *n*, showing the database name being locked, the lock name length, and the Lock name itself. For example, the following report shows Lock name 0017280400030140 (Resource 02) Waiter as the Victim (or losing program). The lock 1 of 4 indicates that there were 4 resources with dependencies involved in the deadlock.

Familiarity and some understanding of DL/I locking terminology and data organizations is needed for a full understanding of the formatted deadlock information provided. See *IMS Administration Guide: Database Manager* for a description of locking.

Start 18Oct2006 11:41:33:70				IMS Performance Analyzer Deadlock List				Page	1
<hr/>									
Pseudo abend record		Abend No = U0777		Time	11:41:47:00	Date	18Oct2006	Recno = 0000000000EB6A0	
Deadlock Analysis Report - Lock Manager is IRLM									
.....									
Resource DMB-name Lock-len Lock-name ** Waiter for this resource is VICTIM **									
01 of 02 PX1A001		10	00389001814A01D70001 (RBA = 00389001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F1F0F9F4	F6F50013	9EAE0021	0001	*0005109465.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									
Resource DMB-name Lock-len Lock-name									
02 of 02 PX1A001		10	0038B001814A01D70001 (RBA = 0038B001, DMB# = 814A, DCB = 01, P-Lock)						
Key is root key of data base record associated with lock...									
000000		F0F0F0F5	F3F3F3F2	F1F70014	1D780004	0001	*0005333217.....*		
.....									

Figure 129. Deadlock report: IMS List

The following fields appear in the report:

Pseudo abend record

Exception Condition SNAP Trace record type.

Abend No

Abend code. Always U0777. The application program terminated abnormally because a potential resource was in the deadlock condition.

Time and Date

Log record time and date.

Recno Log record sequence number.

Deadlock Analysis Report

Beginning of Deadlock report.

Lock Manager is IRLM

The lock manager was IRLM (Internal Resource Lock Manager).

Lock Manager is PI

The lock manager was PI (Program Isolation).

Resource

The resource number and total number of resources involved in the deadlock.

DMB-name

Database name.

Lock-len

Lock name length.

Lock-name

Lock name, up to 35 characters. The lock name is composed of codes that provide information about the lock such as its Relative Block Address (RBA), whether the lock occurred in a Full Function (FF) or Fast Path (DEDB) database, and in the case of a DEDB, whether the lock occurred at the Control Interval (CI) level or at the segment level.

RBA= For a Full Function database, the RBA is displayed in bytes 1-4 of the lock name. For example, in lock name 00000924800501D7, the RBA= 924. Determining the RBA of a lock in a FP database is slightly more complex. The lock name of a FP database is broken down as shown in the following table:

Byte Position

	Lock Information
1	Lock ID
2-4	Relative Block Address
5-6	DMCB Number
7	Area Number
8	Fast Path ID=C6

For a Fast Path database, the first two digits (Byte 1) display the code X'80' if the lock occurred at the segment level. In this case, the next three bytes displayed indicate the 30 bit RBA. To obtain the true RBA, the value in this field is multiplied by 4.

If the lock occurred at the CI level, the first two digits indicate the code X'00'. In this case, the next three bytes displayed indicate the 24 bit RBA. To obtain the true RBA, the value in this field is multiplied by 256 (X'100'). In addition, for any lock that occurred in a FP database, the last two digits (Byte 8) of the lock name

display the code X'C6'. For example, the lock name 80000C02800101C6 occurred in a FP database at the segment level with an RBA of 00003008.

The translation of the remainder of the Lock-name field is dependent on the type of database base being locked, one format for Fast Path database requests and another for Full Function database requests, as follows.

Fast Path (8th byte of lockname=C6)

DMCB#=

DEDB Master Control Block number (5th & 6th bytes of Lockname).

AN= Area number (7th byte of Lockname).

Full Function

DMB#=

DMB (Data Management Block) number (5th & 6th bytes of Lockname).

DCB= DCB number (7th byte of Lockname).

Common to both Fast Path and Full Function databases

x-Lock or Local

x is replaced by the translation of the 8th byte of the Lockname, unless the byte contains X'40' (blank) in which case Local is printed. The value of x is the lock type, for example, X'C6' = F for Fast Path.

SSID= Subsystem ID used for local IRLM requests. This field is only displayed if the key length is 10 bytes.

Waiter for this resource is VICTIM

The waiter for this resource is the one that failed due to the deadlock.

In many cases, the lock is for a database record for which the root key is known. The next lines provide information about the root key for the database record being locked. The following are the possible report statements for the root key.

Key is Root Key of database record associated with Lock

This statement is the most common. It indicates that the key that follows is the root key for the database record involved in the lock. You see this report statement, for example, when a HIDAM or PHIDAM root is retrieved using the index. The key is known when the lock on the root is requested.

Key for resource is not available

This statement indicates that the key for the database record being locked is not available. You see this report statement, for example, when a GN call for an HDAM or PHDAM database causes DL/I to lock the next root anchor. When this lock request is one of the resources involved in the deadlock, it is not possible to print the key associated with the lock.

Locking prior Root for HIDAM Root INSERT, Key displayed is for next higher Root

This statement can occur when a root is inserted in HIDAM or PHIDAM and the root has twin forward and backward pointers. You see this report statement, for example, if the keys 10 and 12 are present and 11 is being inserted. The key displayed is key 12 but the lock is on key 10.

Locking on next HIDAM Root for GN call, Key displayed is for prior HIDAM Root

This statement can occur when using HIDAM or PHIDAM with twin

forward and backward pointing, and keys 10, 11, and 12 exist, and position is on key 10; a GN call requires a lock on 11. When the lock is required, the key is not known, so the key of the prior root is displayed.

Locking on HDAM Anchor, Key displayed is HDAM Key requested

This statement can occur when using HDAM or PHDAM. The item locked is the anchor. When the anchor is locked, the key that will be retrieved is not known but the key that is requested is known, and it is displayed.

The next section contains the record key. The key of record requesting lock (if available) is displayed in both Hex and Character formats, up to 256 bytes.

The lock waiter and blocker information is printed next. Each waiting and holding work unit is identified by IMSID, transaction or job name, PSB name, PST number, and region type. The WAITER listed is the work unit that the database key information pertains to.

There are some differences between the two lines of waiter and blocker information. The current PCB name, the DL/I call, and the lock request pertains only to the Waiter. This information is not available for the blocker of the lock.

IMS-name

IMS subsystem name requesting/holding the lock.

Tran/Job

Transaction or jobname requesting/holding the lock.

PSB-name

PSB name of the application requesting/holding the lock.

PCB-DBD

PCB name of the application requesting the lock.

PST# PST number of the transaction requesting/holding the lock.

RGN Region type of the transaction requesting/holding the lock:

MPP Message Processing Program
BMP Batch Message Processing Program
IFP IMS Fast Path Program
BAT Batch
DBT DB Control Thread
JBP Java Batch Program
??? Unknown region type

Call Database call that resulted in the lock request. The current DL/I call being processed is reported as one of the following:

GET DL/I call was GU, GHU, GN, GHN, GNP or GHNP (the captured information does not allow a breakdown of the specific GET call Function)
REPL Replace
ISRT DL/I call was ISRT or ASRT
DLET Delete
POS DL/I call was POS call on MSDB
COMIT
Commit
??? Unknown

Lock The lock request function identifies deadlocks caused by block level data sharing, by application programs accessing data in a different order, or

mixtures of both. For deadlock purposes, the lock request functions can be summarized by the following (see IMS macro DFSLR for full list):

GBID Get a block lock. Block level sharing only.

GZID Get a data-set-busy lock. Used only to serialize data set opens, closes, and extensions. Any involvement in a deadlock is probably an indication of an error in IMS code.

GXID Get a data-set-extend lock. Used to serialize the extending of a data set. Block level sharing only and probably a HISAM database.

GRID Get a lock on the root of a database record.

GQCM

Get a Q command code lock. This is an application-originated lock on specific data. The GQCM function applies to full function only (Fast Path does not obtain a new lock when the Q command code is issued).

GSEG Get a segment lock for a dependent segment. This is not used when IRLM is the lock manager.

GFPLL

Get a Fast Path lock.

Lockfunc

Provides specific Lock information.

Func= Lock function.

Mode=

Lock mode.

State= Lock state.

Flag= Lock flag.

State The level of the lock.

The States used to reflect the level of the lock are not the same for the two lock managers, the Internal Resource Lock Manager (IRLM) and the Program Isolation (PI) manager. PI supports four states, the IRLM supports eleven, though IMS uses only eight. Sometimes the lock states are referred to with names rather than numbers. The names used and compatibility descriptions of the four States are:

Name Compatibility Description

1. Read

The Lock can be held concurrently with one Update level blocker and multiple Read level blockers, or with multiple Read level and multiple Share level blockers.

2. Share

The Lock can be held concurrently with Read level and /or other Share level blockers.

3. Update

The Lock can be held concurrently with Read level.

4. Exclusive

The Lock is held exclusively.

For the IRLM, the state can have an attribute of private. The private attribute is only significant when using block level data sharing. The private attribute has no impact on granting locks to different threads of a single IMS. The private attribute indicates that the lock should be private (only granted) to this IMS.

Restriction: Any thread of another IMS sharing the data cannot be granted the lock.

The report can show any of the following messages:

Input did not start with the beginning of a data element.

Element starting address is assumed to be 0.

Start of this data element is probably on the prior Log data set.

These messages are displayed when a Deadlock record indicates that it is not the first element in the deadlock, but the first element was not received. The most likely cause of this problem is that the first element was probably written to the log data set prior to the one specified in the JCL. To resolve, concatenate the previous log data set with the data set specified, then rerun the report.

If a deadlock abend x'67FF' record does not contain deadlock abend information, the following message will be issued:

Deadlock information not available.

Report content: DB2 (External) Deadlock List

The DB2 (External) Deadlock List report prints data found in the 67FF Deadlock External log record. The data in this type of record is in message format and is reported as is.

```
Start 21May2014 10.53.33.77                IMS Performance Analyzer
                                           Deadlock List

Pseudo abend record          Abend No = U0777      Time 10:56:02:08 Date 21May2014   Recno = 0000000000000072

EXTERNAL SUBSYSTEM DB2P      DETECTED A DEADLOCK DURING NORMAL CALL
REGION TYPE   : IFP
REGION NUMBER : 0001
JOB NAME      : MKR#LKA
PSB NAME      : FUNPSB02
SMB NAME      :
RECOVERY TOKEN: C9D4C4F340404040000000001000000000
```

Figure 130. Deadlock report: DB2 (External) Deadlock List

The report contains the following information:

Pseudo abend record

Exception Condition SNAP Trace record type.

Abend No

Abend code. Always U0777. The application program terminated abnormally because a potential resource was in the deadlock condition.

Time and Date

Log record time and date.

Recno Log record sequence number.

All the remaining data is as provided in the DEADLOCK EXTERNAL record.

Note: The first eight characters of the Recovery Token field are translated back to printable characters and used as IMS Region ID in the DB2 Summary report.

Report content: IMS Deadlock Summary

The IMS Deadlock Summary report provides a summary of deadlocks by database. It provides a high level view of database deadlock activity which can be used to identify databases that may be impacting performance and require further analysis.

Start 21May2014 16.24.57.06					IMS Performance Analyzer					End 21May2014 16.30.22.96				
Deadlock Summary														
***** Losing Program *****					***** Winning Program *****									
DMB-name	IMS-name	Tran/Job	PSB-name	PCB--DBD	Deadlocks	DMB-name	IMS-name	Tran/Job	PSB-name	PCB--DBD	#	Waits		
DBD01P	IMD3	MKR#LK1A	FUNPSB01	DBD01P	1	DBD01P	IMD3	MKR#LK1B	FUNPSB01	DBD01P	1			
						DBD01P	IMD3	MKR#LK1C	FUNPSB01	DBD01P	1			
						DBD01P	IMD3	MKR#LK1D	FUNPSB01	DBD01P	1			
DBD01P	IMD3	MKR#LK1D	FUNPSB01	DBD01P	1	DBD01P	IMD3	MKR#LK1A	FUNPSB01	DBD01P	1			
						DBD01P	IMD3	MKR#LK1B	FUNPSB01	DBD01P	1			
						DBD01P	IMD3	MKR#LK1C	FUNPSB01	DBD01P	1			
Total number of Deadlocks =					2									

Figure 131. Deadlock report: IMS Deadlock Summary

The report contains the following information:

Losing Program

Program failing Lock request with U0777 deadlock error.

DMB-name

DMB name

IMS-name

IMS Subsystem ID

Tran/Job

Transaction or Job name

PSB-name

PSB name

PCB-DBD

PCB database name

Deadlocks

Total number of deadlocks for the losing program

Winning Program

Program holding resources implicated in deadlock.

DMB-name

DMB name

IMS-name

IMS Subsystem ID

Tran/Job

Transaction or Job name

PSB-name

PSB name

PCB-DBD

PCB database name

Waits

Total number of Waits by the winning program

Total number of Deadlocks =

Total number of deadlocks for all losing programs in the report.

Report content: DB2 (External) Summary

The DB2 (External) Deadlock Summary report provides a count of external deadlocks.

Start 21May2018 10.53.33.77		IMS Performance Analyzer		End 21May2018 11.06.00.50
		<u>DB2 Deadlock Summary</u>		
***** Losing Program *****				
Subsystem	IMS-name	SMB/Job	PSB-name	Deadlocks
-----	-----	-----	-----	-----
DB2P	IMD3	MKR#LKA	FUNPSB02	3
DB2P	IMD3	MKR#LKA7	FUNPSB02	5
Total number of Deadlocks =				8

Figure 132. Deadlock report: DB2 (External) Summary

The report contains the following information:

Losing Program

Program failing Lock request.

Subsystem

Name of the DB2 subsystem requesting the lock

IMS-name

IMS Subsystem

SMB/Job

SMB or Job name requesting the lock

Note: The SMB name takes precedence over the Job name and therefore the Job name is only used if the SMB name field is blank.

PSB-name

PSB name requesting the lock

Deadlocks

Total number of deadlocks for the losing program

Total number of Deadlocks =

Total number of DB2 deadlocks in the Summary report.

System Checkpoint report

The System Checkpoint report provides a detailed analysis of IMS internal checkpoint activity.

The report provides details of your IMS resources, including:

- Databases, with system definition information
- Transactions, with system definition information and basic usage indicators
- Terminals, with message statistics

The report also provides a summary of checkpoint activity, including:

- A breakdown of checkpoint records by type
- The frequency and overhead of internal checkpoint processing

Log records:

The reports are derived from the type 40 log records and are based on data in the last completed checkpoint in the log file. A complete checkpoint is one that starts with a 4001 record and ends with a 4098 record.

If IMS PA processes all checkpoint records in the log file but is unable to find a complete checkpoint and thereby produce a meaningful report, the following error message is printed:

No valid checkpoint records found in Log file

All checkpoint record subtypes are used to provide statistical data for the Summary report. For the detailed reports, only the following checkpoint record subtypes are used:

Subtype	Record blocks	Description	Report
4001	None	Begin Checkpoint	None
4003	CNT	Communication Name (Node) Table	LTERM, PTERM
4004	SMB	Scheduler Message Block	Transaction Definition
4005	CTB	Communication Terminal Block	LTERM, PTERM
4006	DDIR	DMB Directory Entry	Database Definition
4007	PDIR	PSB Directory Entry	Transaction Definition
4014	SPQB	Subpool Queue Block	LTERM, PTERM
4098	None	End Checkpoint	None

Report options

To specify the report options, select the **Checkpoint** report from the Resource Usage and Availability Reports in a Log Report Set.

A set of reports is created for each IMS Subsystem ID. You can request any of the following reports:

- Database Definitions.
- Transaction Definitions.
- Terminal, sorted by LTERM.
- Terminal, sorted by PTERM.
- Record Events.

Additionally, a **Record Summary** is always produced. See “Report content: Checkpoint Summary” on page 230 for an example of the report contents. This summary shows checkpoint statistics including checkpoint count, average duration and frequency, as well as statistics on all record subtypes contained in the reporting checkpoint. Record Summary is always produced if the log file contains at least one complete checkpoint. The Record Summary also prints details of the last checkpoint, unless Record Events is selected.

A report interval can be specified. This applies to the reduced data file after the Global (or Runtime) report interval is effected.

The report output is written to the data set specified by the Report Output DDname. The default is CHECKPT.

You can specify Selection Criteria to include or exclude from the report particular values for the following:

- Database
- Transaction Code
- LTERM
- VTAM Node

- Line/Terminal
- IMS Subsystem ID

Report content: Database Definitions

The Checkpoint Database Definitions report shows a list of databases and is produced from data in the DDIR blocks.

Start 21Jan2018 11.49.45.70				IMS Performance Analyzer Database Definitions – IMS1												End 21Jan2018 12.58.45.16				Page	1											
Database	R	I	S	O	Database	R	I	S	O	Database	R	I	S	O	Database	R	I	S	O	Database	R	I	S	O	Database	R	I	S	O			
ACMDIRIO	R	I	2	0	ACMDIRPO	R	I	1	0	ACMDIRX1	R	I	1	0	ACMTRNIO	I	3	0	ACMTRNPO	I	2	0	ACMTRNX1	R	I	2	0	ACMTRNX0	R	I	1	0
FUNDBXS0			1	0	FUNDBX20	I	2	0	FUNDBX30	I	1	0	FUNDBX31	R	2	0	FUNDBX32	R	1	0	FUNDBX40	I	3	0	FUNDBX39					2	0	
FUNDBX50	R	I	1	0	FUNDBX70	I	2	0	FUNDB0S0			3	0	FUNDB010			2	0	FUNDB020	I	2	0	FUNDB030	I	1	0	FUNDB031	I	2	0		
FUNDB040					FUNDB050	I	2	0	FUNDB060	I	2	0	FUNDB070			3	0	CRIBADDB			2	0	CRIBADDM			2	0	CRIBADDO	R		2	0
CRIBAF3B			2	0	CRIBAF3M	R	I	1	0	CRIBAF3X	R		2	0	CRIBAF31	R	1	0	CRIBAF33	R	3	0	CRIBAF4B	R		2	0	CRIBAF4C	I	3	0	

Figure 133. System Checkpoint report: Database Definitions

The report is produced by IMS Subsystem ID and contains the following information:

Database

Database name.

R Resident DMB.

I Index Database.

S Share Level (SHARELVL).

S can be one of the following values:

0 The database is not to be shared.

1 Sharing is at the database level.

2 Sharing is at the block level but only within the scope of a single IRLM and a single MVS.

3 Sharing is at the block level by multiple IMS subsystems on multiple IRLMs.

O Database is open.

Report content: Transaction Definitions

The Checkpoint Transaction Definitions report provides a list of transactions and is created from data contained in the SMB and PDIR blocks.

Start 21Jan2018 11.49.45.70				IMS Performance Analyzer										End 21Jan2018 12.58.45.16				Page 1	
Transaction Definitions - IMS1																			
S REG		--Priority--			--PROCLIM--		--SPA--		PAR		MAX		----Messages----						
TranCode	Program	T	TYP	Mode	CLS	NRM	LIM	LIMCT	Count	CPU	Size	TF	Limit	RGN	Enq	Deq	Len	Options	
ADDINV	DFSSAM04	1	MPP	MULT	1	2	4	2	65535	65535					0	0	0	RSP NR	
ADDPART	DFSSAM04	1	MPP	MULT	1	2	4	2	65535	65535					132	4032	4032	WFI INQ	
CLOSE	DFSSAM05	1	MPP	MULT	1	2	4	2	65535	65535								FPP FPX	
CMDBMP	CMDBMP	1	BMP	MULT	1	0	0	65535	65535	65535		65535		0				RMT DLO RES	

Figure 134. System Checkpoint report: Transaction Definitions

The report is produced by IMS Subsystem ID and contains the following information:

TranCode	Transaction Code.
Program	Program Name.
ST	Schedule Type: 1, 2, 3 or 4.
REG TYP	Region type: MPP or BMP.
Mode	Single or Multiple.
CLS	Message Class
Priority	
NRM	The normal priority.
LIM	The limit priority.
LIMCT	Limit count of transactions queued and waiting to be processed.
PROCLIM	
Count	Number of transactions that a program can process in a single scheduling.
CPU	Amount of CPU time allowable to process a single transaction.
SPA Size TF	Length of SPA (Scratch Pad Area).
PAR Limit	Parallel processing threshold value.
MAX RGN	Maximum number of MPP regions that can be concurrently scheduled to process this transaction code.
Messages	
Enq	Number of messages enqueued. This field has a limit of 32K and wraps around once the limit is reached. Therefore, it is not a valid counter. To be used as an indicator of activity only.
Deq	Number of messages dequeued. This field has a limit of 32K and wraps around once the limit is reached. Therefore, it is not a valid counter. To be used as an indicator of activity only.
Len	Average message length.
Options	
RSP	Response Mode
NR	Non-recoverable
WFI	Wait-For-Input
INQ	Inquiry Only
FPP	Fast Path Potential
FPX	Fast Path Exclusive
RMT	Remote
DLO	Dynamic Load Option PSB
RES	Resident PSB

Report content: Terminals

The Checkpoint Terminals report provides a list of terminals derived from data contained in the CNT, CTB and SPQB blocks.

You can request the report sorted by LTERM or by PTERM or both.

Start 21Jan2018 11.49.45.70				IMS Performance Analyzer								End 21Jan2018 12.58.45.16				Page	1
Sorted in LTERM Sequence – IMS1																	
LTERM	VTAMNODE /PTERM	-----Messages-----					LTERM	VTAMNODE /PTERM	-----Messages-----								
		Input	Outpt	Enq	Deq	Len			Input	Outpt	Enq	Deq	Len				
ACDV1A	ACDV1A			0	0	132	ACDV1B	ACDV1B	0	0	0	0	0				
ACDV18	ACDV18	34	34	534	534	232	ACDV19	ACDV19	0	0	0	0	0				
AC1P11	AC1P11	0	0	0	0	0	AC1P12	AC1P12	0	0	0	0	0				
AC1P31	AC1P31			0	0	0	ACDV1B	ACDV1B	0	0	0	0	0				
AC1P35	AC1P35	0	0	0	0	0	AC1P36	AC1P36	0	0	0	0	0				

Figure 135. System Checkpoint report: Terminals (sorted in LTERM sequence)

Start 21Jan2018 11.49.45.70						IMS Performance Analyzer						End 21Jan2018 12.58.45.16						Page	1				
														Sorted in PTERM Sequence – IMS1									
VTAMNODE		-----Messages-----					VTAMNODE		-----Messages-----														
/PTERM	LTERM	Input	Outpt	Enq	Deq	Len	/PTERM	LTERM	Input	Outpt	Enq	Deq	Len										
ACDV1A	ACDV1A			0	0	132	ACDV1B	ACDV1B	0	0	0	0	0										
ACDV18	ACDV18	34	34	534	534	232	ACDV19	ACDV19	0	0	0	0	0										
AC1P11	AC1P11	0	0	0	0	0	AC1P12	AC1P12	0	0	0	0	0										
AC1P31	AC1P31			0	0	0	ACDV1B	ACDV1B	0	0	0	0	0										
AC1P35	AC1P35	0	0	0	0	0	AC1P36	AC1P36	0	0	0	0	0										

Figure 136. System Checkpoint report: Terminals (sorted in PTERM sequence)

Each report is printed by IMS Subsystem ID and contains the following information:

LTERM

Logical terminal name.

VTAMNODE/PTERM

VTAM node/Physical terminal node name

Messages

Input Number of input messages. This field is contained in the CTB and is not applicable for ETO. This value has a limit of 32K and wraps around when the limit is reached. To be used as an indicator of activity only.

Outpt Number of output messages. This field is contained in the CTB and is not applicable for ETO. This value has a limit of 32K and wraps around when the limit is reached. To be used as an indicator of activity only.

Enq Number of messages enqueued. This field has a limit of 32K and wraps around once the limit is reached. Therefore, it is not a valid counter. To be used as an indicator of activity only.

Deq Number of messages dequeued. This field has a limit of 32K and wraps around once the limit is reached. Therefore, it is not a valid counter. To be used as an indicator of activity only.

Len Average message length.

Report content: Checkpoint Summary

The Checkpoint Summary report gives checkpoint statistics including checkpoint count, average duration and frequency, as well as statistics on all records subtypes contained in the reporting checkpoint.

The report is always produced (if the log file contains at least one complete checkpoint).

Start 21Jan2018 11.49.45.70	IMS Performance Analyzer Checkpoint Summary - IMS1	End 21Jan2018 12.58.45.16	Page 111
<hr/>			
Completed Checkpoints	=	7	
Average Checkpoint Duration	=	0.204	(hhhh.mm.ss.ths)
Average Checkpoint Frequency	=	11.29.713	(hhhh.mm.ss.ths)
CPL0G	=	46613	
<hr/>			
Checkpoint Start: 21Jan2018 12:58:45:16 End: 21Jan2018 12:58:45:41 Number : 117			
Subtype	Description	Count	Bytes %Total
01	Begin Checkpoint	1	1,504 0.24
03	CNT - Communication Name (Node) Table	2	6,064 0.49
04	SMB - Scheduler Message Block	173	685,128 42.09
05	CTB - Communication Terminal Block	1	3,488 0.24
06	DDIR - DMB Directory Entry	50	50,080 12.17
07	PDIR - PSB Directory Entry	82	83,720 19.95
08	CLB - Communication Line Block	1	192 0.24
0D	CCB - Conversational Control Block	1	1,376 0.24
0F	LCB - Link Control Block	1	176 0.24
10	CRB - Communication Restart Block	1	352 0.24
14	SPQB - Subpool Queue Block	16	60,636 3.89
21	VTCT - VTAM Terminal Control Block	8	30,796 1.95
22	Queue Anchor block (LU 6.2)	1	32 0.24
30	RRE - Residual Recovery Element	6	5,330 1.46
31	SIDX - Subsystem Index Entry	1	132 0.24
32	OTMA TPIPS/QABS	1	240 0.24
33	OTMA MTES/MCBS	1	248 0.24
80	Fast Path Begin Checkpoint	1	307 0.24
83	RCTE - Routing Code Table Entry	1	56 0.24
84	DMCB - DEDB Master Control Block	49	32,396 11.92
86	DMHR - Fast Path Buffer Header	3	13,176 0.73
87	ADSC - Area Data Set Control Block	8	7,696 1.95
89	Fast Path End Checkpoint	1	52 0.24
98	End Checkpoint	1	40 0.24
<hr/> TOTAL		411	983,217 100.00

Figure 137. System Checkpoint report: Summary

A Checkpoint Summary report is produced for each IMS Subsystem ID and contains the following information:

Completed Checkpoints

Number of completed Checkpoints found in the log file. A complete checkpoint is one that starts with a 4001 record and ends with a 4098 record.

Average Checkpoint Duration

The average elapsed time per checkpoint in the format *hhhh.mm.ss.ths*.

If there are insufficient completed checkpoints to allow a meaningful calculation, the following message is printed: Insufficient Checkpoints to calculate.

Average Checkpoint Frequency

The average time between Checkpoints, or how frequently Checkpoints are taken, in the format *hhhh.mm.ss.ths*.

If there are insufficient completed checkpoints to allow a meaningful calculation, the following message is printed: Insufficient Checkpoints to calculate.

CPLOG

Checkpoint frequency. The average number of log records written between checkpoints.

Checkpoint

Start: Checkpoint start date and time.
End: Checkpoint end date and time.
Number:
Checkpoint number.

Subtype

Checkpoint record subtype.

Description

Subtype description.

Count Total number of Checkpoint records of this subtype.

Bytes Total bytes of Checkpoint records of this subtype.

%Total
Percentage of records of this subtype over all Checkpoint records.

Total

Count Total number of records in the Checkpoint.
Bytes Total number of bytes of all records in the Checkpoint.
%Total
Should always be 100.00.

Report content: Checkpoint Duration distribution

The Checkpoint Duration distribution is optional. This graphical report is produced if a distribution (member in the distribution data set) is specified.

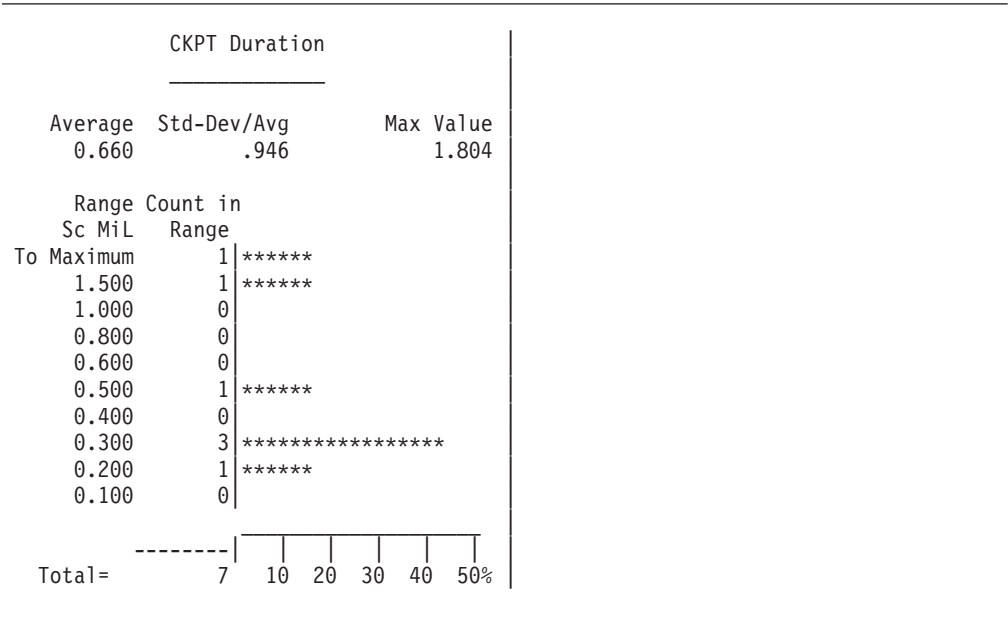


Figure 138. System Checkpoint report: Checkpoint Duration distribution

BMP Checkpoint report

The BMP Checkpoint report provides an analysis of BMP checkpoint frequency that can affect online performance and system restartability. The detailed List report provides a breakdown of individual BMP checkpoint activity. The Summary report provides an overview of each BMP program.

Log records: The report is derived from IMS log records 06, 07, 08, 18, 37, 40, 41, 47.

Uses

The reports can be used to measure BMP checkpoint frequency, highlighting the impact they have on IMS system restartability.

A known difficulty in the IMS programming world is determining an appropriate checkpoint frequency for batch programs. Business requirements often determine (limit) when checkpoints may be taken and these requirements often conflict with technical requirements. Checkpointing too frequently causes excessive resource consumption; checkpointing not frequently enough can cause resource conflicts; checkpointing at the wrong time can violate business requirements.

A hidden consequence of inappropriate checkpointing is the extension of the IMS Control Region restart time: the longer a BMP holds on to a resource, the longer IMS may have to process (roll-back and roll-forward) when performing an emergency restart. Usually, the first time that one becomes aware of this problem is when IMS is taking too long to restart after a crash. There is little you can do at that point but, because SLA conditions have probably been violated, a report on what caused the elongation and possible preventative measures will likely be requested.

You can run the IMS PA BMP Checkpoint reports after the event to determine which BMPs (if any) might have caused the elongated IMS restart. Or you can run the reports proactively (for example, each night) to identify potential problems.

Report options

To specify the report options, select the **BMP Checkpoint** report from the Resource Usage and Availability Reports in a Log Report Set.

You can request a List report, a Summary report, or both. The Summary report is the default.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is applied.

The report output is written to the data set specified by the Report Output DDname. The default is BMPCHKP.

You can specify Selection Criteria to include or exclude data from the report based on values for the following:

- Transaction Code
- Program (PSB) name
- IMS Subsystem ID

Report content: BMP Checkpoint List

The BMP Checkpoint List report provides a detailed list of all events that are relevant to BMP and IMS checkpoints. The data is presented in the order the log records are read from the IMS log.

IMS Performance Analyzer BMP Checkpoint Trace										Page	2
Time of Event	CD	Event	PST	IMID	Job Name	PSB Name	TranCode	OASN	COMN	----Time Since Last----	IMS CHKPs
										BMP CHKP	IMS CHKP
		41 CHKP	3	IMW1	IMW1BN1	FUNPP900		000C060C	00000F50		
06May 01.05.49.84	37	XRST	69	IMW1	IMW1BT1N	FUNPP040		001DB100	00000004	000.01.00.1	000.11.39.1
06May 01.05.49.84	07	BMP End	69	IMW1	IMW1BT1N	FUNPP040	FUNTXYZN	001DB100	00000004	000.00.00.0	000.11.39.1
06May 01.05.50.73	37	XRST	3	IMW1	IMW1BN1	FUNPP900		000C060C	00000F51	000.00.05.0	000.11.40.0
	41	CHKP	3	IMW1	IMW1BN1	FUNPP900		000C060C	00000F51		
06May 01.06.12.67	40	IMS CHKP		IMW1							
06May 01.06.12.67	47	Active BMP	42	IMW1	IMW1BT1H	FUNPP040	FUNTXYZH	001DB101	00000004	000.01.22.8	000.00.00.0
06May 01.06.12.67	47	Active BMP	3	IMW1	IMW1BN1	FUNPP900	FUNT0900	000C060C	00000F52	000.00.21.9	000.00.00.0
06May 01.06.21.21	40	IMS CHKP		IMW1							
06May 01.06.21.21	47	Active BMP	42	IMW1	IMW1BT1H	FUNPP040	FUNTXYZH	001DB101	00000004	000.01.31.4	000.00.00.0
06May 01.06.21.21	47	Active BMP	3	IMW1	IMW1BN1	FUNPP900	FUNT0900	000C060C	00000F52	000.00.30.5	000.00.00.0
06May 01.06.31.44	40	IMS CHKP		IMW1							
06May 01.06.31.44	47	Active BMP	42	IMW1	IMW1BT1H	FUNPP040	FUNTXYZH	001DB101	00000004	000.01.41.6	000.00.00.0
06May 01.06.31.44	47	Active BMP	3	IMW1	IMW1BN1	FUNPP900	FUNT0900	000C060C	00000F52	000.00.40.7	000.00.00.0
06May 01.06.45.77	37	XRST	3	IMW1	IMW1BN1	FUNPP900		000C060C	00000F52	000.00.55.0	000.00.14.3
	41	CHKP	3	IMW1	IMW1BN1	FUNPP900		000C060C	00000F52		
06May 01.06.49.95	37	XRST	42	IMW1	IMW1BT1H	FUNPP040	FUNTXYZH	001DB101	00000004	000.02.00.1	000.00.18.5
06May 01.06.49.95	07	BMP End	42	IMW1	IMW1BT1H	FUNPP040	FUNTXYZH	001DB101	00000004	000.00.00.0	000.00.18.5
06May 01.06.50.78	37	XRST	3	IMW1	IMW1BN1	FUNPP900		000C060C	00000F53	000.00.05.0	000.00.19.3
	41	CHKP	3	IMW1	IMW1BN1	FUNPP900		000C060C	00000F53		
06May 01.07.45.81	37	XRST	3	IMW1	IMW1BN1	FUNPP900		000C060C	00000F54	000.00.55.0	000.01.14.4
	41	CHKP	3	IMW1	IMW1BN1	FUNPP900		000C060C	00000F54		
06May 01.07.50.82	37	XRST	3	IMW1	IMW1BN1	FUNPP900		000C060C	00000F55	000.00.05.0	000.01.19.4
	41	CHKP	3	IMW1	IMW1BN1	FUNPP900		000C060C	00000F55		
06May 01.08.45.85	37	XRST	3	IMW1	IMW1BN1	FUNPP900		000C060C	00000F56	000.00.55.0	000.02.14.4
	41	CHKP	3	IMW1	IMW1BN1	FUNPP900		000C060C	00000F56		
06May 01.08.46.85	37	XRST	3	IMW1	IMW1BN1	FUNPP900		000C060C	00000F57	000.00.01.0	000.02.15.4
06May 01.08.46.87	07	BMP End	3	IMW1	IMW1BN1	FUNPP900	FUNT0900	000C060C	00000F57	000.00.00.0	000.02.15.4
06May 01.09.11.63	40	IMS CHKP		IMW1							
06May 01.09.22.41	06	IMS Stop		IMW1							
06May 02.36.20.53	06	IMS Start		IMW1							
06May 02.37.34.61	40	IMS CHKP		IMW1							
06May 02.37.38.71	08	BMP Start	5	IMW1		KZAECL		001DB13D	00000000		
06May 02.37.38.86	08	BMP Start	2	IMW1		XYZPB05H		001DB13E	00000000		
06May 02.37.39.07	08	BMP Start	4	IMW1		KZAECL		001DB13F	00000000		
06May 02.37.39.18	08	BMP Start	53	IMW1		XYZPB05N		001DB140	00000000		
06May 02.37.39.18	08	BMP Start	42	IMW1		KZAECL		001DB141	00000000		
06May 02.37.39.18	08	BMP Start	6	IMW1		KZAECL		001DB142	00000000		
06May 02.37.39.18	08	BMP Start	13	IMW1		KZAECL		001DB143	00000000		
06May 02.37.39.34	08	BMP Start	3	IMW1		KZRBASR		001DB144	00000000		
06May 02.37.39.45	08	BMP Start	69	IMW1		KZICB01		001DB145	00000000		
06May 02.37.40.12	07	BMP End	4	IMW1	JEXT91DA	KZAECL		001DB13F	00000000	000.00.01.1	000.00.05.5
06May 02.37.40.23	07	BMP End	5	IMW1	JEXT91DC	KZAECL		001DB13D	00000000	000.00.01.5	000.00.05.6
06May 02.37.40.28	07	BMP End	42	IMW1	JEXT91DS	KZAECL		001DB141	00000000	000.00.01.1	000.00.05.7
06May 02.37.40.33	07	BMP End	6	IMW1	JEXT91DT	KZAECL		001DB142	00000000	000.00.01.2	000.00.05.7
06May 02.37.40.39	07	BMP End	13	IMW1	JEXT91DM	KZAECL		001DB143	00000000	000.00.01.2	000.00.05.8
06May 02.37.40.42	07	BMP End	53	IMW1	JAYGX00N	XYZPB05N		001DB140	00000000	000.00.01.2	000.00.05.8
06May 02.37.40.54	07	BMP End	2	IMW1	JAYGX00H	XYZPB05H		001DB13E	00000000	000.00.01.7	000.00.05.9
06May 02.37.47.18	08	BMP Start	42	IMW1		KZAECL		001DB146	00000000		
06May 02.37.48.68	07	BMP End	42	IMW1	JEXT91DA	KZAECL		001DB146	00000000	000.00.01.5	000.00.14.1
06May 02.37.48.81	07	BMP End	69	IMW1	JEXT4AR9	KZICB01		001DB145	00000000	000.00.09.4	000.00.14.2
06May 02.37.48.84	18	CHKPX	3	IMD3		KZRSB1					
06May 02.37.48.84	37	XRST	3	IMW1	JEXTN1D9	KZRBASR		001DB144	00000000	000.00.09.5	000.00.14.2
	41	CHKP	3	IMW1	JEXTN1D9	KZRBASR		001DB144	00000000		
06May 02.37.49.88	07	BMP End	3	IMW1	JEXTN1D9	KZRBASR		001DB144	00000001	000.00.01.0	000.00.15.3
06May 02.39.03.65	08	BMP Start	3	IMW1		FUNPP910	FUNTP910	001DB192	00000000		
06May 02.39.03.86	37	XRST	3	IMW1	IMW1BN1	FUNPP910		001DB192	00000000	000.00.00.2	000.01.29.2
06May 02.39.03.86	07	BMP End	3	IMW1	IMW1BN1	FUNPP910	FUNTP910	001DB192	00000000	000.00.00.0	000.01.29.2

Figure 139. BMP Checkpoint report: List

The BMP Checkpoint List report contains the following information:

Time of Event

The Date/Time from the IMS log record when an event occurred.

CD The IMS log record code.

Event A description of the IMS log code. Possible values are:

- 06** IMS Start / IMS Stop.
- 07** BMP Stop.
- 08** BMP Start.
- 18** CHKPX; Extended checkpoint. Only the last record for an extended checkpoint is reported if relevant to a BMP that is being reported.
- 37** XRST; BMP extended restart. This record signals a transfer of message from temporary to permanent destination at sync point. Only records with bit QLXFFBMP set on in the field QLXFFLGS are reported.
- 40** IMS CHKP; IMS region checkpoint. Only records with subtype 4001 (checkpoint begin) are reported.
- 41** CHKP; BMP batch checkpoint.
- 47** Active BMP; Only reported if dependent PST lists are BMP regions.

PST The PST number associated with this event. If no PST is associated with the event, N/A is printed.

IMID The IMS subsystem ID.

Job Name

MVS job name for the region running the BMP.

PSB Name

The PSB used by the BMP. If the PSB Name is unknown it will appear as *UNKNOWN.

TranCode

The Transaction Code used by the BMP when referencing the IMS Message Queue. If the BMP does not reference the IMS Message Queue, this will be blank. If the Transaction Code is unknown it will appear as *UNKNOWN.

OASN

The Origin Application Sequence Number. This is a linearly increasing number representing the Schedule number. The OASN is reset after a Cold Start of the IMS Control Region.

COMN

The number of commits for this BMP.

Note: **Recovery Token** = IMID + OASN + COMN.

Time Since Last BMP CHKP

The difference in time between this trace entry and the previous BMP checkpoint. If the first BMP checkpoint has not occurred then this field will be blank.

Time Since Last IMS CHKP

The difference in time between this List entry and the previous IMS checkpoint. If there are no previous IMS checkpoints then the field will be blank.

IMS CHKPs

For log record type 07 and 37, the number of IMS checkpoints that have occurred since the last BMP checkpoint. For log record type 47, the number of IMS checkpoints since the time specified in the CAPUORTM field. A value greater than one could have resulted in an elongated emergency restart if one had been performed at this point.

Report content: BMP Checkpoint Summary

The BMP Checkpoint Summary report provides an overview of each BMP program.

IMS Performance Analyzer										Page	1
BMP Checkpoint Summary - IMM1											
PSB Name	TranCode	Count	Average Duration	--- SYNC Count ---		----- Between BMP Syncpoints -----		----- IMS CKPTs -----			
				Average	Total	---- Elapsed Time ----	Long	Average	Max		
FUNPP040	FUNTACM	1	000.01.00.6	2.00	2	000.00.30.3	000.00.00.0		N/C		
FUNPP040	FUNTEXTV	2	000.00.30.6	2.50	5	000.00.12.2	000.01.00.2		N/C		
FUNPP040	FUNTMSN	2	000.01.00.5	2.50	5	000.00.24.2	000.01.00.1	0.19		1	
FUNPP040	FUNTNCBH	1	000.01.00.6	3.00	3	000.00.20.2	000.01.00.2		N/C		
FUNPP040	FUNTNCB5	2	000.00.01.4	2.00	4	000.00.00.7	000.00.00.0		N/C		
FUNPP040	FUNTSOR1	1	000.01.00.8	3.00	3	000.00.20.3	000.01.00.2		N/C		
FUNPP040	FUNTXYZH	2	000.04.08.6	6.50	13	000.00.38.3	000.09.39.1	0.07		1	
FUNPP040	FUNTXYZN	3	000.02.25.5	5.00	15	000.00.29.1	000.01.01.0		N/C		
FUNPP900	FUNT0900	1	000.14.46.4	31.00	31	000.00.28.6	000.00.55.1	0.06		1	
FUNPP910	FUNTP910	1	000.00.00.2	2.00	2	000.00.00.1	000.00.00.0		N/C		
XYZPB05H		2	000.00.27.0	1.50	3	000.00.18.0	000.00.13.0		N/C		

Figure 140. BMP Checkpoint report: Summary

The BMP Checkpoint Summary report is keyed on IMSID, PSB Name and Transaction Code and contains the following information:

IMS ID

IMS Subsystem ID. There is a new report for each IMS ID, which appears in the title of the report.

PSB Name

The PSB used by the BMP. If the PSB name is not known it will be left blank.

TranCode

The Transaction Code used by the BMP when referencing the IMS Message Queue. If the BMP does not reference the IMS Message Queue, this will be blank. If the Transaction Code is not known it will appear as *UNKNOWN.

Count The number of BMPs that ran during the reporting interval. It is the sum of:

- The number of BMPs that finished (type 07 log record), plus
- The number of active BMPs at IMS shutdown time (type 06), plus
- The number of active BMPs at the end of the reporting period (end-of-file)

It cannot be calculated based on the presence of individual log records only.

After Count, the report is divided into two sections:

1. Checkpoint activity statistics for the BMP

This section provides details about the overhead of checkpointing, average

duration, total and average number of checkpoints, average and longest time between checkpoints. This information is used to determine whether checkpoints are occurring at the correct frequency or not. Too often may be an unnecessary overhead. Too few potentially holds resources that affect online performance.

Average Duration

The average elapsed time of each BMP.

SYNC Count Average

The average number of sync points issued by the BMP. This is a measure of the reported sync points, not the value in the last four bytes of the Recovery Token. It is possible for there to be a discrepancy between the reported sync points and the number in the Recovery Token. IMS increments the sync point number in the Recovery Token each time a program reaches a sync point. However, IMS does not necessarily write a Type 41 (Batch Checkpoint) record if the program has no recoverable items at the time of a CHKP call.

SYNC Count Total

The total number of sync points for each BMP.

Between BMP Syncpoints Elapsed Time Average

The average time between BMP sync points for this BMP.

Between BMP Syncpoints Elapsed Time Long

The maximum elapsed time between BMP sync points for this BMP.

2. Checkpoint activity for the BMP in relation to IMS system checkpoint activity

This section provides the average and maximum number of IMS system checkpoints between BMP checkpoints. This information is used solely to determine how long IMS emergency restarts may take. A high number of IMS system checkpoints between BMP checkpoints will cause /ERE to take longer because IMS needs 2 BMP checkpoints to successfully restart. Ideally there should be at most one IMS system checkpoint between BMP checkpoints, so that in the event of an /ERE, it can occur quickly.

Between BMP Syncpoints IMS CKPTs Average

The average number of IMS checkpoints between BMP sync points for this BMP. If this value is greater than one there is a possibility of an elongated IMS emergency restart. N/C appears in this column if the average IMS sync points between BMP checkpoints is unable to be calculated.

Between BMP Syncpoints IMS CKPTs Max

The maximum number of IMS checkpoints between BMP sync points for this BMP. A value greater than 1 could have resulted in an elongated emergency restart if one had been performed at this point.

Log Gap Analysis report

The Log Gap Analysis report contains information on periods of time where log records are not being cut, potentially highlighting an external system event that may have caused IMS to slow down.

Log records: This report is derived from all IMS log records.

Report options

To specify the report options, select **Gap Analysis** from the Resource Usage and Availability Reports in a Log Report Set.

The format of the report command is:

```
IMSPALOG      GAP([BYIMID|SYSPLEX|BOTH,]  
[THRESHOLD(s.thmiju),] default 5 seconds  
[DDNAME(ddname),] default GAPS  
[FROM(date,time),]  
[TO(date,time),]  
[INCL(IMSID(list))|EXCL(IMSID(list))])
```

Specify a **Report Interval** for the reduced data file after the Global (or Runtime) report interval is effected.

Specify the **Report Output DDname** to control the report output data set.

Report content

An example of the Gap Analysis report is shown in the following figure.

IMS Performance Analyzer						
Log Gap Analysis						
Data from:	9.04.28.92	05Jun2009				
ID	Time	System	Elapsed	File	LSN	Code
01	09.04.47.716609	IADE		LIADE001	0000000000000083	33
	09.04.56.281051	IADE	8.564442	LIADE001	0000000000000084	02
02	09.04.56.291027	IADE		LIADE001	0000000000000089	33
	09.05.08.992265	IADE	12.701238	LIADE001	000000000000008A	02
03	09.05.11.354434	IADE		LIADE001	0000000000000096	33
	09.05.35.180944	IADE	23.826510	LIADE001	0000000000000097	03
04	09.05.35.370333	IADE		LIADE001	00000000000000A0	33
	09.09.39.761229	IADE	244.390896	LIADE001	00000000000000A1	63
05	09.09.39.761229	IADE		LIADE001	00000000000000A1	63
	09.09.48.644573	IADE	8.883344	LIADE001	00000000000000A2	16
06	09.09.48.644573	IADE		LIADE001	00000000000000A2	16
	09.10.42.132034	IADE	53.487461	LIADE001	00000000000000A3	01
07	09.10.43.194142	IADE		LIADE001	00000000000000D2	09
	09.10.54.782350	IADE	11.588208	LIADE001	00000000000000D3	01
08	09.10.54.959352	IADE		LIADE001	00000000000000EF	09

Figure 141. Gap Analysis report

Cold Start Analysis report

The Cold Start Analysis report provides a point-in-time snapshot of in-train activity, answering questions such as these in the event of a cold start: What input messages (transactions) are lost? What are the incomplete units-of-work, and what database changes did they make?

An IMS cold start initializes the message queues, the dynamic log, and the restart data sets. The consequences of a cold start can be destructive:

1. All input and output messages on the IMS message queue are lost
2. If IMS terminated abnormally, incomplete transactions may have:
 - Full-function database changes that are not backed-out, leaving databases corrupted
 - External subsystem activity that is left in doubt

Log records: This report is derived from all IMS log records.

Report options

To specify the report options, select **Cold Start Analysis** from the Resource Usage and Availability Reports in a Log Report Set.

The format of the report command is:

```
IMSPALOG      COLDSTART(  
               [DDNAME(ddname),]          default COLDSTAR  
               [FROM(date,time),]  
               [TO(date,time),]  
               [UOW,]  
               [MSG,]  
               [AT(date,time),]  
               [DETAIL,]  
               [SUMMARY])
```

You can specify **UOW** to include all incomplete units of work with database update or ESAF activity. You can also specify **MSG** to include all messages enqueued but not dequeued. These options apply to the Detail report and are ignored by the Summary report.

The report is produced at the end of file or at a specified point in time.

Report content

An example of the Cold Start Analysis report is shown in the following figure.

IMS Performance Analyzer								
Cold Start Analysis								
Data at: 07Apr2014 12.00.05.00								
Recovery Token	Start LSN	Start time	Active Units of Work		Reg	Database	Block updates	ESAF
			Time in progress	Trancode				
IMSA/0002B97C0000F892	00000009606ECDDF	12.00.04.877622	0.122378	INV2410	MPP			DB2A
IMSA/0002BD8C00000370	00000009606ECE1F	12.00.04.899782	0.100218	PRT223	MPP			DB2A
IMSA/0002BD6F00002492	00000009606ECE86	12.00.04.925301	0.074699	ACC345	MPP			DB2A
IMSA/0002B9750000D0A1	00000009606ECF14	12.00.04.954346	0.045654	INV2410	MPP			DB2A
IMSA/0002B8AC0000DEFD	00000009606ECF20	12.00.04.958853	0.041147	INV2410	MPP			DB2A
IMSA/0002BD5200007D7F	00000009606ECF31	12.00.04.966937	0.033063	ACC345	MPP			DB2A
IMSA/0002BCAB0000CA46	00000009606ECF4D	12.00.04.974316	0.025684	PRT223	MPP			DB2A
IMSA/0002BD5B0000420A	00000009606ECF4F	12.00.04.974943	0.025057	ACC345	MPP			DB2A
IMSA/0002BD4D000058B9	00000009606ECF80	12.00.04.985851	0.014149	PRT223	MPP			DB2A
IMSA/0002BD44000056C9	00000009606ECF91	12.00.04.991138	0.008862	PRT223	MPP			DB2A
IMSA/0002BCE3000091ED	00000009606ECF9B	12.00.04.993454	0.006546	PRT223	MPP			DB2A
IMSA/0002BD170000532B	00000009606ECF9D	12.00.04.993488	0.006512	PRT223F	MPP			DB2A
IMSA/0002BD070000C85F	00000009606ECF9F	12.00.04.993522	0.006478	ACC345	MPP			DB2A
IMSA/0002BD16000082C0	00000009606ECFA1	12.00.04.993550	0.006450	PRT223F	MPP			DB2A
IMSA/0002BD8900000630	00000009606ECFAD	12.00.04.994949	0.005051	PRT223	MPP			DB2A
IMSA/0002BD23000079FA	00000009606ECFC0	12.00.04.996666	0.003334	PRT223F	MPP			DB2A
Active UOWs . .	16	Pending database updates . .	0					

Summary by Trancode					
Trancode	Input Queue Count	----- Active UOWs -----			
		UOW Count	Database Updates	Databases	External subsystems
INV2410	0	3	0		DB2A
PRT223	0	6	0		DB2A
PRT223F	0	3	0		DB2A
ACC345	0	4	0		DB2A

Summary by External Subsystem	
ESAF	Active UOW Count
DB2A	16

Figure 142. Cold Start Analysis report

Fast Path Transit reports

The Fast Path Transit reports contain detailed transit time and resource usage statistics for Fast Path transactions.

Understanding Fast Path Transit Time

IMS PA breaks down Fast Path transaction transit time into four intervals: input queue time, processing time, output queue time, output time.

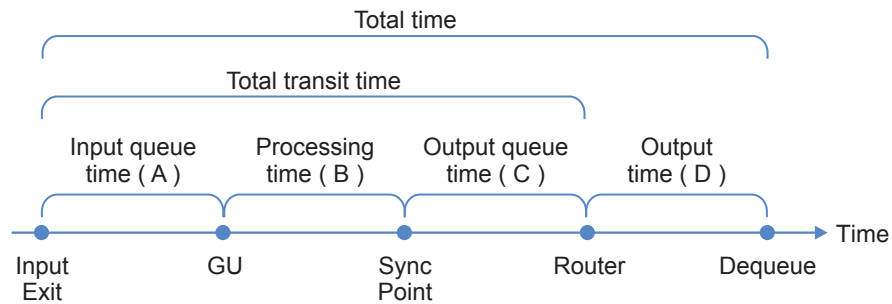


Figure 143. Transit Time intervals

- (A) Input queue time. The period from input exit to the Get Unique (GU) call of the application program. It includes:
 1. EMH/BALG queue time
 2. Shared EMH queue time
- (B) Processing time. The period from the Get Unique (GU) call of the application program to sync point.
- (C) Output queue time. The period from sync point to entry to the output router.

Also reported in the total time, but not as part of the total transit time:

- (D) Output time. The period from output router entry to dequeue time.

In summary, the sum of (A), (B), and (C) is total transit time; that is, the time from input exit to entry to the output router. The sum of (A), (B), (C), and (D) is total time; that is, the time from input exit to dequeue.

The maximum interval that can be recorded on the log records is 65.535 seconds. If any transit time exceeds this, then it will be displayed as 65.535 seconds (or 65535 milliseconds).

IMS PA reports these times for the average transaction and for a peak load situation, as defined by you. Your analysis of these components can indicate whether corrective action is appropriate for transit time problems. For example, long input queue times suggest that there are not enough IFP regions.

For IMS shared EMH queue, IMS PA produces composite transit time reports by merging the data from the log input of the multiple IMS subsystems in the sysplex. For efficient batch report processing, it is advisable to specify a global **Start** and **Stop** time period that intersects the log input from all the IMS subsystems in the sysplex. For further details, see "Specifying the time period for Transit reports" in the *IMS Performance Analyzer for z/OS: User's Guide*.

Timer Units:

The Fast Path 59 log records present elapsed queue times in timer units of 1.024 milliseconds. All IMS PA Fast Path Transit reports convert the timer units to actual milliseconds when reporting elapsed queue times, except for the Fast Path Transaction Exception report and extract, which give elapsed times in timer units.

The Fast Path Transaction Exception report and extract provide equivalent reporting and extract capability to DBFULTA0, which also reports elapsed times in timer units. Therefore, converting from DBFULTA0 to IMS PA ensures continuity of information in a standard format.

Uses of the Fast Path Transit reports

The Fast Path Transit reports are used for monitoring the performance of Fast Path transactions, gathering diagnostic information, and tuning IMS.

Monitoring the performance of Fast Path transactions:

On a daily basis, you will probably want to know whether anything happened in the system that significantly affected Fast Path transaction response time. You'd like to determine this at a quick glance, rather than having to study pages of tabulated listings. The Fast Path Transit reports are designed for this purpose.

You'll probably want to look at the Fast Path Transit Analysis report by Transaction Code or by Time. Each of these reports is normally no longer than five to ten pages. The Fast Path Transit Analysis by Time shows any spikes in transit time and whether the overall pattern differs from the normal pattern. If there is a spike or deviation, then you may be directed to the Fast Path Transit Analysis by Transaction Code (or Routing Code), which may highlight a particular transaction code that is performing badly. You may then want to rerun IMS PA to produce other reports for the spike periods, to get more detailed perspectives or different views of the data. For example, the Fast Path Transit Log produces a chronological log of individual transactions and their response times. Also, the Fast Path Transaction Exception Log produces a more comprehensive log of individual transactions with their response times and resource usage. This Exception Log can be filtered to show only poor performing transactions, by setting expectation criteria for transit times, DL/I calls and DB waits, and so on.

Here are some examples of how this process might occur:

Example 1: Suppose a transaction stays in a region for an unusually long time. The Fast Path Transit Analysis by Time report shows a spike for the time period in which the transaction is completed, and the spike indicates lengthy processing time.

Further, the input queue transit time may be lengthening, because transactions are waiting for a region to become free. By looking at the Fast Path Transit Analysis by Transaction Code report, you should be able to identify the problem transaction.

You can request the Fast Path Transit Log or Fast Path Transaction Exception Log to determine which occurrences of the problem transaction caused the problem. Perhaps you will find that the problems all occurred for the same userid.

If necessary, you can consult more detailed IMS PA reports to help determine the cause of the problem. For example, the DEDB Update Activity report shows update activity on the databases used by the problem transaction. The DEDB Update Trace report shows all DEDB activity for each transaction. The IFP Region Occupancy report shows which IFP regions are processing the transactions most efficiently.

Example 2: If the Fast Path Transit Analysis by Time indicates only long input queue times, and not abnormally long processing times, then this could mean that your system is overloaded or that too few regions are available. The IFP Region Occupancy report should help you analyze this symptom.

Tuning IMS and gathering diagnostic information:

The other way in which IMS PA Fast Path Transit reports are used is as a source of system tuning and diagnostic information. The reports help you determine whether a transaction code, userid, or a certain time of day contributes to poor transit time. The activity reports help you specifically identify problem areas.

Fast Path Transit Analysis report

The Fast Path Transit Analysis report can show response time performance by transaction code, routing code, userid, and time of sync point. For multi-subsystem log input, IMS PA assumes a sysplex environment with shared EMH queues and produces composite reports interrelating the data from the multiple subsystems.

Each of the reports that can be produced is designed to give a system analyst insight into a different facet of response tuning:

- The transaction code and routing code reports show areas in application design and region availability that may require attention.
- The userid report shows whether the distribution of service among system users is adequate.
- The time of sync point report notes performance problems caused by momentary surges of transaction input. The display of transit time by time period is useful in isolating time periods of high response.

The reports are structured so that for a system with good performance, a daily glance at the reports is all that is needed; more detailed scrutiny can be done if a problem is noticed.

Log records: This report is derived from IMS log records 5901, 5903, 5911, 5916, 5936, 5937, 5938.

Report options

To specify the report options, select the Fast Path Transit **Analysis** report in a Log Report Set.

Several reporting sequences are available for this report. It can be ordered by:

- Transaction Code
- Routing Code
- Userid
- Time of sync point

Specific values can be included in or excluded from the report by specifying Object Lists for one or more of the following:

- Transaction Code
- Routing Code
- Userid

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output is written to the data set specified by the Report Output DDname.

From the Fast Path (EMH) Transit Options panel, the following options can be specified:

- The percentile transit time
- The time increments
- Whether the time intervals begin with the first value encountered, or are adjusted to align on the hour

Report content

This figure shows examples of the Fast Path Transit Analysis reports for both local and global (shared EMHQ) transaction processing.

Several report formats are available, ordered by:

- Transaction Code
- Routing Code
- User ID
- Time of sync point

IMS Performance Analyzer														
Fast Path (EMH) Transit Time Analysis by Transaction Code														
From 15Apr2018 19.00.43.88			To 15Apr2018 20.02.58.95			Elapsed= 1 Hrs 2 Mins 15.076.307 Secs								
Transact Code	Routing Code	Resp Count	Min Tran Time	--Average Transit Time--			--90% Peak Transit Time--			Max Tran Time	Global Count	--- Shared EMHQ Time ---		
				Input Queue	Pgm Exec Queue	Outpt Queue Total	Input Queue	Pgm Exec Queue	Outpt Queue Total			Average Input	90% Peak Outpt	Input Outpt
INQUIRY	INQUIRY	1438	112	61	264	40 365	162	430	96 576	1200	1438	15	8	55 45
ORDER	ORDER	8619	35	270	48 41	359	727	81 94	816 1800	1800	8619	158	6	529 30
PARTS	PARTS	3618	40	53	62 36	151	119	140 88	271 1103	1103	3618	16	7	59 34
STOCK	STOCK	156	466	46	2661	41 2749	92	3735	113 3823	5971	156	9	4	27 18
System Totals		21839	30	189	104	39 332	576	488	93 856	5971	13839	104	6	411 33

Fast Path (EMH) Transit Time Analysis by Routing Code														
From 15Apr2018 19.00.43.88			To 15Apr2018 20.02.58.95			Elapsed= 1 Hrs 2 Mins 15.076.307 Secs								
Routing Code	Transact Code	Resp Count	Min Tran Time	--Average Transit Time--			--90% Peak Transit Time--			Max Tran Time	Global Count	--- Shared EMHQ Time ---		
				Input Queue	Pgm Exec Queue	Outpt Queue Total	Input Queue	Pgm Exec Queue	Outpt Queue Total			Average Input	90% Peak Outpt	Input Outpt
INQUIRY	INQUIRY	1438	112	61	264	40 365	162	430	96 576	1200	1438	15	8	55 45
ORDER	ORDER	8619	35	270	48 41	359	727	81 94	816 1800	1800	8619	158	6	529 30
PARTS	PARTS	3618	40	53	62 36	151	119	140 88	271 1103	1103	3618	16	7	59 34
STOCK	STOCK	156	466	46	2661	41 2749	92	3735	113 3823	5971	156	9	4	27 18
System Totals		21839	30	189	104	39 332	576	488	93 856	5971	13839	104	6	411 33

Fast Path (EMH) Transit Time Analysis by Userid														
From 15Apr2018 19.00.43.88			To 15Apr2018 20.02.58.95			Elapsed= 1 Hrs 2 Mins 15.076.307 Secs								
User ID	Transact Code	Resp Count	Min Tran Time	--Average Transit Time--			--90% Peak Transit Time--			Max Tran Time	Global Count	--- Shared EMHQ Time ---		
				Input Queue	Pgm Exec Queue	Outpt Queue Total	Input Queue	Pgm Exec Queue	Outpt Queue Total			Average Input	90% Peak Outpt	Input Outpt
JANE	INQUIRY	1	620	131	452	37 620	131	452	37 620	620	1	131	22	131 22
	ORDER	2	170	131	69 52	251	217	121 62	399 333	333	2	91	5	105 5
	PARTS	1	118	37	26 55	118	37	26 55	118 118	118	1	37	13	37 13
JANE	*Total*	4	118	107	154 49	310	185	411 61	599 620	620	4	87	11	137 21
JIM	INQUIRY	1	671	49	587 35	671	49	587 35	671 671	671	1	14	10	14 10
	ORDER	4	70	296	36 53	384	695	49 76	808 736	736	4	291	6	685 6
	PARTS	3	123	129	116 73	318	327	255 120	617 577	577	3	112	16	324 44
JIM	*Total*	8	70	202	135 58	395	514	386 92	748 736	736	8	189	10	506 26
System Totals		21839	30	189	104	39 332	576	488	93 856	5971	13839	104	6	411 33

Fast Path (EMH) Transit Time Analysis by Time														
From 15Apr2018 19.00.43.88			To 15Apr2018 20.02.58.95			Elapsed= 1 Hrs 2 Mins 15.076.307 Secs								
Start of Time Interval	Transact Code	Resp Count	Min Tran Time	--Average Transit Time--			--90% Peak Transit Time--			Max Tran Time	Global Count	--- Shared EMHQ Time ---		
				Input Queue	Pgm Exec Queue	Outpt Queue Total	Input Queue	Pgm Exec Queue	Outpt Queue Total			Average Input	90% Peak Outpt	Input Outpt
19:00:00	INQUIRY	236	34	60	248 77	385	142	390 156	551 794	794	236	24	16	56 73
	ORDER	1337	62	217	51 71	339	415	115 146	562 1199	1199	1337	175	14	367 63
	PARTS	522	58	76	77 63	216	168	173 136	367 1103	1103	522	38	16	78 66
	STOCK	20	1445	60	2627 123	2810	103	3571 230	3762 4139	4139	20	17	5	27 11
19:00:00	*Total*	2115	34	163	104 70	337	352	452 146	724 4139	4139	2115	123	15	300 65
19:30:00	INQUIRY	957	26	39	228 30	296	78	343 68	419 817	817	957	6	4	16 14
	ORDER	5438	43	92	46 30	168	187	66 67	265 514	514	5438	35	4	108 14
	PARTS	2261	34	40	53 27	120	80	99 63	184 518	518	2261	7	4	18 13
	STOCK	97	430	39	2781 25	2845	77	3830 61	3900 4512	4512	97	6	4	21 17
19:30:00	*Total*	8753	26	72	98 29	199	157	488 66	591 4512	4512	8753	24	4	85 14
System Totals		21839	30	189	104	39 332	576	488	93 856	5971	13839	104	6	411 33

Figure 144. FP Transit Analysis report

The first two columns in the report are ordering columns according to your selection. For example:

- If you select Transaction Code as the ordering operand, the first two column headers are **Transact Code** and **Routing Code**. Each Routing Code within the transaction identifies it as being associated with the transaction code. Usually, there is a one to one correspondence between Transaction Code and Routing Code, and in this case, only one report line per transaction is written. When

Transaction Codes are associated with more than one Routing Code, multiple report lines per transaction are written, one for each Routing Code. In this case, a ***TOTAL*** report line signifies the accumulated total of all Routing Codes for this Transaction Code.

- If you select Userid as the ordering operand, the first two column headers are **Userid** and **Transact Code**. For each userid, a report line is written for every transaction code processed on behalf of the user. Usually, each userid will have used more than one transaction code, and in this case, multiple report lines per userid are written, one for each Transaction Code. A ***TOTAL*** report line signifies the accumulated total of all transaction codes for this userid.
- If you select Time Interval, the first two column headers are **Start of Time Interval** and **Transaction Code**. Each transaction code that was processed during the time interval is reported. A ***TOTAL*** report line signifies the accumulated total of all transaction codes processed during the interval.

The report heading contains the reporting period. **From** specifies the date and time of the first transaction to be processed, and **To** specifies the date and time of the last transaction to be processed. **Elapsed** is the reporting period elapsed time, the time between the first and last transactions that were processed.

The following fields appear in the report after the two ordering fields:

Resp Count

Number of transactions completed during the time period being examined.

Min Tran Time

The shortest total transit time, in milliseconds, for a single transaction.

Average Transit Time

The average (mean) transit time, in milliseconds, required to process each transaction. These transit times are broken down into their component parts:

- Input queue time
- Program execution time
- Output queue time
- Total time

***nnn%* Peak Transit Time**

A statistical estimate, based on a normal distribution, that *nnn%* (between 50% and 100% as specified by you) of all transactions had transit times less than the time shown. For example, it is estimated that *nnn%* of transactions completed within the total transit time shown. Times are in milliseconds. The estimated transit times are broken down into their component parts:

- Input queue time, which includes time on the shared EMHQ
- Program execution time
- Output queue time
- Total time

The total time is a statistical estimate itself, rather than the sum of the component estimates.

The peak values are a statistical estimate only, so care should be taken when interpreting the values if the transaction volume is low.

Max Tran Time

The longest total transit time, in milliseconds, for a single transaction.

Global Count

The number of transactions that were processed globally (shared EMHQ) during the time period being examined.

Average Shared EMHQ Time

The average (mean) elapsed time, in milliseconds, that the transaction's Input and Output message spent on the global SEMHQ.

***nnn%* Peak Shared EMHQ Time**

A statistical estimate, based on a normal distribution, that *nnn%* (between 50% and 100% as specified by you) of all transactions had global SEMHQ Input and Output queue times less than the time shown. Times are in milliseconds.

The peak values are a statistical estimate only, so care should be taken when interpreting the values if the transaction volume is low.

Fast Path Transit Log report

The Fast Path Transit Log is a chronological listing of all IFP transactions processed during the reporting interval. This report can help you diagnose problem areas. It shows transit activity and DL/I call details of each IFP transaction.

For multi-subsystem log input, IMS PA assumes global (shared EMHQ) processing, and produces a composite report by merging log data from all subsystems in the sysplex.

Log records: This report is derived from IMS log records 5901, 5903, 5911, 5916, 5936, 5937, 5938.

Report options

To specify the report options, select the Fast Path Transit **Log** report in a Log Report Set.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output is written to the data set specified by the Report Output DDname.

Specific transaction codes can be included in or excluded from the report by specifying an Object List.

Report content

This figure shows an example of the Fast Path Transit Log applicable to both local and global (shared EMHQ) transaction processing.

IMS Performance Analyzer Fast Path (EMH) Transaction Transit Log														Page	1
Log 30Jul2018 15:49:42:15															
Sync Point Time	Transact Code	Routing Code	Logical Terminal	User ID	---Proc-- IMID PST	-DB Call- DEDB MSDB	----- In-Q	Transit Time Proc Out-Q	----- Total	Output Time	Total Time	-SEMHQ Input	Time- Outpt		
15:49:42.15	DFSIVP4	*IFP			IADE 1	0 0	0	0 0	0	0	0				
16:19:56.39	IVTFD	IVTFD	FUNTRM12	FUNTRM12	IADE 1	1 0	0	420 268	688	6	694				
16:20:01.06	IVTFD	IVTFD	FUNTRM12	FUNTRM12	IADE 1	1 0	0	17 104	122	7	129				
16:20:04.94	IVTFD	IVTFD	FUNTRM12	FUNTRM12	IADE 1	1 0	0	10 237	247	7	254				
16:20:16.90	IVTFD	IVTFD	FUNTRM12	FUNTRM12	IADE 1	1 0	0	29 325	353	7	360				
16:20:20.04	IVTFD	IVTFD	FUNTRM12	FUNTRM12	IADE 1	1 0	0	1 196	197	7	204				
16:20:24.58	IVTFD	IVTFD	FUNTRM12	FUNTRM12	IADE 1	1 0	0	344 142	486	7	494				
16:20:28.59	IVTFD	IVTFD	FUNTRM12	FUNTRM12	IADE 1	1 0	0	10 138	148	8	157				
16:20:34.40	IVTFD	IVTFD	FUNTRM12	FUNTRM12	IADE 1	1 0	0	1 389	390	7	397				
16:20:38.37	IVTFD	IVTFD	FUNTRM12	FUNTRM12	IADE 1	1 0	0	2 135	137	8	145				
16:20:51.60	IVTFD	IVTFD	FUNTRM12	FUNTRM12	IADE 1	1 0	0	1 181	182	8	190				
9:38:04.77	IVTFD	IVTFD	FUNTRM65	DVP	IADE 1	1 0	0	10 347	357	6	364				
9:38:09.30	IVTFD	IVTFD	FUNTRM65	DVP	IADE 1	1 0	1	13 301	315	7	323				
9:38:14.23	IVTFD	IVTFD	FUNTRM65	DVP	IADE 1	1 0	0	14 118	132	6	138				
9:38:19.43	IVTFD	IVTFD	FUNTRM65	DVP	IADE 1	1 0	0	1 188	189	6	196				
9:38:27.60	IVTFD	IVTFD	FUNTRM65	DVP	IADE 1	1 0	0	1 292	293	6	299				
9:38:32.13	IVTFD	IVTFD	FUNTRM65	DVP	IADE 1	1 0	0	28 254	282	6	288				
9:38:37.59	IVTFD	IVTFD	FUNTRM65	DVP	IADE 1	1 0	0	13 313	327	7	334				
9:38:50.82	IVTFD	IVTFD	FUNTRM65	DVP	IADE 1	1 0	0	1 360	361	6	368				
9:38:54.07	IVTFD	IVTFD	FUNTRM65	DVP	IADE 1	1 0	0	1 358	359	7	367				
9:38:59.99	IVTFD	IVTFD	FUNTRM65	DVP	IADE 1	1 0	0	19 252	271	7	279				
9:39:12.80	IVTFD	IVTFD	FUNTRM65	DVP	IADE 1	1 0	1	1 164	166	7	173				
9:39:22.76	IVTFD	IVTFD	FUNTRM65	DVP	IADE 1	1 0	0	16 226	243	6	249				
9:39:26.00	IVTFD	IVTFD	FUNTRM65	DVP	IADE 1	1 0	0	1 233	234	7	242				
9:39:35.10	IVTFD	IVTFD	FUNTRM65	DVP	IADE 1	2 0	0	1 156	157	7	164				
11:03:54.70	IVTFD	IVTFD	3101	CEX002	IADE 1	1 0	0	77 0	77	0	77				
11:03:54.79	IVTFD	IVTFD	3101	CEX002	IADE 1	1 0	0	19 0	19	0	19				
11:03:54.90	IVTFD	IVTFD	3101	CEX002	IADE 1	1 0	0	13 0	13	0	13				
:															

Figure 145. FP Transit Log report

The report heading contains the start of the reporting period. **Log** specifies the date and time of the first transaction to be processed.

The following fields appear in the report:

Sync Point Time

Time of day of the transaction sync point.

Transact Code

The transaction code that was processed.

Routing Code

The Routing Code of the IFP transaction, or

- *IFP for an IFP transaction that failed synchronization, or
- Region type for a non-IFP transaction, which can be:
 - *MPP MPP region
 - APPLID DBCTL, when the CICS system name is available
 - *DBC DBCTL, when the CICS system name is not available
 - Jobname
 - BMP, when the jobname is available
 - *BMP BMP, when the jobname is not available

Logical Terminal

The logical terminal (LTERM) at which the transaction is entered.

User ID

The userid associated with the transaction.

Proc The IMS subsystem that processed the transaction, broken down into:

IMID The IMS subsystem where the transaction was processed
PST The dependent region PST ID that processed the transaction

DB Call

The number of DL/I calls issued by the transaction, broken down into:

DEDB DL/I calls to DEDB databases

MSDB

DL/I calls to MSDB databases

Transit Time

The transit time, in milliseconds, required to process the transaction. These transit times are broken down into their component parts:

In-Q Input queue time

Proc Program execution time

Out-Q Output queue time

Total Total time

Output Time

The elapsed time, in milliseconds, that the output message took to be sent to the terminal.

Total Time

The transaction response time, in milliseconds, and is a sum of the total transit time and the output time.

SEMHQ Time

The elapsed time, in milliseconds, that the transaction spent on the shared EMH queue. These transit times are broken down into their component parts:

Input Input queue time

Outpt Output queue time

Fast Path Transit Extract by Interval

The Fast Path Transit Extract by Interval provides a facility to extract Fast Path transaction transit time by time interval data to a file for later processing by IMS PA to produce graphs, or to export for use by external programs or for downloading to a PC.

Log records: This extract is derived from IMS log records 5901, 5903, 5911, 5916, 5936, 5937, 5938.

Extract options

To specify the extract options, select the Fast Path Transit **Extract by Interval** in the Log Report Set.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output is written to the data set specified by the Report Output DDname.

Select whether to accumulate data by time interval for individual transactions or for all transactions.

Specify the output data set which is to store the extract data. Optionally, specify an input data set containing previous extracts which are to be merged with the current extract.

Specific transaction codes can be included in or excluded from the extract by specifying an Object List.

The options on the Fast Path (EMH) Transit Options panel applicable to the extract are:

- Time interval
- Whether the time increments begin with the first value encountered, or are adjusted to align on the hour. Aligning to an even hour is recommended when merging extract files, so that start times are aligned and evenly spaced.

Extract by Interval file content

The format of the Fast Path Transit Extract by Interval file is a proprietary format, the same as that produced by the Transaction Transit (MSQ) Extract by Interval.

See Figure 12 on page 65.

IMS PA provides facilities to filter and convert the extract data to an export file for use by external programs or to download to PC. Table 3 on page 67 shows the record format of the export file and Figure 13 on page 67 shows an example of the contents.

The following figure shows an example of a report which provides a summary of the extract processing. The **Start** date and time is that of the start of the first interval on the extract file. The **End** date and time is that of the start of the last interval on the extract file.

```
                    IMS Performance Analyzer
Fast Path (EMH) Transaction Transit Extract by Time Interval

Extract data set . . IMSPA.FP.EXTRACT
Start . . . . . 12Jan2018 19:00:00
End . . . . . 12Jan2018 20:00:00
Record count . . . . 1356
Time interval . . . . 15 minutes
Time interval is aligned to even hour
Extract contains Trancode data
Extract contains Interval totals
```

Figure 146. FP Transit Extract by Interval: Summary report

Fast Path Transaction Exception report and extract

The Fast Path Transaction Exception reports provide detailed and summary information about IFP transactions, as well as message queue transactions that use Fast Path databases. The content of these reports is similar to that produced by the Fast Path Log Analysis Utility DBFULTA0.

See *IMS Utilities Reference: System* for an explanation of DBFULTA0.

The Fast Path Transaction Exception report consists of the following reports and extracts, all optional:

- Fast Path Transaction Exception Log. This is a chronological listing with comprehensive detail of every Fast Path transaction exception.
- Fast Path Transaction Exception Summary. This report summarizes the transactions reported in the Transaction Exception Log.
- Fast Path Sync Point Failure Summary. This report summarizes the reasons for transaction sync point failures.
- Fast Path Total Traffic data set. This extract data set is similar to the DBFULTA0 Total Traffic data set.
- Fast Path Exception Traffic data set. This extract data set is similar to the DBFULTA0 Exception Traffic data set.
- Fast Path Transaction Exception Recap. This report provides a one page summary of system activity in the report period.

Log records: This report is derived from IMS log records 5901, 5903, 5911, 5916, 5936, 5937, 5938.

Report options

To specify the report options, select the Fast Path Transit **Transaction Exception** report in a Log Report Set.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output is written to the data set specified by the Report Output DDname.

Transaction exceptions are determined by the specification of an Expectation Set. A transaction is defined as an exception if it is outside the range defined in the Expectation Set for any of the following values:

- Input queue time
- Processing time
- Output queue time
- Total transit time
- FP DB DL/I calls
- DEDB waits

If the Expectation Set is not specified, then all transactions are treated as exceptions.

You can also select non-IFP transactions (message queue transactions that use FP databases) to always be treated as exceptions.

Specify the Total Traffic extract data set to create a file equivalent to the DBFULTA0 Total Traffic data set. All Fast Path transactions have a detail record written to this data set.

Specify the Exception Traffic extract data set to create a file equivalent to the DBFULTA0 Exception Traffic data set. Only Fast Path exception transactions have an exception record written to this data set.

Extract file content

The record formats of the Total Traffic and Exception Traffic extract data sets are the same as the DBFULTA0 Fast Path transaction detail record FPTDR. The record layout is defined by the assembler macro IPIFPDR in the SIPIMAC library.

- The Total Traffic record is the first 143 bytes of the FPTDR.

The data fields are fixed length, and can be separated by a blank or comma, depending on the extract options set in Log Global Options. Set the delimiter character to ensure that the extract is suitable for use by other reporting and statistical analysis tools.

SeqNo	Trancode	SyncTime	F_RoutCode	Lterm	PST	OQcnt	InQ	Proc	OutQ	Total	OutTm	DEC	ADR	ADU	VSR	VSU	MSC	BfU	Cl	UW	OW	CW	T	S	...
1	TR01N	19:02:00.02	TR01N	LTMO4203	19	0	39	255	57	351	1.5	56	20	18	12	0	0	32	0	0	0	0	0	I,G	...
3	TR01N	19:02:00.06	TR01N	LTMO1501	24	0	56	393	33	482	1.6	68	23	21	15	0	0	38	0	0	0	0	0	I,G	...
2	TR01N	19:02:00.04	TR01N	LTMO9301	23	0	74	313	32	419	1.6	68	23	21	15	0	0	38	0	0	0	0	0	I,G	...
5	TR01N	19:02:00.20	TR01N	LTMO7807	12	0	56	245	49	350	1.6	68	23	21	15	0	0	38	1	0	0	0	0	I,G	...
6	TR01S	19:02:00.22	TR01S	LTMI2105	72	0	68	3160	125	3353	1.6	382	177	0	0	0	0	177	0	0	0	0	0	I,G	...
4	TR01N	19:02:00.08	TR01N	LTMT22509	3	0	24	127	73	224	1.8	44	17	15	9	0	0	26	0	0	0	0	0	I,G	...
7	TR01N	19:02:00.40	TR01N	LTMI6309	12	0	40	138	43	221	1.5	28	13	11	5	0	0	18	0	0	0	0	0	I,G	...
8	TR01N	19:02:00.42	TR01N	LTMI1101	24	0	55	159	19	233	1.6	40	16	14	8	0	0	24	0	0	0	0	0	I,G	...
9	TR01N	19:02:00.44	TR01N	LTMI1701	21	0	53	129	41	223	1.6	40	16	14	7	0	0	23	0	0	0	0	0	I,G	...
11	TR01N	19:02:00.53	TR01N	LTMO7807	9	0	87	134	21	242	1.6	32	14	12	6	0	0	20	0	0	0	0	0	I,G	...
12	TR01P	19:02:00.53	TR01P	LTMT3207	43	0	33	42	41	116	1.6	7	4	4	0	0	0	5	0	0	0	0	0	I,G	...
10	TR01P	19:02:00.50	TR01P	LTMT24905	47	0	60	38	60	158	1.6	7	4	4	0	0	0	5	0	0	0	0	0	I,G	...
13	TR01N	19:02:01.06	TR01N	LTMO3309	3	0	85	114	12	211	1.4	28	13	11	5	0	0	18	0	0	0	0	0	I,G	...
226	TR01S	19:02:01.55	TR01S	LTMT0709	72	0	46	945	149	1140	1.2	400	185	0	0	0	0	185	0	0	0	0	0	I,G	...
281	TR01N	19:02:01.79	TR01N	LTMO5105	21	0	114	269	30	413	1.2	52	19	17	11	0	0	30	0	0	0	0	0	I,G	...
288	TR01N	19:02:01.81	TR01N	LTMI1901	9	0	98	293	32	423	1.2	64	22	20	14	0	0	36	0	0	0	0	0	I,G	...
289	TR01N	19:02:01.82	TR01N	LTMT1109	24	0	38	227	25	290	1.2	60	21	19	13	0	0	34	0	0	0	0	0	I,G	...
291	TR01S	19:02:01.85	TR01S	LTMT24607	70	0	22	2401	35	2458	1.2	420	189	0	0	0	0	189	0	0	0	0	0	I,G	...
290	TR01N	19:02:01.83	TR01N	LTMT26905	29	0	97	162	85	344	1.1	48	18	16	10	0	0	28	0	0	0	0	0	I,G	...
292	TR01O	19:02:01.86	TR01O	LTMT0701	73	0	63	27	56	146	1.1	18	3	0	0	0	0	3	0	0	0	0	0	I,G	...
293	TR01N	19:02:01.87	TR01N	LTMI8203	12	0	85	269	52	406	1.1	60	21	19	12	0	0	33	0	0	0	0	0	I,G	...
301	TR01N	19:02:01.89	TR01N	LTMO7709	3	0	65	224	49	338	1.1	56	20	18	12	0	0	32	0	0	0	0	0	I,G	...
509	TR01N	19:02:03.16	TR01N	LTMO3305	21	0	51	269	93	413	1.1	68	23	21	15	0	0	38	0	0	0	0	0	I,G	...
510	TR01N	19:02:03.16	TR01N	LTMI9905	6	0	94	157	93	344	1.1	44	17	15	8	0	0	25	1	0	0	0	0	I,G	...
504	TR01N	19:02:03.13	TR01N	LTMI0109	28	0	56	243	164	463	1.1	36	15	13	7	0	0	22	0	0	0	0	0	I,G	...

Figure 147. Extract file content: Fast Path Transaction Transit Traffic

The following table shows the record format of the extract file, mapped by macro IPIFPDR.

Table 5. Extract file record layout: Fast Path Transaction Transit Traffic

Field description	Column heading	Field length (bytes)
Sequence number	SeqNo	7
Transaction Code or PSB Name	Trancode	8
Sync point time (hh:mm:ss.th)	SyncTime	11
Sync point failure character	F	1
Routing Code	RoutCode	8

Table 5. Extract file record layout: Fast Path Transaction Transit Traffic (continued)

Field description	Column heading	Field length (bytes)
LTERM	Lterm	8
Region PST ID	PST	3
On queue count	OQcnt	5
Input Queue time (msecs)	InQ	4
Processing time (msecs)	Proc	4
Output Queue time (msecs)	OutQ	4
Total Transit time (msecs)	Total	5
Output time (secs)	OutTm	5
DEDB Call count	DEC	3
ADS Read count (number of CI's)	ADR	3
ADS Update count (number of CI's)	ADU	3
VSO Read count (CI's; DASD or DS)	VSR	3
VSO Update count (number of CI's)	VSU	3
MSDB Call count	MSC	3
Number of Buffers used	BfU	3
CI Contentions (Waits)	CI	2
UOW Contentions (Waits)	UW	2
Waits for OBA Allocation	OW	2
Waits for Common Buffers	CW	2
Region type: IFP, MPP, and so on	T	1
Special processing; G=GLOBAL, H=HSSP, R=REORG	S	1
Sync point date (YYDDD)	SPDat	5
IMS Release level	IMS	3
Phase 1 to Phase 2 time	Sync	4
Input message length	IMLn	4
Output message length	OMLn	4
Relative Physical Line number	Line	4
Relative Physical Terminal number	Term	4
GU	GU	3
GN	GN	3
GNP	GNP	3
GHU	GHU	3
GHN	GHN	3

Table 5. Extract file record layout: Fast Path Transaction Transit Traffic (continued)

Field description	Column heading	Field length (bytes)
GHNP	GHP	3
REPL	REP	3
ISRT	ISR	3
DLET	DLE	3
FLD	FLD	3
POS	POS	3
NBA Buffers	NBA	3
Overflow Buffers	OFB	3
Buffer Steals	BSt	3
Buffer Waits	BWt	3
OThread Updates	OTU	3
Unrelated Buffers	UrB	3
PVT Buffers	PVB	3
PVT Buffer Waits	PVW	3
ASync Reads	ASR	3
ASync Read Waits	ASW	3

Report content: Fast Path Transaction Exception Log

This is an example of the Fast Path Transaction Exception Log report applicable to both local and global (shared EMHQ) transaction processing.

IMS Performance Analyzer																				
Fast Path Transaction Exception Log																				
Log 15Apr2018 17:18:39.48																				
Sync Point	S	Transact	Routing	P	User	PST	Queue	--Transit Times (Msec)--				Output	-DB Call-	--ADS--	--VSO--	Buf	--DB Wait--			
Time	F	Code	Code	T	ID	ID	Count	In-Q	Proc	Out-Q	Total	(sec)	DEDB	MSDB	Get	Put	Get	Put	Use	CI UW OB CB
17:18:39.48	-	TPCCO	TPCCO	-	WH022403	13	2	1	90	0	91	0.00	8	0	3	0	0	0	3	0 0 0 0
DEDB Calls	-	GU= 3	GN= 0	GNP= 5	GHU= 0	GHN= 0	GHP= 0	REPL= 0	ISRT= 0	DLET= 0	FLD= 0	POS= 0	Total= 8							
Buffer	-	NBA= 3/5	OVFN= 0/10	STEAL= 0	WAIT= 0	OTHR= 0	NRDB= 0	PBUF= 0	PBWT= 0	ASIO= 0	AIOW= 0									
VSO	-	VGET= 0	VPUT= 0	DGET= 0	SDEP= 0	CI#= 0	SEG#= 0													
Shared EMHQ	-	IMSG Transit= 0 (Msec)	OMSG Transit= 0 (Msec)	Org IMS ID=IMS1	Proc IMS ID=IMS1															

Figure 148. FP Transaction Exception report: Detail Log

The report heading shows the start of the reporting period. **Log** specifies the date and time of the first transaction processed.

The report consists of one to five lines of information for each transaction:

1. Exception detail
2. DEDB Calls
3. Buffer
4. VSO

5. Shared EMHQ

The first line is the detailed exception listing and is always provided. The data is presented in columns.

The other four lines are optional and can be requested individually to produce up to four rows of additional statistics.

The report provides the following information:

1. **Exception detail line.** Detailed exception listing. This is always produced. The column headings are:

Sync Point Time

The clock time at sync point processing.

SF A reason code for transactions that fail synchronization processing. Synchronization failure is indicated by one of the following characters, and the corresponding report columns will be blank.

A	MSDB verify failure
B	MSDB arithmetic overflow
C	DEDB sequential dependent area full
D	DEDB sequential dependent insert caused buffer overflow
E	DEDB sequential dependent buffer overflow three times
F	DEDB area not available for use
G	Dynamic MSDB area full
H	MSDB required segment not found
I	DEDB FLD calls; lock for a CI could not be obtained
J	DEDB FLD calls; deadlock occurred
K	DEDB FLD calls; overflow occurred
L	ROLB call
M	DEDB FLD calls; verify failed
N	DEDB FLD calls; segment in CI was deleted
O	Out of resources
P	Inflight condition in /ERE
Q	RESYNC abort requested
R	Resource deadlock
S	Out of space in data sets
U	Application program abend

Transact Code

The transaction code, or PSB name.

Routing Code

Identification of the balancing group (BALG) of the IFP transaction, or

- *IFP for an IFP transaction that failed synchronization, or
- Region type for a non-IFP transaction, which can be:
 - *MPP MPP region
 - APPLID DBCTL, when the CICS system name is available
 - *DBC DBCTL, when the CICS system name is not available
 - Jobname
 - BMP, when the jobname is available
 - *BMP BMP, when the jobname is not available

PT The process type, either:

G	GLOBAL
H	HSSP
R	Reorganization

User ID

The identifier of the user logged onto the input terminal that initiated the transaction. When IMS does not use security and the User ID is not available, LTERM name is reported instead.

PST ID

The PST number.

Queue Count

The number of transactions in the balancing group (BALG) queue when this transaction entered sync point processing.

In-Q Transit Time (Msec)

Time interval (A). Input Queue time in milliseconds. This will be marked N/A for Shared EMH input/output transit time when the transaction is:

- Local only.
- Global only, or local first transaction which is processed on other CEC while IMS PA is reading the log of the IMS backend.

An IFP transaction is classified as an exception if the Input Queue time falls outside the range specified for the transaction code in the Expectation Set.

In this report, the Transit Queue times are only applicable in an IFP environment. For non-IFP transactions, the Transit Queue times are left blank, indicating that they are not applicable. Use the Message Queue Transit Time Analysis and Transaction Exception reports to analyze the Transit Queue times of MPP and BMP transactions that use FP databases.

Proc Transit Time (Msec)

Time interval (B). Processing time in milliseconds.

An IFP transaction is classified as an exception if the Processing time falls outside the range specified for the transaction code in the Expectation Set.

Out-Q Transit Time (Msec)

Time interval (C). Output Queue time in milliseconds. This will be marked N/A for Shared EMH input/output transit time when the transaction is:

- Local only.
- Global only, or local first transaction which is processed on other CEC while IMS PA is reading the log of the IMS backend.

An IFP transaction is classified as an exception if the Output Queue time falls outside the range specified for the transaction code in the Expectation Set.

Total Transit Time (Msec)

The sum of time intervals (A), (B), (C).

An IFP transaction is classified as an exception if the Total Transit time falls outside the range specified for the transaction code in the Expectation Set.

Output (sec)

Time interval (D). Output time (to dequeue) in seconds.

DB Call

The number of calls of the following type:

DEDB Total number of DEDB calls.

MSDB

Number of MSDB calls.

A transaction is classified as an exception if the number of DB Calls falls outside the range specified for the transaction code in the Expectation Set.

ADS The number of CIs processed, broken down into:

Get Number of CIs read.

Put Number of CIs updated.

VSO The number of CIs processed from the data space or coupling facility structure.

Get Number of CIs read from the data space or coupling facility structure.

Put Number of CIs updated in the data space or coupling facility structure.

Buf Use

The total number of buffers used from the common buffer pool. This number includes non-related buffers used for MSDBs and SDEPs.

DB Wait

The number of waits, broken down by:

CI Number of waits for CIs.

UW Number of waits for UOWs.

OB Number of waits for overflow buffer allocation. This number should never be greater than 1.

CB Number of waits for common buffers.

A transaction is classified as an exception if the number of DB Waits falls outside the range specified for the transaction code in the Expectation Set.

2. **DEDB Calls.** Optional. Contains the number of DL/I calls by type for DEDB calls. The different types of DL/I calls are:

GU Number of GU calls.

GN Number of GN calls.

GNP Number of GNP calls.

GHU Number of GHU calls.

GHN Number of GHN calls.

GHNP

Number of GHNP calls.

REPL Number of REPL calls.

ISRT Number of ISRT calls.

DLET Number of DLET calls.

FLD Number of FLD calls.

POS Number of POS calls.

Total Total number of DL/I calls.

3. **Buffer.** Optional. Contains the amount of buffer use by type. The different types of buffer use are:

NBA SYNCNBA / SYNCNBA#. The number of NBA (normal) buffers used.

/ The NBA value specified in the region startup procedure. The SYNCNBA# field introduced in IMS V9 is reported as zero for earlier releases of IMS.

OVFN SYNCOVFN / SYNCOBA#. The number of OBA (overflow) buffers. / The OBA value specified in the region startup procedure. The SYNCOBA# field introduced in IMS V9 is reported as zero for earlier releases of IMS.

STEAL Number of times buffer stealing is invoked by this transaction.

WAIT Number of times the transaction waited for a buffer to become available.

OTHR Number of buffers sent to OTHREAD.

NRDB Number of buffers used by MSDB and SDEP processing.

PBUF Number of private buffers used by HSSP or the High Speed DEDB Direct Reorganization utility in a transaction (one unit of work).

PBWT Number of waits for private buffers by HSSP or the High Speed DEDB Direct Reorganization utility in a transaction (one unit of work).

ASIO Number of UOW asynchronous read-aheads by HSSP or the High Speed DEDB Direct Reorganization utility in a transaction (one unit of work).

AIOU Number of UOW asynchronous read-aheads to complete by HSSP or the High Speed DEDB Direct Reorganization utility in a transaction (one unit of work). This number should be either zero or one.

4. **VSO**. Optional. Contains information collected on VSO usage by transaction. The type of information collected is as follows:

VGET The number of CI read requests satisfied from a data space or coupling facility structure.

VPUT The number of CIs with updates to a data space or coupling facility structure. This number represents the number of CIs that would have been sent to OTHREAD if the areas were non-VSO.

DGET The number of CIs read from DASD into a data space or coupling facility structure.

SDEP - CI#
SYNCSDEPCI#. Commit SDEP CI number used. Introduced in IMS V9, this field is reported as zero for earlier releases of IMS.

SDEP - SEG#
SYNCSDEPSEG#. Commit SDEP Segment number. Introduced in IMS V9, this field is reported as zero for earlier releases of IMS.

5. **Shared EMHQ**. Optional.

IMSG Transit
The elapsed time, in milliseconds, that the transaction input message spent on the shared EMH queue.

OMSG Transit
The elapsed time, in milliseconds, that the transaction output message spent on the shared EMH queue.

Org IMS ID

The IMS subsystem where the transaction originated.

Proc IMS ID

The IMS subsystem where the transaction was processed.

Report content: Fast Path Transaction Exception Summary

This is an example of the Transaction Exception Summary report applicable to both local and global (shared EMHQ) transaction processing.

IMS Performance Analyzer																					
Fast Path Transaction Exception Summary																					
Log 15Apr2018 19.01.43.88																					
Transact Code	Routing Code	Resp Count	--Average Transit Time--				--Maximum Transit Time--				----- DB Calls -----				----- DB Waits -----						
			Input Queue	Pgm Exec	Outpt Queue	Total	Input Queue	Pgm Exec	Outpt Queue	Total	DEDB Avg	DEDB Max	MSDB Avg	MSDB Max	CI Av	CI Mx	UOW Av	UOW Mx	OBA Av	OBA Mx	CB Av
INQUIRY	INQUIRY	1438	60	258	39	356	532	1073	311	1172	28	68	0	0	0	2	0	0	0	0	0
ORDER	ORDER	3637	424	49	32	504	1717	610	469	1758	14	18	0	0	0	0	0	0	0	0	0
PARTS	PARTS	1735	65	84	49	198	666	948	438	1077	4	7	0	0	0	2	0	0	0	0	0
STOCK	STOCK	156	45	2599	40	2684	253	5771	299	5831	282	485	0	0	0	0	0	0	0	0	0
System Totals		6974	251	158	38	446	1717	5771	469	5831	20	485	0	0	0	2	0	0	0	0	0

Figure 149. FP Transaction Exception report: Summary by Transaction

The report heading shows the start of the reporting period. **Log** specifies the date and time of the first transaction processed.

The following fields appear in the report:

Transact Code

The transaction code that was processed.

Routing Code

The Routing Code of the IFP transaction, or

- *IFP for an IFP transaction that failed synchronization, or
- Region type for a non-IFP transaction, which can be:
 - *MPP MPP region
 - APPLID DBCTL, when the CICS system name is available
 - *DBC DBCTL, when the CICS system name is not available
 - Jobname
 - BMP, when the jobname is available
 - *BMP BMP, when the jobname is not available

Resp Count

Number of transactions completed during the time period being examined.

Average Transit Time

The average (mean) transit time, in milliseconds, required to process each IFP transaction. These transit times are broken down into their component parts:

- Input queue time
- Program execution time
- Output queue time
- Total time

In this report, the Transit Queue times are only applicable in an IFP environment. For non-IFP transactions, the Transit Queue times are left blank, indicating that they are not applicable. Use the Message Queue

Transit Time Analysis and Transaction Exception reports to analyze the Transit Queue times of MPP and BMP transactions that use FP databases.

Maximum Transit Time

The longest transit time, in milliseconds, required to process each IFP transaction. These transit times are broken down into their component parts:

- Input queue time
- Program execution time
- Output queue time
- Total time

DB Calls

Fast Path database DL/I call count, average and maximum, broken down into:

- DEDB DL/I calls
- MSDB DL/I calls

DB Waits

DEDB number of waits, average and maximum, broken down into:

- CI** Waits for CIs.
- UOW** Waits for UOWs.
- OBA** Waits for overflow buffer allocation. This number should never be greater than 1.
- CB** Waits for common buffers.

Report content: Fast Path Transaction Sync Failure Summary

This is an example of a Transaction Sync Failure Summary report applicable to both local and global (shared EMHQ) transaction processing.

IMS Performance Analyzer		
Fast Path Syncpoint Failure Summary		
Log 15Apr2018 19.01.43.88		
S		
F	Count	Synchronization Failure Description
C	12	DEDB SDEP Area full
L	297	ROLB call caused Sync failure
R	15	Resource Deadlock
U	154	Application Program or Pseudo ABEND

Figure 150. FP Transaction Exception report: Sync Failure Summary

The report heading shows the start of the reporting period. **Log** specifies the date and time of the first transaction processed.

The following fields appear in the report:

- SF** Synchronization failure reason code.
- Count** Number of transactions that failed sync point processing.
- Synchronization Failure Description**
Description of the Synchronization failure reason code.

Report content: Fast Path Transaction Exception Recap

This is an example of the Transaction Exception Recap report applicable to both local and global (shared EMHQ) transaction processing. The Recap report is always

produced after all requested reports and extract data sets have been generated. It provides a summary of the processing involved in generating the requested reports and extract files.

```

                                IMS Performance Analyzer
                                Fast Path Transaction Exception Recap
                                Log 15Apr2018 19.01.43.88

Total number of Fast Path transactions examined (detail records) . . . . . 13839
Number of Fast Path exception transactions (exception records) . . . . . 6974

Expectation Set used in the analysis . . . FPEXCEPT in Library IMSPA.V440.EXPSET

Breakdown of exceptions by type:
  IFP transactions where the expectation was not met . . . . . 6974
  IFP transaction Sync failures . . . . . 8
  IFP transactions where no dequeue record was found . . . . . 3977
  Non-IFP transactions (including Sync failures) . . . . . 0

Total Traffic Data set . . . . . IMSPA.FP.TTRAFFIC
Exception Traffic Data set . . . IMSPA.FP.XTRAFFIC
```

Figure 151. FP Transaction Exception report: Recap

The report heading shows the start of the reporting period. **Log** specifies the date and time of the first transaction processed.

Fast Path Resource Usage reports

This report category provides detailed and summary information for analysis of the usage and availability of various Fast Path resources.

The Fast Path resources include:

- IFP Regions and Programs
- FP Transactions
- FP buffers
- DEDB databases and areas
- VSO
- DEDB and MSDB DL/I Calls
- Local and Global (SEMHQ) messages

Fast Path Resource Usage and Contention report

The Fast Path Resource Usage and Contention report provides detailed statistics on the Fast Path resources used by IFP transactions and non-IFP programs.

The following resources are reported on:

- DEDB databases
- Area data sets
- VSO
- Common buffers
- Locks
- Logging
- Sync point failures
- Transaction throughput

Log records: This report is derived from IMS log records 5901, 5937, 5938.

Uses

Use the Fast Path Resource Usage and Contention report to gauge the performance of transactions that use DEDB databases. This report identifies transactions that:

- Issue excessive DL/I calls that cause Area data set I/O
- Use excessive resources, including buffers and VSO
- Cause excessive contention
- Cause excessive logging
- Fail during sync point processing

Report options

To specify the report options, select **Resource Usage and Contention** from the Fast Path Resource Usage Reports in a Log Report Set, then select **Resource Usage & Contention** from Reports Required. This is the default report selection, but it complements the Fast Path Buffer Usage report which you can request at the same time or separately.

The command for the Fast Path Resource Usage and Contention report is:

```
IMSPALOG      FPIRUC([BYIMID|SYSPLEX,]
                RESUSAGE,
                [RESDDN(ddname),]          default FPRUCRPT
                [FROM(date,time),]
                [TO(date,time),]
                [INCL(TRANCODE(list))|EXCL(TRANCODE(list)),]
                [INCL(IMSID(list))|EXCL(IMSID(list))])
IMSPALOG      EXECUTE
```

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output is written to the data set specified by the Resource Report Output DDname. The default is FPRUCRPT.

By using Object Lists, you can specify that only certain values be included in or excluded from the report for:

- Transaction Codes
- IMS Subsystem IDs

Report content

This figure shows an example of a Fast Path Resource Usage and Contention report applicable to both local and global (shared EMHQ) transaction processing.

The report was produced by the command:

```
IMSPALOG      FPIRUC(RESUSAGE,
IMSPALOG      RESDDN(FPRUCRPT))
IMSPALOG      EXECUTE
```

IMS Performance Analyzer																			Page		1				
Fast Path Resource Usage and Contention - IMSA																									
From 15Apr2018 19.00.43.88 To 15Apr2018 20.02.58.95 Elapsed= 1 Hrs 2 Mins 15.076.307 Secs																									
Transact Code	Routing Code	Count	---DEDB Calls---				--- ADS I/O ---				--VSO Activity--				-Common Buffer-				Contentions			LGNR Stat		Totl Sync	Tran Rate /Sec
			Reads	Max	Updates	Avg	Max	Reads	Max	Updates	Avg	Max	Reads	Max	Updates	Avg	Max	Wts	Stl	Tot UOW	Tot OBA	CI/ Sec	Total Comb		
COSTING	*MPP	1758	12	45	0	0	6	7	0	0	0	0	0	0	2	4	0	0	0	0	0	0	0	0	23
INQUIRY	INQUIRY	881	22	33	24	35	18	24	15	22	10	15	0	0	27	39	0	0	0	0	1	0	0	14	12
ORDER	ORDER	5576	13	18	0	0	3	5	0	0	0	0	0	0	3	5	0	0	0	0	0	0	0	73	
PARTS	PARTS	2323	3	3	4	4	4	5	4	4	0	0	0	0	5	5	0	0	0	0	2	0	0	31	
STOCK	STOCK	105	419	485	0	0	193	227	0	0	0	0	0	0	193	227	0	0	0	0	0	0	0	1	
System Totals		37892	16	485	3	35	7	227	3	22	1	15	0	0	8	227	0	0	0	0	3	0	0	14	117

Figure 152. Fast Path Resource Usage and Contention report

When processing multi-subsystem log files:

- One report is written for each subsystem, with the subsystem name in the report heading
- A total system wide report is written, with **Total** appearing in the report heading

The report heading contains the reporting period. **From** specifies the date and time of the first transaction to be processed, and **To** specifies the date and time of the last transaction to be processed. **Elapsed** is the reporting period elapsed time, the time between the first and last transactions that were processed.

The following fields appear in the report:

Transact Code

The Transaction Code name for an IFP transaction, or the program name for a non-IFP transaction.

Routing Code

The Routing Code of the IFP transaction, or the region type for a non-IFP transaction. The non-IFP region types can be:

***MPP** MPP region

APPLID DBCTL, when the CICS system name (APPLID) is available

***DBC** DBCTL, when the CICS system name is not available

Jobname

BMP, when the jobname is available

***BMP** BMP, when the jobname is not available

***Batch** Batch job

***Utility**

IMS Utility

***Unknown**

When a X'5937' Syncpoint record is processed without a preceding X'5901' or X'5911'.

***SF=f** Syncpoint failure reason code for transactions that fail synchronization processing. A non-blank character indicates synchronization failure, in which case the rest of the row is blank. The meaning of the codes is:

- A** MSDB verify failure
- B** MSDB arithmetic overflow
- C** DEDB sequential dependent area full
- D** DEDB sequential dependent insert caused buffer overflow
- E** DEDB sequential dependent buffer overflow three times
- F** DEDB area not available for use
- G** Dynamic MSDB area full
- H** MSDB required segment not found

I	DEDB FLD calls; lock for a CI could not be obtained
J	DEDB FLD calls; deadlock occurred
K	DEDB FLD calls; overflow occurred
L	ROLB call
M	DEDB FLD calls; verify failed
N	DEDB FLD calls; segment in CI was deleted
O	Out of resources
P	Inflight condition in /ERE
Q	RESYNC abort requested
R	Resource deadlock
S	Out of space in data sets
U	Application program abend

Count The number of transactions that were processed in the report period.

DEDB Calls

The average and maximum number of DEDB calls, broken down into:

Reads The total number of “Read” DL/I calls (GU, GN, GNP, GHU, GHN, GHNP, POS).

Updates

The total number of “Update” DL/I calls (REPL, ISRT, DLET, FLD).

ADS I/O

The average and maximum number of Area data set I/O calls, broken down into:

Reads The total number of Area data set CIs read.

Updates

The total number of Area data set CIs updated.

VSO Activity

The average and maximum number of VSO activity calls, broken down into:

Reads The total number of CI read requests satisfied from a data space or coupling facility structure

Updates

The total number of CIs with updates to a data space or coupling facility structure

Common Buffer Usage

The amount of buffer usage, broken down into:

Avg The average number of calls

Max The maximum number of calls

Wts The total number of times a transaction waited for a buffer to become available

Stl The total number of times buffer stealing was invoked for the transaction

Contentions

The number of other (not Common Buffer) contentions, broken down into:

Tot UOW

The total number of times unit-of-work contentions occurred for this transaction code

Tot OBA

The total number of times overflow buffer area contentions occurred for this transaction code

CI/Sec The total number of CI contentions per second for this transaction code

LGNR Total Comb

The total number of times the LGNR specification was exceeded for this transaction code; either 0 or 1

Stat #CI Logd

The total number of times an entire CI was logged for this transaction code; either 0 or 1 and will only be 1 if **LGNR Total Comb** is also 1

Totl Sync Fail

The total number of occurrences of this transaction code that failed sync point processing

Tran Rate/Sec

The average number of transactions processed per second

Fast Path Buffer Usage report

The Fast Path Buffer Usage report provides detailed statistics on Fast Path Buffer usage by IFP transactions and non-IFP programs. It complements the Fast Path Resource Usage and Contention report by providing a more comprehensive breakdown of Fast Path Buffer statistics.

Log records: This report is derived from IMS log records 5901, 5937, 5938.

Report options

To specify the report options, select **Resource Usage and Contention** from the Fast Path Resource Usage Reports in a Log Report Set, then select **Buffer Usage** from Reports Required. The Fast Path Buffer Usage report complements the Fast Path Resource Usage and Contention report which you can request at the same time or separately.

The command for the Fast Path Buffer Usage report is:

```

IMSPALOG      FPIRUC([BYIMID|SYSPLEX,]
               BUFFER,
               [BUFDDN(ddname),]          default FPBUFRPT
               [PEAK(nnn),]               default 90%
               [FROM(date,time),]
               [TO(date,time),]
               [INCL(TRANCODE(list))|EXCL(TRANCODE(list)),]
               [INCL(IMSID(list))|EXCL(IMSID(list))])
IMSPALOG      EXECUTE

```

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output is written to the data set specified by the Buffer Report Output DDname. The default is FPBUFRPT.

By using Object Lists, you can specify that only certain values be included in or excluded from the report for:

- Transaction Codes
- IMS Subsystem IDs

Report content

This figure shows an example of the Fast Path Resource Usage and Contention report applicable to both local and global (shared EMHQ) transaction processing.

The report was produced by the command:

```
IMSPALOG      FPIRUC(BUFFER,
                BUFDN(FPBUFRPT),
                PEAK(90))
IMSPALOG      EXECUTE
```

IMS Performance Analyzer																		
Fast Path Transaction Buffer Usage - IX23																		
Transact	Routing	From 17Jun2014	7.59.29.12	To 17Jun2014	8.11.51.99	Elapsed=	0 Hrs	12 Mins	22.870.286 Secs									
Code	Code	Count	NBA Val	NBA Used	OBA Val	OBA Used	Steal	Wait	OTHRD	NRDB	PBUF	PBUFWT						
			Min Max	Avg 90% MAX	Min Max	Avg 90% MAX	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max						
WDB	*MPP	65	0 0	1 1 1	0 0	0 0 0	0 0	0 0	1 1	0 0	0 0	0 0						
WDB2	*MPP	2	0 0	1 1 1	0 0	0 0 0	0 0	0 0	1 1	0 0	0 0	0 0						
QASUBMPA	*BMP	1	0 0	0 0 0	0 0	0 0 0	0 0	0 0	0 0	0 0	0 0	0 0						
	SECIN23	13	0 0	20 24 24	0 0	2 6 6	144 295	0 0	19 25	0 0	0 0	0 0						
QASUBMPA	*Total*	14	0 0	19 24 24	0 0	2 4 6	134 295	0 0	18 25	0 0	0 0	0 0						
VAC3MUUP	*MPP	4	0 0	1 1 1	0 0	0 0 0	0 0	0 0	1 1	0 0	0 0	0 0						
VAC3UUEP	*MPP	6	0 0	1 1 1	0 0	0 0 0	0 0	0 0	1 1	0 0	0 0	0 0						
VASMIDBM	*MPP	77	0 0	1 1 2	0 0	0 0 0	0 0	0 0	1 1	0 0	0 0	0 0						
VASMSELM	*MPP	11	0 0	1 1 1	0 0	0 0 0	0 0	0 0	0 1	0 0	0 0	0 0						
VASTACKP	*MPP	1	0 0	2 2 2	0 0	0 0 0	0 0	0 0	2 2	0 0	0 0	0 0						
VASUDLET	*MPP	1	0 0	1 1 1	0 0	0 0 0	0 0	0 0	1 1	0 0	0 0	0 0						
VCTLMVUP	*MPP	2	0 0	1 1 1	0 0	0 0 0	0 0	0 0	1 1	0 0	0 0	0 0						
VIAMRLLD	DVPSIN23	46	0 0	6 6 6	0 0	0 0 0	1 1	0 0	0 0	0 0	0 0	0 0						
VOP3AINA	*MPP	3	0 0	2 2 2	0 0	0 0 0	0 0	0 0	2 2	0 0	0 0	0 0						
VOP3IAOP	*MPP	4	0 0	2 2 2	0 0	0 0 0	0 0	0 0	2 2	0 0	0 0	0 0						
VOP3IDOP	*MPP	35	0 0	2 3 4	0 0	0 0 0	0 0	0 0	2 2	0 0	0 0	0 0						
VOP3IPOP	*MPP	22	0 0	2 3 3	0 0	0 0 0	0 0	0 0	2 2	0 0	0 0	0 0						
VOP3ITOP	*MPP	9	0 0	8 14 20	0 0	0 0 0	0 0	0 0	4 7	0 0	0 0	0 0						
VOP3JUPA	*MPP	9	0 0	1 2 2	0 0	0 0 0	0 0	0 0	1 2	0 0	0 0	0 0						
...																		
System Totals		1544	0 0	2 4 24	0 0	0 0 6	1 295	0 0	1 25	0 0	0 0	0 0						

Figure 153. Fast Path Buffer Usage report

When processing multi-subsystem log files:

- One report is written for each subsystem, with the subsystem ID in the report title
- A total system wide report is written, with **Total** appearing in the report heading

The report heading contains the reporting period. **From** specifies the date and time of the first transaction to be processed, and **To** specifies the date and time of the last transaction to be processed. **Elapsed** is the reporting period elapsed time, the time between the first and last transactions that were processed.

The following fields appear in the report:

Transact Code

The Transaction Code name for an IFP transaction, or the program name for a non-IFP transaction.

Routing Code

The Routing Code of the IFP transaction, or the region type for a non-IFP transaction. The non-IFP region types can be:

***MPP** MPP region

APPLID DBCTL, when the CICS system name (APPLID) is available

***DBC** DBCTL, when the CICS system name is not available

Jobname

BMP, when the jobname is available

***BMP** BMP, when the jobname is not available

***Batch** Batch job

***Utility**

IMS Utility

Count The number of transactions that were processed in the report period.

NBA Val

SYNCRBA#. The Normal Buffer Allocation (NBA) specified in the region startup procedure. Minimum and Maximum values are reported.

This field introduced in IMS V9 is zero for earlier releases of IMS.

NBA Used

SYNCRBA. The number of NBA buffers used. Average, Peak percentile and Maximum values are reported.

OBA Val

SYNCOBA#. The Overflow Buffer Allocation (NBA) specified in the region startup procedure. Minimum and Maximum values are reported.

This field introduced in IMS V9 is zero for earlier releases of IMS.

OBA Used

SYNCOBFA. The number of OBA buffers used. Average, Peak percentile and Maximum values are reported.

Steal SYNCRSTL. The number of Buffer Steals. Average and Maximum values are reported.

Wait SYNCRFWT. The number of waits for buffers. Average and Maximum values are reported.

OTHRD

SYNCOTHR. The number of updated buffers sent to the OTHR. Average and Maximum values are reported.

NRDB

SYNCRNRDB. The number of buffers used for MSDB and SDEP processing. Average and Maximum values are reported.

PBUF SYNCRPBUF. The number of HSP Private Buffers used. Average and Maximum values are reported.

PBUFWT

SYNCRPFWT. The number of waits for HSP Private Buffers. Average and Maximum values are reported.

Fast Path Database Call Statistics report

The Fast Path Database Call Statistics report provides a breakdown of DL/I call function codes by transaction code.

Log records: This report is derived from IMS log records 5901, 5937, 5938.

Uses

This report identifies transactions that issue excessive DL/I calls, breaking down the call count by function code.

After identifying transactions with poor response time (using the FP Transit Analysis report), or transactions using excessive resources (using the FP Resource Usage and Contention report), use the Fast Path Database Call Statistics report to identify the DL/I call function codes most frequently used by the transactions.

Report options

To specify the report options, select **Database Call Statistics** from the Fast Path Resource Usage Reports in a Log Report Set.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output is written to the data set specified by the Report Output DDname.

By using Object Lists, you can specify that only certain values be included in or excluded from the report for:

- Transaction Code
- IMS Subsystem IDs

Report content

This figure shows an example of the Fast Path Database Call Statistics report applicable to both local and global (shared EMHQ) transaction processing.

		IMS Performance Analyzer																											
		Fast Path Database Call Statistics - IMSA																											
		From 15Apr2018 19.00.43.88										To 15Apr2018 20.02.58.95										Elapsed=		1 Hrs		2 Mins		15.076.307 Secs	
		----- D E D B C a l l s -----																				MSDB							
Transact	Routing	Count	..GU...	..GN...	..GNP..	..GHU..	..GHN..	..GHN..	..REPL..	..ISRT..	..DLET..	..FLD..	..POS..	..Total..	Calls														
Code	Code		Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max													
COSTING	*MPP	436	6	8	1	2	1	2	12	15	0	0	0	0	7	8													
INQUIRY	INQUIRY	867	12	17	0	0	0	0	11	16	0	0	0	0	11	16													
ORDER	ORDER	5576	3	3	0	0	10	15	0	0	0	0	0	0	0	0													
PARTS	PARTS	2322	0	0	0	0	0	0	3	3	0	0	0	0	3	3													
STOCK	STOCK	105	218	253	0	0	201	232	0	0	0	0	0	0	0	0													
System Totals		13450	6	253	0	0	9	232	2	16	0	0	0	0	2	16													

Figure 154. FP Database Call Statistics report

When processing multi-subsystem log files:

- One report is written for each subsystem, with the subsystem name in the report heading
- A total system wide report is written, with **Total** appearing in the report heading

The report heading contains the reporting period. **From** specifies the date and time of the first transaction to be processed, and **To** specifies the date and time of the last transaction to be processed. **Elapsed** is the reporting period elapsed time, the time between the first and last transactions that were processed.

The following fields appear in the report:

Transact Code

The Transaction Code name for an IFP transaction, or the program name for a non-IFP transaction.

Routing Code

The Routing Code of the IFP transaction, or the region type for a non-IFP transaction. The non-IFP region types can be:

***MPP** MPP region

APPLID DBCTL, when the CICS system name (APPLID) is available

***DBC** DBCTL, when the CICS system name is not available

Jobname

BMP, when the jobname is available

***BMP** BMP, when the jobname is not available

***Batch** Batch job

***Utility**

IMS Utility

Count The number of transactions that were processed in the report period.

DEDB Calls

The average and maximum DEDB DL/I call counts, broken down into the individual function codes. The **Total** column represents the average and maximum DEDB DL/I call counts for all function codes.

MSDB Calls

The average and maximum MSDB DL/I call counts.

IFP Region Occupancy report

The IFP Region Occupancy report provides approximate region occupancy rates for IFP regions.

Log records: These reports are derived from IMS log records 07, 08, 5901, 5903, 5911, 5916, 5936, 5937, 5938, 5950.

Uses

You can use this report to determine if an appropriate number of IFP regions is available for processing the workload.

Report options

To specify the report options, select **IFP Region Occupancy** from the Fast Path Resource Usage Reports in a Log Report Set.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output is written to the data set specified by the Report Output DDname.

Object Lists can be used to specify that specific values be included in or excluded from the report for:

- Region ID by PST number
- Program name
- IMS Subsystem ID

Report content

This is an example of the IFP Region Occupancy report applicable to both local and global (shared EMHQ) transaction processing.

IMS Performance Analyzer Fast Path (IFP) Region Occupancy										Page	1
-Region--		From 06Dec2010 11:11:19:45	To 06Dec2010 11:12:27:74	Elapsed=		0 Hrs	1 Mins	08.290.852 Secs			
IMID	PST	Program Name	Tran Count	<- Processing ->		<---- Idle ---->		<- Not Active ->			
				HH.MM.SS	Pct	HH.MM.SS	Pct	HH.MM.SS	Pct		
IMS1	81	JBBPDEP1	33	0	0.4	1.05	95.9	3	3.7		
IMS1	82	JBBPDEP1	38	0	0.7	1.05	95.6	3	3.7		
IMS1	83	JBBPDEP1	47	0	0.7	1.07	98.6	1	0.8		
IMS1	85	JBBPDEP1	3	0	0.0	1.08	99.2	1	0.8		
IMS1	88	JBBPDEP2	46	1	0.7	57	83.9	10	15.4		
IMS1	90	JBBPDEP2	53	0	0.7	1.07	98.6	1	0.7		
IMS1	92	JBBPDEP2	43	0	0.5	1.03	92.9	4	6.6		
IMS1	94	JBBPDEP2	26	0	0.3	1.04	93.1	4	6.6		
IMS1	95	JBBPMTD1	14	0	0.4	1.07	97.4	1	2.2		
IMS1	96	JBBPDEP2	43	0	0.6	1.07	98.7	1	0.8		
IMS1	98	JBBPMTD1	31	1	0.8	1.06	97.0	1	2.2		
IMS1	99	JBBPMTD1	47	1	1.3	1.07	98.0	1	0.8		
IMS1	101	JBBPMTN1	12	0	0.2	1.08	99.1	0	0.7		
IMS1	102	JBBPMTE1	18	0	0.3	1.05	94.6	4	5.2		
IMS1	104	JBBPMTE1	22	0	0.4	1.07	97.4	2	2.2		

Figure 155. IFP Region Occupancy report (IMS V12)

When processing multi-subsystem log files, IFP regions from all subsystems are included in a single report, and the report is ordered by IMS subsystem ID, then PST number.

The report heading contains the reporting period. **From** specifies the date and time of the first transaction to be processed, and **To** specifies the date and time of the last transaction to be processed. **Elapsed** is the reporting period elapsed time, the time between the first and last transactions that were processed.

The following fields appear in the report:

Region

The IFP region identification, broken down into:

IMID The IMS subsystem ID

PST The dependent region PST ID

Program Name

The Program (PSB) that is active in the IFP region. The program name will be *UNKNOWN in the absence of DEDB update (5950) log records, as these are the only Fast Path log records that include the program name.

Tran Count

The number of transactions processed by the region during the report period.

Processing

Processing time (**HH.MM.SS**). The time during which the region is executing the program to process a transaction. The processing time is the sum of the following two times:

- Application processing time
- Phase 1 and phase 2 sync point processing time

Regions with a high processing time compared to idle time have high utilization (**Pct**).

Idle Idle time (**HH.MM.SS**). The time during which the region is available but waiting to process a transaction; that is, waiting for input.

Regions with a high idle time compared to processing time have low utilization (**Pct**).

Not Active

Not Active time (HH.MM.SS). The time during which the region is not active or not available to process transactions. The Not Active time is the sum of the following times:

- The start of the reporting period to the commencement of transaction processing in the region
- The completion of the last transaction processed in the region to the end of the reporting period

The Not Active time also includes time when the region is not available, because:

- The region is shut down
- The region has been restarted with another program
- The region has been restarted as a non-IFP region

Reports generated for IMS V13 take advantage of IMS 5904 log record and contain additional information.

IMS Performance Analyzer												Page	1
Fast Path (IFP) Region Occupancy													
From 14May2015 8:47:34:27 To 14May2015 8:55:35:03 Elapsed= 0 Hrs 8 Mins 00.761.212 Secs													
-Region--	Program	Tran	<--- Proc+Sync --->	<--- Post Sync --->	<--- Occupied --->	<--- Idle --->	<Not	Active>					
IMID PST	Name	Count	HH.MM.SS.THM Pct	HH.MM.SS.THM Pct	HH.MM.SS.THM Pct	HH.MM.SS.THM Pct		Pct					
IDDE	1 DFSIVP5	81	0.007	0.0	0.002	0.0	0.008	0.0	7.38.785	95.4	4.6		
IDDE	2 DFSIVP4	111	0.113	0.0	0.002	0.0	0.115	0.0	7.38.676	95.4	4.6		

Figure 156. IFP Region Occupancy report (IMS V13)

EMH Message Statistics report

The EMH Message Statistics report contains information on the number and length of EMH messages that are processed by balancing groups and shared EMH queues.

Log records: This report is derived from IMS log records 5901, 5903.

Uses

This report can be used to gauge:

- The size and frequency of transaction messages processed by IFP regions.
- The ratio of transactions processed locally versus those processed globally.

Report options

To specify the report options, select **EMH Message Statistics** from the Fast Path Resource Usage Reports in a Log Report Set.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output is written to the data set specified by the Report Output DDname.

Object Lists can be used to specify that specific values be included in or excluded from the report for:

- Transaction Codes

Report content

This figure shows an example of the EMH Message Statistics report applicable to both local and global (shared EMHQ) transaction processing.

IMS Performance Analyzer																		
Fast Path (EMH) Message Statistics																		
From 14Apr2018 19.00.01.23						To 14Apr2018 20.01.02.39						Elapsed= 1 Hrs 1 Mins 16.089.795 Secs						
		----- Locally Processed -----						----- Globally Processed -----						----- Total (Local+Global) -----				
Transact	Routing	Count	Avg	Max	Avg	Max	Count	Avg	Max	Avg	Max	Count	Avg	Max	Avg	Max		
Code	Code																	
INQUIRY	INQUIRY	3506	206	206	966	966	867	206	206	966	966	4373	206	206	966	966		
ORDER	ORDER	22418	42	42	428	584	5575	42	42	429	584	27993	42	42	428	584		
PARTS	PARTS	8677	54	54	412	592	2322	54	54	412	592	10999	54	54	412	592		
STOCK	STOCK	366	22	22	46	46	105	22	22	46	46	471	22	22	46	46		
System Totals		34967	61	206	474	966	8869	61	206	472	966	43836	61	206	474	966		

Figure 157. EMH Message Statistics report

When processing multi-subsystem log files, transaction messages from all IMS subsystems are combined into a single report.

The report heading contains the reporting period. **From** specifies the date and time of the first transaction to be processed, and **To** specifies the date and time of the last transaction to be processed. **Elapsed** is the reporting period elapsed time, the time between the first and last transactions that were processed.

The following fields appear in the report:

Transact Code

The IFP transaction code name.

Routing Code

The Routing Code of the IFP transaction.

Transaction messages are reported in three categories:

Locally Processed

Transaction messages processed locally

Globally Processed

Transaction messages processed globally via the shared EMHQ

Total (Local+Global)

Statistics for local and global messages combined

Within each category, the following statistics are presented:

Count The number of transactions that were processed in the report period.

In-Length

The average and maximum input message length.

Out-Length

The average and maximum output message length.

DEDB Update Activity report

The DEDB Update Activity report can help you determine the cost of data entry database (DEDB) calls, and shows the rate of processing against your DEDB databases.

The report shows:

- Number of SDEP and DDEP segments updated
- Segment update rate
- Number of database opens
- Number of database errors

Log records: This report is derived from IMS log records 5921, 5924, 5950.

Uses

This report can be used to:

- Determine the most highly used DEDB databases (and their areas), allowing you to prioritize their tuning, reorganization, and other database administration tasks.
- View DEDB database update activity when diagnosing application performance problems.

Report options

To specify the report options, select **DEDB Update Activity** from the Fast Path Resource Usage Reports in a Log Report Set.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output is written to the data set specified by the Report Output DDname.

Object Lists can be used to specify that only certain values be included in or excluded from the report for:

- DEDB Database name
- DEDB Area name
- IMS Subsystem ID

Report content

This figure shows an example of the DEDB Update Activity report applicable to both local and global (shared EMHQ) transaction processing.

IMS Performance Analyzer DEDB Update Activity - IMSA										
From 14Apr2018 8.54.43.80		To 14Apr2018 8.54.46.00		Elapsed=		0 Hrs		0 Mins		2.201.638 Secs
Database Name	Area Name	Root/DDEP Update	SDEP Insert	ADS Open	New EQE	Updates /sec	---- First Date	Update Time	---- Last Date	Update Time
ACCOUNTS	ACCOUNTS	9	12	0	0	16.2	14Apr2018	8.54.44.57	14Apr2018	8.54.45.86
CLIENTS	CLIENTA1	6	6	0	0	6.1	14Apr2018	8.54.43.86	14Apr2018	8.54.45.80
	CLIENTA2	2	2	0	0	6.8	14Apr2018	8.54.44.62	14Apr2018	8.54.45.21
CLIENTS	*Total*	8	8	0	0	8.2	14Apr2018	8.54.43.86	14Apr2018	8.54.45.80
FINANCE	FINANCE	103	0	1	0	49.9	14Apr2018	8.54.43.94	14Apr2018	8.54.46.00
ORDERS	ORDERS	27	74	0	0	48.9	14Apr2018	8.54.43.94	14Apr2018	8.54.46.00
STOCK	STOCKA1	1	21	0	0	22.0	14Apr2018	8.54.45.39	14Apr2018	8.54.45.39
	STOCKA2	2	43	0	0	154.1	14Apr2018	8.54.44.69	14Apr2018	8.54.45.21
	STOCKA3	2	46	0	0	78.9	14Apr2018	8.54.45.35	14Apr2018	8.54.45.96
	STOCKA4	1	22	0	0	23.0	14Apr2018	8.54.45.43	14Apr2018	8.54.45.43
STOCK	*Total*	6	132	0	0	160.5	14Apr2018	8.54.44.69	14Apr2018	8.54.45.96
System Totals		4804	721	1	0	2509.4	14Apr2018	8.54.43.80	14Apr2018	8.54.46.00

Figure 158. DEDB Update Activity report

When processing multi-subsystem log files:

- One report is written for each subsystem, with the subsystem name in the report heading
- A total system wide report is written, with **TOTAL** appearing in the report heading

The report heading contains the reporting period. **From** specifies the date and time of the first transaction to be processed, and **To** specifies the date and time of the last transaction to be processed. **Elapsed** is the reporting period elapsed time, the time between the first and last transactions that were processed.

The following fields appear in the report:

Database Name

DEDB database name

Area Name

DEDB Area name

Root/DDEP Update

The number of Root and Direct dependent (DDEP) segment updates

SDEP Insert

The number of Sequential dependent (SDEP) segment inserts

ADS Open

The number of times that the Area data set was opened during the report period

New EQE

The number of new Error Queue Elements (EQEs) that occurred during the report period

Updates/sec

The average number of segment updates per second during the report period

First Update

The date and time of the first update to a segment in the report period

Last Update

The date and time of the last update to a segment in the report period

VSO Statistics report

The VSO Statistics report provides detailed statistics on VSO resource usage.

The VSO resources include:

- Data spaces for SHARELVL 0/1
- Coupling Facility for SHARELVL 2/3
- Lookaside Buffers for SHARELVL 2/3
- DEDB Area data set I/O

This report will only be produced if there were VSO writes to disk in the log reporting period.

Log records: This report is derived from IMS log records 5910, 5912.

Uses

This report can be used to determine how well VSO is performing by:

- Comparing Data Space I/O with Area data set I/O, for SHARELVL 0/1
- Comparing Coupling Facility I/O with Area data set I/O, for SHARELVL 2/3
- Checking the Lookaside hit rate, for SHARELVL 2/3
- Ensuring that Castout frequency and elapsed times are within expectations

Report options

To specify the report options, select **VSO Statistics** from the Fast Path Resource Usage Reports in a Log Report Set.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output is written to the data set specified by the Report Output DDname.

By using Object Lists, you can specify that only certain values be included in or excluded from the report for:

- DEDB database name
- DEDB Area name
- IMS subsystem ID

Report content

This is an example of the VSO Statistics report applicable to both local and global (shared EMHQ) transaction processing.

The VSO Statistics report is broken down into two separate reports:

1. SHARELVL 0/1, where VSO uses Data Spaces for single IMS subsystems.
2. SHARELVL 2/3, where VSO uses the Coupling Facility for sharing by multiple IMS subsystems, and optionally Lookaside-pool buffers for local IMS subsystems.

IMS Performance Analyzer										
VSO Activity Summary: SHARELVL 0/1 - IMSA										
From 14Apr2018 8.00.00.01		To 14Apr2018 9.01.02.01		Elapsed=		1 Hrs	1 Mins	0.425.492 Secs		
Database Name	Area Name	--IMS from/to Gets	VSO DS-- Puts	-----VSO DS Gets	from/to Puts	DASD----- Castouts	I/O Scheduled	I/O Elapsed HH:MM:SS:TH		
STOCK	STOCKA1	4901	8498	547	387	1	12	1.43.11		
	STOCKA2	6462	6743	491	256	1	15	2.13.14		
STOCK	*Total*	11363	15241	1038	643	2	27	3.56.25		
System Totals		344352	492812	67574	38564	78	387	1.12.35.65		

VSO Activity Summary: SHARELVL 2/3 - IMSA										
VSO Activity Summary: SHARELVL 2/3 - IMSA										
From 14Apr2018 8.00.00.01		To 14Apr2018 9.01.02.01		Elapsed=		1 Hrs	1 Mins	0.425.492 Secs		
Database Name	Area Name	---IMS from/to Gets	CF Puts	-----VSO CF Gets	from/to Puts	DASD----- Castouts	Searches	Lookaside-Pool Hits Pct		
ORDERS	ORDERA1	4901	8498	547	387	1	134875	75621	53.4	72071
	ORDERA2	6462	6743	491	256	1	144470	79621	52.7	73957
ORDERS	*Total*	11363	15241	1038	643	2	279345	155242	53.1	146028
System Totals		344352	492812	67574	38564	78	744470	365432	54.9	345428

Figure 159. VSO Statistics report

When processing multi-subsystem log files:

- One report is written for each subsystem, with the subsystem name in the report heading
- A total system wide report is written, with **Total** appearing in the report heading

The report heading contains the reporting period. **From** specifies the date and time of the first transaction to be processed, and **To** specifies the date and time of the last transaction to be processed. **Elapsed** is the reporting period elapsed time, the time between the first and last transactions that were processed.

The following fields appear in the report:

Database Name

DEDB Database name

Area name

DEDB Area data set name

SHARELVL 0/1

IMS from/to VSO DS

The number of VSO Data Space I/O requests, broken down by:

Gets The total number of CIs read from the data space.

Puts The total number of CIs written to the data space. This number is the total number of CIs that would have been sent to OTHREAD if the areas were non-VSO.

VSO DS from/to DASD

The number of VSO DASD I/O requests, broken down by:

Gets The number of CIs read from DASD into a data space.

Puts The number of CIs written from a data space to DASD.

Castouts

The number of times that Castout was scheduled for this data space.

I/O Scheduled

The total number of times that I/O was scheduled to harden the data space (write VSO updates to DASD).

I/O Elapsed

The total elapsed time (HH.MM.SS.TH) taken to harden the data space (write VSO updates to DASD).

SHARELVL 2/3**IMS from/to CF**

The number of VSO Coupling Facility I/O requests, broken down by:

Gets The total number of CIs read from the coupling facility structure.

Puts The total number of CIs written to the coupling facility structure.

VSO CF from/to DASD

The number of VSO DASD I/O requests, broken down by:

Gets The number of CIs read from DASD into the coupling facility.

Puts The number of CIs written from the coupling facility to DASD.

Castouts

The number of times that Castout was scheduled for this coupling facility.

Lookaside-Pool Buffer

The following fields are presented only when the DEDB Area is using the Lookaside Pool.

Searches

The number of times that the Lookaside Pool was searched.

Hits The number of times that the CI was successfully found in the Lookaside Pool.

Pct The percentage of searches that successfully found the CI in the Lookaside Pool.

Hit Valid

The number of times that the CI was found in the Lookaside Pool, and the buffer was valid.

Pct The percentage of searches that successfully found the CI in the Lookaside Pool, and the buffer was valid.

Note: Searches can be non-zero when Lookaside is not used. This is explained by the way VSO uses its buffers. SVSO private buffer pools can be defined by DBDNAME, AREANAME, or just by BufferSize and the LKASID option. When defined using DBDNAME, all areas in the database share the same buffer pool. VSOSPGET (the number of times the buffer pool was searched) in the 5912 log record is populated from PPDETGET. The PPDE is the control block that represents the buffer pool.

For non-lookaside pools, PPDETGET is the number of times a buffer was obtained (not searched) from the pool. PPDETGET is reset at Castout in module DBFVXOC0, which is when the 5912 record is cut. The first 5912 record cut is usually the last area in collating sequence, since the DMACs are chained off ESCDVSOS in LIFO sequence. This area has the correct VSOSPGET (PPDETGET) value, and this is the number of buffers obtained from the pool since last Castout. PPDETGET is reset before each new area is processed (castout). During this time, applications may obtain some buffers from the pool, and PPDETGET will reflect the number obtained during this (short) period of time. This applies to all areas sharing the same buffer pool.

In summary, the buffer pools can be shared between areas, but the 5912 record is unique per area. Unless each area is defined with its own dedicated buffer pool, then the buffer pool statistics in the 5912 log records do not reflect the buffer usage for that area. Note that the actual CF I/O counts are accurate because they are maintained in a control block that is unique to each area and CF structure.

ATF Enhanced Summary reports

This report category provides details and statistics from the OMEGAMON ATF Enhanced Summary record.

The ATF Enhanced Summary reports section includes:

- Transit Options
- Extract
- Transaction Analysis
- DLI Call Analysis
- DB2 Call Analysis
- MQ Call Analysis

ATF Enhanced Summary Extract

The ATF Enhanced Summary Extract provides a facility to extract fields from the ATF Enhanced Summary record to a file for later use by external programs or for downloading to a PC.

Extract options

To specify the extract options, select the ATF Enhanced Summary **Extract** in the Log Report Set.

The ATF Enhanced Summary Transit Options specify the 2-digit hexadecimal log record code of the OMEGAMON ATF Enhanced Summary records written to the IMS log. Those options also specify whether to process exception transactions only.

You can specify a report interval, which applies to the reduced data file after applying the Global (or runtime) report interval.

The extract includes the ATF Enhanced Summary record fixed part of the record, and optionally, up to six repeating sections. The HEADER section is always included; the six sections are as follows:

- DATABASE
- DLI DB
- DLI TM
- DB2
- MQ
- OTHER

The extract for each section is written to the extract data set name that you specify for that section.

You can choose to include field labels, which is typically useful when you will examine the data in a spreadsheet. If you intend to load the data into a database, be aware that many database systems treat the first row as a row of data rather than a row of field labels. You can also specify the character to use as a field delimiter in the extract.

You can include or exclude records that have a specific transaction, program, database, user ID, or IMS subsystem by specifying an object list.

Extract content

OMEGAMON V530 introduced the functionality to create an ATF Enhanced Summary record in the IMS log. This record consists of a fixed section, also known as the header, and up to six repeating sections. You can extract data from each of these sections into separate CSV files.

The data in an ATF enhanced summary record is hierarchical; one transaction can use many databases, and each database might have many calls made against it. Therefore, a single row in the CSV cannot completely represent a single ATF Enhanced Summary record. The facility to output the data in seven separate CSVs enables you to extract the particular data you need. The sections are as follows:

Table 6. Sections of the ATF Enhanced Summary record

Section	Description
HEADER	The start of the log record, containing the log code, subsystem, and time stamp. It also includes: <ul style="list-style-type: none">• details about the transaction such as who ran it and when, and tokens to uniquely identify the unit-of-work• overall response time and resource usage performance measurements• information about what other sections to expect in the remainder of the record
DATABASE	Databases referenced by the transaction
DLI DB	DLI DB call types, counts, elapsed times, and CPU times
DLI TM	DLI TM call types, counts, elapsed times, and CPU times
DB2	DB2 call types, counts, elapsed times, and CPU times
MQ	MQ call types, counts, elapsed times, and CPU times
OTHER	Other counts, elapsed times, and CPU times

For descriptions of the individual fields, see the information about **Description of Application Trace Facility summary log record** in the IBM OMEGAMON for IMS documentation.

The following figure shows an example of a report which provides a summary of the extract processing.

Extract completed
Extract DDname .: ATFHEAD
Data Set Name . .: ABC.IMSPA.HEAD1.CSV
Record Count . .: 265

Figure 160. ATF Enhanced Summary Extract: Summary report

ATF Enhanced Summary Transaction Analysis report

The ATF Enhanced Summary Transaction Analysis report can show performance by transaction or database depending on the options you select. The report is available in both List and Summary format.

The List report is available with or without the Database option selected.

List without Database

All transactions are listed with elapsed times and CPU time broken down by dependent region.

List with Database

All databases used by the transaction are listed with DLI Gets and Updates broken down into call counts, elapsed time, and CPU time.

The Summary report is available with or without the Database option selected

Summary without Database

All transactions are summarized by transaction and program with elapsed time and CPU time averaged by dependent region.

Summary with Database

All database usage is summarized with DLI Gets and Updates broken down into call counts, elapsed time, and CPU time.

Report options

To specify the report options, select the ATF Enhanced Summary **Transaction Analysis** report in a Log Report Set.

You can produce the following reports by selecting the List, Summary and Database options:

- List
- List showing performance by database
- Summary
- Summary showing performance by database

You can specify selection criteria for one or more of the following:

- Transaction code
- Program
- Database
- User ID
- IMS subsystem ID

A report interval can be specified. This applies to the reduced data file after the global (or runtime) report interval takes effect.

The report output is written to the data set specified by the Report Output DDnames.

On the ATF ES Transit Options panel, the following options are applicable:

- **OMEGAMON ATF ES Log Code**, which specifies the log record code of the OMEGAMON ATF Enhanced Summary records.
- **Process exception transactions only**, which you select to process only transactions that match defined exception criteria.

Report content

These examples show the four possible ATF Enhanced Summary Transaction Analysis reports.

IMS Performance Analyzer OMEGAMON ATF Transaction List												
Report from 01Feb2018 14:42:37.96										Page 1		
Time	Trancode	InputQ	Process	DLI	DB2	DEP	DLI	DB2	MQ	CTL	DLISAS	Total
14:42:37.965804	CEXSCONV	0.002881	5.011627	0.001258	0.003130	0.003970	0.000526	0.001820	0.000000	0.000000	0.000000	0.003970
14:43:52.897459	CEXSCONV	0.007209	5.015028	0.002944	0.002780	0.003842	0.000525	0.001709	0.000000	0.000000	0.000000	0.003842
14:45:09.335656	CEXSCONV	0.003973	5.011173	0.001779	0.002370	0.003632	0.000563	0.001536	0.000000	0.000000	0.000000	0.003632
14:46:24.258090	CEXSCONV	0.007129	5.014297	0.001832	0.002508	0.003434	0.000520	0.001528	0.000000	0.000000	0.000000	0.003434
14:47:38.641717	CEXSCONV	0.005422	5.009537	0.002278	0.002468	0.003869	0.000539	0.001645	0.000000	0.000000	0.000000	0.003869

Figure 161. OMEGAMON ATF Transaction List report

Table 7. OMEGAMON ATF Transaction List columns

Field	Field group	Description
Time	N/A	Time when the transaction started
Trancode	N/A	IMS transaction name
InputQ	Elapsed Time	Elapsed time the input message spent on the IMS local or shared queues
Process	Elapsed Time	Elapsed processing time
DLI	Elapsed Time	Elapsed time spent in DL/I calls
DB2	Elapsed Time	Elapsed time spent in DB2 SQL calls
DEP	CPU Time	CPU time spent in the dependent region
DLI	CPU Time	CPU time spent in DL/I calls
DB2	CPU Time	CPU time spent in DB2 SQL calls
MQ	CPU Time	CPU time spent in IBM MQ calls
CTL	CPU Time	CPU time spent in the control region TCB
DLISAS	CPU Time	CPU time spent in the DLISAS TCB
Total	CPU Time	Total CPU time

IMS Performance Analyzer OMEGAMON ATF Transaction-Database List											
Report from 01Feb2018 14:42:37.96											
Time	Trancode	Process	Elap DLI	CPU DLI	Database	Gets	Elap Get	CPU Get	Updates	Elap Upd	CPU Upd
14:42:37.965804	CEXSCONV	5.011627	0.001258	0.000526	DI21PART	2	0.000300	0.000143	3	0.000265	0.000217
14:43:52.897459	CEXSCONV	5.015028	0.002944	0.000525	DI21PART	2	0.000295	0.000141	3	0.000226	0.000214
14:45:09.335656	CEXSCONV	5.011173	0.001779	0.000563	DI21PART	2	0.000505	0.000164	3	0.000214	0.000214
14:46:24.258090	CEXSCONV	5.014297	0.001832	0.000520	DI21PART	2	0.000472	0.000149	3	0.000213	0.000213
14:47:38.641717	CEXSCONV	5.009537	0.002278	0.000539	DI21PART	2	0.000283	0.000145	3	0.000226	0.000226

Figure 162. OMEGAMON ATF Transaction-Database List report

Table 8. OMEGAMON ATF Transaction-Database List columns

Field	Description
Time	The time when the application started
Trancode	IMS transaction name
Process	Processing time
Elap DLI	Elapsed time spent in DL/I calls
CPU DLI	CPU processing time spent in DL/I calls
Database	Database name
Gets	The number of gets from the database
Elap Get	Elapsed time spent performing database gets
CPU Get	CPU processing time spent performing database gets
Updates	The number of updates from the database
Elap Upd	Elapsed time spent performing database updates
CPU Upd	CPU processing time spent performing database updates

IMS Performance Analyzer OMEGAMON ATF Transaction Summary											
Report from 01Feb2018 14:42:37.96 to 01Feb2018 14:47:38.64											
Tran ----- Average Elapsed Time -----											
Trancode	Program	Count	InputQ	Process	DLI	DB2	DEP	DLI	DB2	MQ	CTL
CEXSCONV	CEXSPGM	5	0.005322	5.012332	0.002018	0.002651	0.003749	0.000534	0.001647	0.000000	0.000000
Total		5	0.005322	5.012332	0.002018	0.002651	0.003749	0.000534	0.001647	0.000000	0.000000

Figure 163. OMEGAMON ATF Transaction Summary report

Table 9. OMEGAMON ATF Transaction Summary columns

Field	Field group	Description
Trancode	N/A	IMS transaction name
Program	N/A	Name of the program scheduling block (PSB)
Tran Count	N/A	Transaction count
InputQ	Average Elapsed Time	Average elapsed time the input message spent on the IMS local or shared queues

Table 9. OMEGAMON ATF Transaction Summary columns (continued)

Field	Field group	Description
Process	Average Elapsed Time	Average processing time
DLI	Average Elapsed Time	Average elapsed time spent in DL/I calls
DB2	Average Elapsed Time	Average elapsed time spent in DB2 SQL calls
DEP	Average CPU Time	Average CPU time spent in the dependent region
DLI	Average CPU Time	Average CPU time spent in DL/I calls
DB2	Average CPU Time	Average CPU time spent in DB2 SQL calls
MQ	Average CPU Time	Average CPU time spent in IBM MQ calls
CTL	Average CPU Time	Average CPU time spent in the control region TCB
DLISAS	Average CPU Time	Average CPU time spent in the DLISAS TCB
Total	Average CPU Time	Average CPU time

IMS Performance Analyzer OMEGAMON ATF Database Summary										
Report from 01Feb2018 14:42:37.96 to 01Feb2018 14:47:38.64										
Page 1										
Database	Reads	Average Elapsed	CPU	Total Elapsed	CPU	Updates	Average Elapsed	CPU	Total Elapsed	CPU
DI21PART	10	0.000185	0.000074	0.001855	0.000743	15	0.000076	0.000072	0.001144	0.001083
Total	10	0.000185	0.000074	0.001855	0.000743	15	0.000076	0.000072	0.001144	0.001083

Figure 164. OMEGAMON ATF Database Summary report

Table 10. OMEGAMON ATF Database Summary columns

Field	Field group	Description
Database	N/A	Database name
Reads	N/A	The number of read operations
Elapsed	Average	Average elapsed time of those reads
CPU	Average	Average CPU time of those reads
Elapsed	Total	Total elapsed time of those reads
CPU	Total	Total CPU time of those reads
Updates	N/A	The number of update operations
Elapsed	Average	Average elapsed time of those updates
CPU	Average	Average CPU time of those updates
Elapsed	Total	Total elapsed time of those updates

Table 10. OMEGAMON ATF Database Summary columns (continued)

Field	Field group	Description
CPU	Total	Total CPU time of those updates

ATF Enhanced Summary DLI Call Analysis report

The ATF Enhanced Summary DLI Call Analysis report can show database activity within transactions. The report is available in both List and Summary format.

List Within each transaction, DLI activity is reported by database and call type. Whether Database is selected has no effect.

The Summary report is available with or without the Database option selected

Summary without Database

When Database is not selected, DLI activity is summarized by transaction, with DLI call counts, average elapsed time and CPU time.

Summary with Database

When Database is selected, DLI activity is summarized by database, with DLI call counts, average elapsed time and CPU time.

Report options

To specify the report options, select the ATF Enhanced Summary **DLI Call Analysis** report in a Log Report Set.

You can produce the following reports by selecting the List, Summary and Database options:

- List of DLI activity
- Summary showing DLI activity summarized by transaction
- Summary showing DLI activity summarized by database

You can specify selection criteria for one or more of the following:

- Transaction code
- Program
- Database
- User ID
- IMS subsystem ID

A report interval can be specified. This applies to the reduced data file after the global (or runtime) report interval takes effect.

The report output is written to the data set specified by the Report Output DDnames.

On the ATF ES Transit Options panel, the following options are applicable:

- **OMEGAMON ATF ES Log Code**, which specifies the log record code of the OMEGAMON ATF Enhanced Summary records.
- **Process exception transactions only**, which you select to process only transactions that match defined exception criteria.

Report content

These examples show the three possible ATF Enhanced Summary DLI Call Analysis reports.

IMS Performance Analyzer
OMEGAMON ATF DLI List

Report from 02Jan2018 10:04:07.94

Time	Trancode	Program	Process	DLI	Total	DLI	Database	Type	Count	Elapsed	DLI
10:04:07.944935	IVTNV	DFSIVP2	0.013984	0.006359	0.002561	0.001120	IVPDB2	GU	1	0.000295	0.000128
								STAT	3	0.000064	0.000060
15:22:43.055838	MQATREQ1	MQATPGM	0.802600	0.010961	0.174719	0.002962	DI21PART	GHU	2	0.000439	0.000272
								ISRT	1	0.000140	0.000137
								REPL	1	0.000128	0.000128
								DLET	1	0.000090	0.000090
								STAT	3	0.000043	0.000042
							IVPDB1	GHU	3	0.000302	0.000106
								ISRT	1	0.000334	0.000178
								REPL	1	0.000034	0.000034
								DLET	1	0.000128	0.000128
							IVPDB2	GHU	3	0.000171	0.000082
								ISRT	1	0.000430	0.000070
								REPL	1	0.000026	0.000023
								DLET	1	0.000064	0.000064
15:22:44.862129	MQATREQ1	MQATPGM	0.280577	0.009757	0.011686	0.002275	DI21PART	GHU	2	0.000372	0.000143
								ISRT	1	0.000069	0.000069
								REPL	1	0.000073	0.000073
								DLET	1	0.000072	0.000072
								STAT	3	0.000038	0.000032
							IVPDB1	GHU	3	0.000227	0.000066
								ISRT	1	0.000386	0.000177
								REPL	1	0.000030	0.000026
								DLET	1	0.000128	0.000111
							IVPDB2	GHU	3	0.000179	0.000082
								ISRT	1	0.000146	0.000069
								REPL	1	0.000030	0.000030
								DLET	1	0.000060	0.000060
15:22:47.151796	IVTNO	DFSIVP1	0.006771	0.000431	0.001903	0.000192	IVPDB1	GU	1	0.000397	0.000159
15:22:48.158186	IVTNO	DFSIVP1	0.006664	0.001482	0.001180	0.000323	IVPDB1	ISRT	1	0.000633	0.000286
15:22:49.162697	IVTNO	DFSIVP1	0.004944	0.002099	0.001347	0.000401	IVPDB1	ISRT	1	0.001689	0.000358
15:22:50.169540	IVTNO	DFSIVP1	0.003772	0.001329	0.001197	0.000339	IVPDB1	ISRT	1	0.000855	0.000306
15:22:51.175578	IVTNO	DFSIVP1	0.003459	0.000874	0.000850	0.000186	IVPDB1	GU	1	0.000402	0.000150
15:22:52.184311	IVTNO	DFSIVP1	0.003533	0.000836	0.001023	0.000247	IVPDB1	GHU	1	0.000372	0.000147
								REPL	1	0.000064	0.000064
15:22:53.194390	IVTNO	DFSIVP1	0.003135	0.000781	0.000877	0.000190	IVPDB1	GU	1	0.000364	0.000154
15:22:54.199774	IVTNO	DFSIVP1	0.008117	0.002056	0.001207	0.000378	IVPDB1	GHU	1	0.000440	0.000153
								DLET	1	0.000193	0.000184

Figure 165. OMEGAMON ATF DLI List report

Table 11. OMEGAMON ATF DLI List columns

Field	Field group	Description
Time	N/A	Time when the application started
Trancode	N/A	Name of the transaction that was traced
Program	N/A	Name of the program scheduling block (PSB)
Process	Elapsed Time	Elapsed processing time
DLI	Elapsed Time	Elapsed time spent in DL/I calls
Total	CPU Time	Total CPU time
DLI	CPU Time	CPU time spent in DL/I calls
Database	N/A	Database name
Type	Call Summary	DL/I call type. See the information about DL/I call functions in the IMS documentation for more information about each call type.
Count	Call Summary	DL/I call count
Elapsed	Call Summary	Elapsed time spent for this call type

Table 11. OMEGAMON ATF DLI List columns (continued)

Field	Field group	Description
DLI	Call Summary	Time spent in DL/I calls for this call type

IMS Performance Analyzer OMEGAMON ATF DLI Summary by Database									
Report from 01Feb2018 14:42:37.96 to 01Feb2018 14:47:38.64									
Database	Tran Count	Trancode	Type	Count	Elapsed	CPU	Elapsed	CPU	Calls /Second
DI21PART	5	CEXSCONV	GHU	10	0.000185	0.000074	0.001855	0.000743	0.03
			ISRT	5	0.000070	0.000070	0.000354	0.000354	0.02
			REPL	5	0.000083	0.000074	0.000419	0.000371	0.02
			DLET	5	0.000074	0.000071	0.000370	0.000358	0.02
				25	0.000119	0.000073	0.002998	0.001825	0.08
Subtotal	5		GHU	10	0.000185	0.000074	0.001855	0.000743	0.03
Total			ISRT	5	0.000070	0.000070	0.000354	0.000354	0.02
			REPL	5	0.000083	0.000074	0.000419	0.000371	0.02
			DLET	5	0.000074	0.000071	0.000370	0.000358	0.02
	5			25	0.000119	0.000073	0.002998	0.001825	0.08

Figure 166. OMEGAMON ATF DLI Summary by Database report

Table 12. OMEGAMON ATF DLI Summary by Database columns

Field	Field group	Description
Database	N/A	Database name
Tran Count	N/A	Transaction count
Trancode	N/A	Name of the transaction that was traced
Type	Call	DL/I call type. See the information about DL/I call functions in the IMS documentation for more information about each call type.
Count	Call	DL/I call count
Elapsed	Average	Average elapsed time for this call type
CPU	Average	Average CPU time for this call type
Elapsed	Total	Total elapsed time for this call type
CPU	Total	Total CPU time for this call type
Calls/Second	N/A	Number of calls per second

IMS Performance Analyzer OMEGAMON ATF DLI Summary by Transaction												
Report from 01Feb2018 14:42:37.96 to 01Feb2018 14:47:38.64												
Trancode	Tran Count	Database	Type	Call Count	Average Elapsed	Average CPU	Total Elapsed	Total CPU	Average Process	Average Elapsed DLI	Average CPU Total	Average CPU DLI
CEXSCONV	5	DI21PART	GHU	10	0.000185	0.000074	0.001855	0.000743				
			ISRT	5	0.000070	0.000070	0.000354	0.000354				
			REPL	5	0.000083	0.000074	0.000419	0.000371				
			DLET	5	0.000074	0.000071	0.000370	0.000358				
Subtotal	5			25	0.000119	0.000073	0.002998	0.001825	5.012332	0.002018	0.003749	0.000534
Total			GHU	10	0.000185	0.000074	0.001855	0.000743				
			ISRT	5	0.000070	0.000070	0.000354	0.000354				
			REPL	5	0.000083	0.000074	0.000419	0.000371				
			DLET	5	0.000074	0.000071	0.000370	0.000358				
	5			25	0.000119	0.000073	0.002998	0.001825	5.012332	0.002018	0.003749	0.000534

Figure 167. OMEGAMON ATF DLI Summary by Transaction report

Table 13. OMEGAMON ATF DLI Summary by Transaction columns

Field	Field group	Description
Trancode	N/A	Name of the transaction that was traced
Tran Count	N/A	Transaction count
Database	N/A	Database name
Type	Call	DL/I call type. See the information about DL/I call functions in the IMS documentation for more information about each call type.
Count	Call	DL/I call count
Elapsed	Average	Average elapsed time for this call type
CPU	Average	Average CPU time for this call type
Elapsed	Total	Total elapsed time for this call type
CPU	Total	Total CPU time for this call type
Process	Average Elapsed	Average elapsed processing time
DLI	Average Elapsed	Average elapsed time spent in DL/I calls
Total	Average CPU	Total average CPU time
DLI	Average CPU	Total average time spent in DL/I calls

ATF Enhanced Summary DB2 Call Analysis report

The ATF Enhanced Summary DB2 Call Analysis report can show DB2 SQL call activity within transactions. The report is available in both List and Summary format.

List The List report shows DB2 activity within transaction by SQL call type, including call count, elapsed time and CPU time.

Summary

The Summary report shows DB2 activity summarized by transaction and SQL call type, including call count, elapsed time, and CPU time.

Report options

To specify the report options, select the ATF Enhanced Summary **DB2 Call Analysis** report in a Log Report Set.

You can produce the following reports by selecting the List and Summary options:

- List of DB2 activity within each transaction
- Summary showing DB2 activity summarized by transaction and SQL call type

You can specify selection criteria for one or more of the following:

- Transaction code
- Program
- User ID
- IMS subsystem ID

A report interval can be specified. This applies to the reduced data file after the global (or runtime) report interval takes effect.

The report output is written to the data set specified by the Report Output DDnames.

On the ATF ES Transit Options panel, the following options are applicable:

- **OMEGAMON ATF ES Log Code**, which specifies the log record code of the OMEGAMON ATF Enhanced Summary records.
- **Process exception transactions only**, which you select to process only transactions that match defined exception criteria.

Report content

These examples show the ATF Enhanced Summary DB2 Call Analysis reports.

IMS Performance Analyzer OMEGAMON ATF DB2 List									
Report from 01Feb2018 14:42:37.96									
Page 1									
Time	Trancode	Program	Process	DB2	Total	DB2 Type	Count	Elapsed	DB2
14:42:37.965804	CEXSCONV	CEXSPGM	5.011627	0.003130	0.003970	0.001820	OTHER	1	0.000030
						SELECT	14	0.000767	0.000598
						INSERT	1	0.000132	0.000119
						UPDATE	1	0.000149	0.000149
						DELETE	1	0.000141	0.000141
						OPEN	1	0.000171	0.000171
						TOTAL	19	0.001391	0.001209
14:43:52.897459	CEXSCONV	CEXSPGM	5.015028	0.002780	0.003842	0.001709	OTHER	1	0.000030
						SELECT	14	0.000710	0.000624
						INSERT	1	0.000112	0.000112
						UPDATE	1	0.000146	0.000146
						DELETE	1	0.000137	0.000137
						OPEN	1	0.000167	0.000167

Figure 168. OMEGAMON ATF DB2 List report

Table 14. OMEGAMON ATF DB2 List columns

Field	Field group	Description
Time	N/A	Time when the application started
Trancode	N/A	Name of the transaction that was traced
Program	N/A	Name of the program scheduling block (PSB)
Process	Elapsed Time	Elapsed processing time
DB2	Elapsed Time	Elapsed time spent in DB2 SQL calls

Table 14. OMEGAMON ATF DB2 List columns (continued)

Field	Field group	Description
Total	CPU Time	Total CPU time
DB2	CPU Time	CPU time spent in DB2 SQL calls
Type	Call Summary	DB2 call type
Count	Call Summary	DB2 call count
Elapsed	Call Summary	Elapsed time spent for this call type
DB2	Call Summary	Time spent in DB2 calls for this call type

IMS Performance Analyzer OMEGAMON ATF DB2 Summary											
Report from 01Feb2018 14:42:37.96 to 01Feb2018 14:47:38.64											
Tran - Average Elapsed - --- Average CPU --- Call											
Trancode	Program	Count	Process	DB2	Total	DB2	Type	Count	----- Average Elapsed	----- CPU	Page 1 ----- Total Elapsed ----- CPU
CEXSConv	CEXSPGM	5	5.012332	0.002651	0.003749	0.001647	OTHER	5	0.000027	0.000027	0.000136
							SELECT	70	0.000044	0.000038	0.003097
							INSERT	5	0.000120	0.000113	0.000603
							UPDATE	5	0.000152	0.000144	0.000761
							DELETE	5	0.000125	0.000125	0.000625
							OPEN	5	0.000165	0.000151	0.000825
							TOTAL	95	0.000063	0.000057	0.006048
Total		5	5.012332	0.002651	0.003749	0.001647	OTHER	5	0.000027	0.000027	0.000136
							SELECT	70	0.000044	0.000038	0.003097
							INSERT	5	0.000120	0.000113	0.000603
							UPDATE	5	0.000152	0.000144	0.000761
							DELETE	5	0.000125	0.000125	0.000625
							OPEN	5	0.000165	0.000151	0.000825
							TOTAL	95	0.000063	0.000057	0.006048

Figure 169. OMEGAMON ATF DB2 Summary report

Table 15. OMEGAMON ATF DB2 Summary columns

Field	Field group	Description
Trancode	N/A	Name of the transaction that was traced
Program	N/A	Name of the program scheduling block (PSB)
Tran Count	N/A	Transaction count
Process	Average Elapsed	Average elapsed processing time
DB2	Average Elapsed	Average elapsed time spent in DB2 calls
Total	Average CPU	Average CPU time
DB2	Average CPU	Average CPU time spent in DB2 SQL calls
Call Type	N/A	DB2 call type
Count	N/A	Number of calls of each call type
Elapsed	Average	Average elapsed time for each call of this type
CPU	Average	Average CPU time for each call of this type
Elapsed	Total	Total elapsed time for each call of this type
CPU	Total	Total CPU time for each call of this type

ATF Enhanced Summary MQ Call Analysis report

The ATF Enhanced Summary MQ Call Analysis report can show IBM MQ call activity within transactions. The report is available in both List and Summary format.

List The List report shows MQ activity within transaction by call type, including elapsed time and CPU time.

Summary

The Summary report shows MQ activity summarized by transaction and call type, including call count, average elapsed time, and CPU time.

Report options

To specify the report options, select the ATF Enhanced Summary **MQ Call Analysis** report in a Log Report Set.

You can produce the following reports by selecting the List and Summary options:

- List of MQ activity within each transaction
- Summary showing MQ activity summarized by transaction and call type

You can specify selection criteria for one or more of the following:

- Transaction code
- Program
- User ID
- IMS subsystem ID

A report interval can be specified. This applies to the reduced data file after the global (or runtime) report interval takes effect.

The report output is written to the data set specified by the Report Output DDnames.

On the ATF ES Transit Options panel, the following options are applicable:

- **OMEGAMON ATF ES Log Code**, which specifies the log record code of the OMEGAMON ATF Enhanced Summary records.
- **Process exception transactions only**, which you select to process only transactions that match defined exception criteria.

Report content

These examples show the ATF Enhanced Summary MQ Call Analysis reports.

IMS Performance Analyzer OMEGAMON ATF MQ List									
Report from 01Feb2018 14:42:02.46								Page	1
Time	Trancode	Program	Process	MQ	Total	MQ Type	Count	Elapsed	MQ
14:42:02.465064	MQATREQ1	MQATPGM	0.434473	0.034159	0.032512	0.003342 MQGET	11	0.260438	0.001941
						MQPUT	1	0.000885	0.000392
						MQCONN	1	0.036697	0.005178
						MQOPEN	2	0.000390	0.000350
						MQCLOS	2	0.000141	0.000141
						MQDISC	1	0.000141	0.000141
14:42:03.932546	MQATREQ1	MQATPGM	0.307635	0.003409	0.012675	0.001971 MQGET	2	0.251036	0.000437
						MQPUT	2	0.001047	0.000415
						MQCONN	1	0.000009	0.000009
						MQOPEN	2	0.005076	0.000312
						MQCLOS	2	0.000115	0.000114
						MQDISC	1	0.000145	0.000145
14:42:18.398551	MQATREQ1	MQATPGM	0.298245	0.004505	0.015945	0.003005 MQGET	3	0.252283	0.000760
						MQPUT	5	0.007035	0.001205
						MQCONN	1	0.000013	0.000013

Figure 170. OMEGAMON ATF MQ List report

Table 16. OMEGAMON ATF MQ List columns

Field	Field group	Description
Time	N/A	Time when the application started
Trancode	N/A	Name of the transaction that was traced
Program	N/A	Name of the program scheduling block (PSB)
Process	Elapsed Time	Elapsed processing time
MQ	Elapsed Time	Elapsed time spent in IBM MQ calls
Total	CPU Time	Total CPU time
MQ	CPU Time	CPU time spent in MQ calls
Type	Call Summary	MQ call type. See the information about IBM MQ function calls in the IBM MQ documentation for more information about each call type.
Count	Call Summary	MQ call count
Elapsed	Call Summary	Elapsed time spent for this call type
MQ	Call Summary	Time spent in MQ calls for this call type

IMS Performance Analyzer OMEGAMON ATF MQ Summary											
Report from 01Feb2018 14:42:02.46 to 01Feb2018 14:48:05.71											
Trancode	Program	Tran Count	Average Process	Elapsed MQ	Average Total	CPU MQ	Call Type	Count	Average Elapsed	CPU	Page 1 Total Elapsed CPU
MQATREQ1	MQATPGM	40	0.600211	0.005793	0.079770	0.002633	MQPUT	7,390	0.002029	0.000138	14.995819 1.025705
							MQCONN	8,340	0.000771	0.000146	6.432410 1.223333
							MQCLOS	40	0.001006	0.000141	0.040257 0.005676
							MQSUB	80	0.000237	0.000172	0.019028 0.013833
Total		40	0.600211	0.005793	0.079770	0.002633	MQPUT	7,390	0.002029	0.000138	14.995819 1.025705
							MQCONN	8,340	0.000771	0.000146	6.432410 1.223333
							MQCLOS	40	0.001006	0.000141	0.040257 0.005676
							MQSUB	80	0.000237	0.000172	0.019028 0.013833

Figure 171. OMEGAMON ATF MQ Summary report

Table 17. OMEGAMON ATF MQ Summary columns

Field	Field group	Description
Trancode	N/A	Name of the transaction that was traced
Program	N/A	Name of the program scheduling block (PSB)
Tran Count	N/A	Transaction count
Process	Average Elapsed	Average elapsed processing time
MQ	Average Elapsed	Average elapsed time spent in MQ calls
Total	Average CPU	Average CPU time
MQ	Average CPU	Average CPU time spent in MQ calls
Call Type	N/A	MQ call type
Count	N/A	Number of calls of each call type
Elapsed	Average	Average elapsed time for each call of this type
CPU	Average	Average CPU time for each call of this type
Elapsed	Total	Total elapsed time for each call of this type
CPU	Total	Total CPU time for each call of this type

Trace reports

The Trace reports provide a chronological listing of Log data. Although the Transaction Transit Log and Fast Path Transit Log are also chronological listings, they do not appear here, but rather with their respective Transit report categories because they utilize common Transit Options and report processing.

DC Queue Manager Trace report

The DC Queue Manager Trace report provides a record of all DC-related activity for the specified time period. It gives you detailed information about the DC aspects of individual transactions.

You can also request the DC UOW Tracker report. This allows you to trace transaction message flow using the IMS Tracking UOW.

The DC Queue Manager Trace report is a formatted printout of selected log records. There is no summarizing analysis.

Log records: This report is derived from IMS log records 01, 03, 07, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 72.

Uses

You should use the DC Queue Manager Trace report only when you can't determine the cause of poor response or inefficient use of resources from the other, more general reports. Probably other reports have helped you focus on certain transactions or time periods, which you can now examine in detail in the DC Queue Manager Trace report.

Report options

To specify the report options, select **DC Queue Manager Trace** from the Trace Reports in a Log Report Set.

The report options are:

- Select either to print LTERM instead of VTAM Node names or Line/Terminal values. Whatever the choice, the column heading in the report is shown as **LTERM**.
- You can request to print complete transactions. This ensures that all messages associated with a transaction are reported, regardless of the filtering options in effect. For example, if you specify `INCLUDE(MSGID(TR*))` to only include messages for transactions that start with TR, then IMS PA also reports the output messages for these transactions, even though their Message ID does not match TR*.
- You can request to print the entire message text for 01/03 log records. Otherwise, only the first 64 bytes of each text segment is reported.
- You can request to include the Tracking UOW for each log record in the report. This option changes the format of the report to include additional information. Specify the required format of the UTC time stamp for the DC UOW Tracker report:
 1. Convert the UTC from GMT to local time by applying the local time zone offset. This is the default.
 2. Do not convert the UTC to local time. The UTC is reported as it appears in the log record without the time zone offset applied.
- A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.
- The report output data set is controlled by specifying the **Report Output DDname**.
- Specify **Selection Criteria** to include or exclude particular values from the report for:
 - Lines/Terminals (LINE/PTERM; line and terminal numbers)
 - Logical Terminals (LTERM names)
 - VTAM Nodes
 - Log Record Codes
 - Message IDs
 - User IDs
 - IMS Subsystem IDs

Report content: DC Trace

This is an example of the DC Queue Manager Trace report.

Start 04Jun2018 16.10.15.93				IMS Performance Analyzer DC Queue Manager Trace										Page	1
Time When	Term	IMS Id	Reason for Entry	DRRN 1st Record	DRRN This Rec	Data	Data	Data	Data	Data	Data	Data	Data	Data	Data
16101593	NE9N01ZA	IM02	Input(P)	3S	3S	'JDB #1'									
16101596			Msg Enq(P)	3S		/									
			Get Unique	3S		/Reg 2/									
16101593	NE9N01ZA	IM02	Pgm Swi(P)	5S	5S	'TIMULUDU TIMP03AC3'									
16101652			Msg Enq(P)	5S	2Q	/Reg 2/QBLOCK Allocated/									
16101593	NE9N01ZA	IM02	Output(P)	6S	6S	'TIMMIDBM *ENT JDB #1 UTDD						TIMP03		IM02'	
16101660			Msg Enq(P)	6S	4Q	/Reg 2/Q No 4/QBLOCK Allocated/									
			QBLK Sync	4Q	2Q	/Reg 2/									
			Free DRRNs	6S											
			QBLK Sync			/Reg 2/									
16101593	NE9N01ZA	IM02	Output(R)	6S	6S	'									
16101667			Msg Enq(R)	6S	4Q	/Q No 1/QBLOCK Allocated/									
			Get Unique	6S		/Q No56/									
16101678			Msg Deq	6S	4Q	/Q No 1/QBLOCK Freed/									
			Free DRRNs	6S											
16101679	1 1	IM02	Output(P)	5S	5S	'DFS2500I DATABASE DBCIDLDB SUCCESSFULLY ALLOCATED									
16101680			Msg Enq(P)	5S	2Q	/Q No 3/QBLOCK Allocated/									
16101682			Get Unique	5S		/Q No68/									
			Msg Deq	5S	2Q	/Q No 3/QBLOCK Freed/									
			Free DRRNs	5S											
16101697	1 1	IM03	Output(P)	4S	4S	'DFS2500I DATABASE DBCIDLDB SUCCESSFULLY ALLOCATED									
16101698			Msg Enq(P)	4S	2Q	/Q No 3/QBLOCK Allocated/									
16101701			Get Unique	4S		/Q No68/									
16101702			Msg Deq	4S	2Q	/Q No 3/QBLOCK Freed/									
			Free DRRNs	4S											

Figure 172. DC Queue Manager Trace report

Time When is in the format *hhmmssstth* with no periods.

In the **Term** column, VTAM node names are reported instead of Line/Terminal where appropriate. Question marks appear when the line/terminal information is unavailable.

IMS Id shows the IMS Subsystem ID.

Reason for Entry can be suffixed to indicate:

- (P) Message put onto the shared message queue
- (R) Message read from the shared message queue

DRRN is in decimal format and followed by either:

- Q Queue block
- S Short message data set
- L Long message data set

Report content: DC UOW Tracker

This is an example of the DC UOW Tracker report. This alternative format of the DC Queue Manager Trace provides additional information to trace transaction message flow using the IMS Tracking UOW.

Start 13Jun2018 16.08.02.29		IMS Performance Analyzer DC UOW Tracker									
UTC(Local) Msg#/Rel Time+	Reason for Entry	Dest In/Out	Userid/ Terminal	DRRN Msg/Rec	PST/ Data	Tracking UOW					Log Seq Number
						Org ID	Org STCK	Token	Proc ID	Proc STCK	Token
160802.298.728 Msg # 1	Input 01C18194	LTRM0003 ORDER	JOHN NODE0003	04000004 04000004	+0000	IMSP 'ORDER	B83991AAE59EFFF3 02500031110190086052693850	IMSP ORDR	B83991AAE59EFFF3 10-32-33'		000000000007691F
160802.298.728 Rel + 0	Enq SMB 350C84	LTRM0003 ORDER	JOHN NODE0003	04000004		IMSP	B83991AAE59EFFF3	IMSP	B83991AAE59EFFF3		0000000000076920
160802.298.990 Rel + 262	GU DLI 31E00064	LTRM0003 ORDER	JOHN NODE0003	04000004	0004	IMSP	B83991AAE59EFFF3	IMSP	B83991AAE59EFFF3		0000000000076923
160802.298.728 Msg # 2	Input 03C18190	LTRM0003 SECURE	JOHN NODE0003	04000009 04000009	+0000	IMSP 'SECURE	B83991AAE59EFFF3 50	IMSP '	B83991AAE83179F1		0000000000076926
160802.309.381 Rel + 10.653	Enq SMB 358C80	LTRM0003 SECURE	JOHN NODE0003	04000009		IMSP	B83991AAE59EFFF3	IMSP	B83991AAE83179F1		0000000000076927
	Free DRRN 33019E	LTRM0003 ORDER	JOHN NODE0003	04000004		IMSP	B83991AAE59EFFF3	IMSP	B83991AAE59EFFF3		0000000000076929
160802.310.081 Rel + 11.353	GU DLI 31E00064	LTRM0003 SECURE	JOHN NODE0003	04000009	0004	IMSP	B83991AAE59EFFF3	IMSP	B83991AAE83179F1		0000000000076930
160802.298.728 Msg # 3	Output 03C18210	LTRM0003 LTRM0003	JOHN NODE0003	04000004 04000004	+0000	IMSP 'You have authority to proceed with order number ORDR 10-32-330. '	B83991AAE59EFFF3	IMSP	B83991AAF41FA3F1		0000000000076932
					+0040	'Press Enter to continue.'					
160802.358.540 Rel + 59.812	Enq CNT 359C13	LTRM0003 LTRM0003	JOHN NODE0003	04000004	0004	IMSP	B83991AAE59EFFF3	IMSP	B83991AAF41FA3F1		0000000000076933

Figure 173. DC Queue Manager Trace: UOW Tracker report

The report contains the following information:

UTC(Local)

The log record's UTC time-stamp converted to local time by applying the time zone offset. The format of the UTC is *HHMMSS.THM.IJU* and has a precision of microseconds.

UTC(GMT)

The log record's UTC time-stamp as it appears in the Log record without the local time zone offset applied. The format of the UTC is *HHMMSS.THM.IJU* and has a precision of microseconds.

Msg#/Rel Time+

Msg# Msg# is reported for IMS Message (type 01/03) records. Starting at 1 for the first message of a UOW, this number is incremented by 1 for every subsequent message in the UOW.

Rel Time+

Rel Time+ is reported for all other IMS record types that have a time-stamp (UTC). It represents the elapsed time from the start of the UOW. The format is *+ MM.SS.THM.IJU* and has a precision of microseconds. Time starts from the enqueue (type 35) of the first message in the UOW, not the 01 record.

Reason for Entry

Reason for Entry describes the purpose of the log record.

Reason	Log code (hex)	Explanation
Input	01/03	IMS message with an SMB destination, typically a transaction input message. An 03 Input record usually indicates a program switch.
Msg Swi	01	IMS message with a CNT destination, usually a message to a terminal, printer or remote system.
Output	03	IMS message with a CNT destination, typically a transaction output message.
MSC Tx	01	Remote MSC transaction input message.
MSC Swi	03	Remote MSC program switch input message.
MSC Resp	01/03	Remote MSC transaction output response message.
APPC Tx	01/03	APPC transaction input message. Only transactions that use the IMS implicit LU 6.2 API are reported. Explicit CPI-C transactions do not use the IMS message queue.
APPC Resp	01/03	APPC transaction output response message.
OTMA Tx	01/03	OTMA transaction input message.
OTMA Resp	01/03	OTMA transaction output response message.
Cancelled	01/03	IMS message was cancelled.
Continued	01/03	Long IMS message continued onto a second or subsequent log record.
Prefix Add	30	Additional message prefix information (Format-Name).
GU DLI	31	Get Unique (GU) to the message queue to pass an incoming message to the application program.
GU Comms	31	Get Unique (GU) to start an outgoing message to its destination terminal.
Reject	32	Removal of an input message used by a program that abended.
Free DRRN	33	IMS message has been freed.
Msg Cancel	34	IMS message has been cancelled.
Enq SMB	35	Incoming message has been placed on the message queue.
Enq CNT	35	Outgoing message has been placed on the message queue.
Msg Deq	36	IMS message has been dequeued by the QMGR.
Msg Save	36	IMS message has been saved by the QMGR.
Msg Del	36	IMS message has been deleted by the QMGR.
QBLK Sync	37	IMS message transferred by the QMGR at sync point to its permanent destination.
SMB Return	38	Unprocessed input message has been returned to the input SMB after an application has abended.
CNT Releas	39	Output message was freed during cleanup processing of a RELEASE call.

In a shared queues environment, Reason for Entry can be suffixed to indicate:

- (P)** Message put onto the shared message queue
- (R)** Message read from the shared message queue

Directly beneath the Reason for Entry is the first 2 to 4 bytes of the log record, starting with the log record code. This contains additional message control information.

Dest In/Out

The Input Destination is the input CNT name where the message originated. The Output Destination is the message destination, either an SMB or CNT.

Userid

The Userid for this message.

Terminal

Physical Input Terminal ID (PTERM). Usually this is the VTAM Node name or Line/Terminal number. For APPC messages, this is the Network ID. For OTMA messages, this is the Tpipe name.

DRRN Msg/Rec

The Message DRRN is the DRRN of the current message. It identifies the first log record for this message. The Record DRRN is the DRRN of the current log record. It identifies a continuation of the message to a second or subsequent log record.

PST The Region PST ID where the message was processed.

Data For 01/03 message records only, the text data of the message. By default only the first 64 bytes of each message segment is reported. When the TEXTALL option is specified, the entire message text data is reported. The message text is preceded with a hexadecimal offset, prefixed with a + sign.

Tracking UOW

The Tracking Unit of Work (UOW) uniquely identifies each transaction's messages and associated log records events. It consists of:

- Originating-system message ID. The Message ID assigned by the IMS system that originates the message.
 - Originating IMSID
 - Time stamp token
- Processing-system message ID. The Message ID assigned by the IMS system processing the message.
 - Processing IMSID
 - Time stamp token

Because the UOW has IDs for both the system that originates the message and the system (if any) that processes the message, all messages that are associated with an original message can be tied together by the UOW (specifically, the originating-system message ID in the UOW).

Log Seq Number

The sequence number of the log record. This hexadecimal value occupies the last 8 bytes of every log record to identify its sequence in the log file.

Database Trace report

The Database Trace report provides a record of all database changes by application programs as recorded on the IMS log.

Backout changes caused by emergency restart are also reported and identified separately, but changes due to the reorganization utilities are not reported. Log records created by pseudo-abends are included in the report.

The report shows the content of segments, prefix pointers, and free space elements, and shows both the *before* and *after* versions of these as appropriate. The report also identifies the time of the change and the name of the program (PSB) making the change.

Log records: This report is derived from IMS log records 01, 03, 06, 07, 08, 20, 21, 24, 40, 50.

Uses

You can use this report:

- To debug database problems
- To debug programs
- As a performance tool

For example, you can use the report to identify a culprit program and its user for erroneous or unauthorized database changes. You can use it to monitor who is updating any database. You can also use the report to identify the source of specific problems, such as program errors or a mix-up of logs during backout. In this latter case, the Database Trace report is a useful companion to the SMU feature of DBT. SMU can report, for example, that some pointer chains are broken. The Database Trace report can then tell you when the pointers were changed and who changed them.

Report options

To specify the report options, select **Database Trace** from the Trace Reports in a Log Report Set.

A report interval can be specified. This applies to the reduced data file after the Global (or Runtime) report interval is effected.

The report output data set is controlled by specifying the Report Output DDname.

There are three report options available:

1. Database with transaction-oriented information.
2. Database information only. This produces a report which includes all databases, but excludes all transaction-oriented information.
3. Database open/close only. This produces a report which includes all databases, but excludes all transaction-oriented information. All opens and closes are reported, but update operations are not.

Selection Criteria can be specified to include or exclude particular data from the report:

- For report option 1, you can filter by Transaction Code, Database, Program (PSB), Key, Block ID, and IMS Subsystem ID.
- For report option 2, you can filter by Key, Block ID, and IMS Subsystem ID.
- For report option 3, you can filter by IMS Subsystem ID.

In your Selection Criteria:

- Include a Database Object List to report open, close, and update operations for only those databases.
- Include a Transaction Code Object List so the trace will report inputs, program scheduling, all updates, and program terminations for only those programs

invoked by the specified transaction codes. However, all opens and closes will be reported because they are not identified by specific transaction codes.

- Specify a Key Object List to include keyed (KSDS) records. If more than one database is included, the values specified in the Key Object List pertain to all of them.
- Specify a Block ID Object List to include records for which keys are unknown or nonexistent. The values in the Block ID Object List can be RBA, RBN, and so on, as appropriate.

Report content

The following figure is an example of a Database Trace report.

Start 04Jun2018 16.10.15.93

IMS Performance Analyzer
D A T A B A S E T R A C E

Page 1

Time HHMMSS.TH	IMS Id	PSB Reg	Database Name	D S	DL/I Call	Reason For Entry	Segment Image	Ident	Offset on Blk	Hexadecimal Data Display	Interpreted Data
161015.93						Input					
161015.96	IM02	2	DBIDB			Pgm Sched					
161016.04	IM02	0	PIMMIDBP	DBNAMDB	1	Open					*DSNAMDB*
161015.93						Input					
161016.69	IM02	2	PIMMIDBP	DBIDB		Pgm Term			00000000		
161018.07	IM02	2		DBTASUDU		Pgm Sched					
161015.93						Input					
161018.10	IM02	0	PIMULUDP	DBNAMIA	1	Open					*DSNAMIA*
	IM02	0	PIMULUDP	DBNAMIB	1	Open					*DSNAMIB*
	IM02	0	PIMULUDP	DBNAMIC	1	Open					*DSNAMIC*
	IM02	0	PIMULUDP	DBNAMID	1	Open					*DSNAMID*
161019.28	IM03	27		DBTASUDU		Pgm Sched					
161019.29	IM03	27	PIMULUDP	DBTASUDU		Pgm Term			00000000		
161022.59	IM02	2	PIMULUDP	DBNAMDB	1	REPL			00908000		
						Phys REPL Before	VSAM RBA		0001AE	F2	*2*
						Phys REPL After	Data		0001AE	F4	*4*
										Userid:**TIMP03	
161022.39						Input					
161022.15	IM02	0	PIMULUDP	DBCIDLDB	1	Open					*DSXIDLDB*
161022.46	IM03	27		DBIDB		Pgm Sched					
161022.39						Input					
161022.58	IM03	0	PIMMIDBP	DBCTBLDB	1	Open					*DSXTBLDB*
									00000000		
	IM02	0	PIMULUDP	DBNAMIB	1	Open					*DSNAMIB*

D A T A S E T O V E R V I E W

Database Name	IMS Access Method	Data Set Name	DS No	OS A/M	Block Size	Recrd Size
DBNAMDB	HDAM	DSNAMDB	1	ESDS	4096	4089
DBNAMIA	Index Uniq	DSNAMIA	1	KSDS	4096	62
DBNAMIB	Index Uniq	DSNAMIB	1	KSDS	4096	62
DBNAMIC	Index Uniq	DSNAMIC	1	KSDS	4096	78
DBNAMID	Index Uniq	DSNAMID	1	KSDS	4096	62
DBCIDLDB	HDAM	DSXIDLDB	1	ESDS	4096	4089
DBCTBLDB	HISAM	DSXTBLDB	1	KSDS	4096	816
DBPLSACC	HIDAM	DSLPSACC	1	ESDS	4096	4089
DBPLSACT	HIDAM	DSLPSACT	1	ESDS	8192	8185
DBPLSCFT	HIDAM	DSPCFT01	1	ESDS	8192	8185
		DSPCFT02	2	ESDS	8192	8185
		DSPCFT03	3	ESDS	8192	8185
		DSPCFT04	4	ESDS	8192	8185
DBPLSCNT	HISAM	DSLPCNT	1	KSDS	4096	204

Figure 174. Database Trace report

The report shows all instances of inserts, replaces, and deletes (physical and logical). Note that for inserts and deletes, changes to free space elements, prefix pointers, and bit maps are also reported. In addition, transaction input, program scheduling, and program termination (with completion code) are reported so that you can trace all database activity for a specific transaction.

The leftmost column **Time** is in the format *hhmmss.th*. For log records with a time stamp, that time is reported. For log records without a time stamp, the most recent log record with a time stamp is used.

The Region is identified by the IMS Subsystem ID **IMS Id** and PST number **Reg**.

DS gives the data set number within the database. On the Data Set Overview (the last page of the report), this number is used to identify the name and characteristics of the data set.

The last line of each update entry has the userid under which the database update was made if the userid is present in the log record.

When using Start or From date and time options, some open records may not be available to the trace program because they occur before the start time of the report. As a result, the record identifiers for updates to these databases cannot be converted to RBA, RBN, and key. In these cases, a question mark (?) appears to the left of the record identifiers (**Ident**) and pointer elements (**Hexadecimal Data Display**). Likewise, **Data Set Name** is reported as ? ? ? ? in the Data Set Overview.

DEDB Update Trace report

The DEDB Update Trace report provides a record of all DEDB changes by application programs as recorded on the IMS log.

The report shows:

- All DEDB segment updates, including the RBA and contents of the modified data
- DEDB Area data set Open and Close events
- Creation of Error Queue Elements (EQEs)
- Application sync points for all transactions that updated reported DEDBs

Log records: This report is derived from IMS log records 5921, 5922, 5924, 5937, 5938, 5950.

Uses

Use this report to:

- Debug DEDB database problems and application program problems
- Diagnose performance problems and tune your applications

For example, you can monitor individual program or user updates to a particular database.

Report options

To specify the report options, select **DEDB Update Trace** from the Trace Reports in a Log Report Set.

The DEDB Update Trace can generate large amounts of output over a very short period of time. To avoid large and unwanted report output, it is recommended that:

- The reporting period is narrowed down by using the From and To times.
- Object Lists are used to filter the databases, programs or users included in the report.
- The desired report option is set to include only the type of DEDB events required.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output is written to the data set specified by the Report Output DDname.

By using Object Lists, you can specify which databases are to be included in or excluded from the report:

- DEDB Database name
- DEDB Area name

Also, you can restrict the source of the database updates by filtering on the following criteria:

- Program name
- User ID
- IMS Subsystem ID
- IMS Region PST ID

There are three report options available to further restrict the information reported:

1. DEDB information including related sync point entries, which includes:
 - DEDB updates
 - Application sync points that have some DEDB updates reported
 - DEDB open and close events
 - DEDB errors
2. DEDB information only
 - DEDB updates
 - DEDB open and close events
 - DEDB errors
3. DEDB Open/Close only
 - DEDB open and close events
 - DEDB errors

Report content

The following figure is an example of the DEDB Update Trace report applicable to both local and global (shared EMHQ) transaction processing.

IMS Performance Analyzer DEDB Update Trace Log 15Apr2018 8.54.43.80												
Time	Database Name	Area Name	--Region-- IMID PST	Program Name	User ID	Type	RBA of 1st byte	Hexadecimal Data Display				Interpreted Data
8:54:43.80	ORDERS	ORDERS				OPEN						
8:54:43.81	ORDERS	ORDERS	IMSA 46	ORDER	JANE	SDEP	08B14000	02000000	014E08A5	A8CA00B9	99105C00	Order number 001
								8544363C	C2C1D7F9	F1F24040	F5000F5C	e***BAP912 5***
	ORDERS	ORDERS	IMSA 46	ORDER	JANE	DDEP	007BC000	01820000	00000000	014E08B1	4BF3	*b*****.3
	PARTS	PARTSA1	IMSA 46	ORDER	JANE	DDEP	195E5000	00000CF7	F1F8F000	331F000C	083C7BDC	***7180*****#
								40D70041	599C0000	13185CF2	F1F3F7F2	P*****21372
8:54:43.81			IMSA 46	ORDER	JANE	SYNC		TranCode=ART012				

Figure 175. DEDB Update Trace report

When processing multi-subsystem log files, DEDB updates from all IMS subsystems are combined into a single report.

All DEDB updates and the sync point record for a single transaction are grouped together, because the DEDB update log records are written immediately prior to the associated sync point log record.

The report heading contains the start of the reporting period. **Log** specifies the date and time of the first transaction to be processed.

The following fields appear in the report:

Time Time of day.

Database Name
DEDB database name.

Area Name
DEDB Area data set name.

Region
The IFP region identification, broken down into:
IMID The IMS subsystem ID
PST The dependent region PST ID

Program Name
The Program (PSB) that affected the DEDB update or the application sync point.

User ID
The userid associated with the DEDB update or application sync point.

Type Type of report entry which can be:
OPEN DEDB Area data set open
CLOS DEDB Area data set close
EQE Error Queue Element creation
SDEP SDEP (Sequential Dependent) segment insert
DDEP Root or DDEP (Direct Dependent) segment update
SYNC Application sync point

RBA of 1st Byte
For SDEP and DDEP, the RBA of the first byte of the data. For EQE (and OPEN when applicable), the RBA of the CI in error.

Hexadecimal Data Display
For SDEP and DDEP, the hexadecimal representation of the updated CI data. The data display is continued onto the following lines, until all of the data has been written. For OPEN (when applicable), the RBA of up to 9 additional CIs in error. For SYNC, TranCode= identifies the transaction code that has completed its sync point.

Interpreted Data
For SDEP and DDEP, the character representation of the updated CI data.

ESAF Trace report

The External Subsystem Attach Facility (ESAF) Trace report provides a chronological listing of all external subsystem connects and disconnects for the specified time period.

Log records: This report is derived from IMS log record 56.

Uses

You can use this report to determine when external subsystems were connected.

Report options

To specify the report options, select **ESAF Trace** from the Trace Reports in a Log Report Set.

You can specify that specific external subsystems and IMS subsystems be included in or excluded from the report.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output data set is controlled by specifying the Report Output DDname.

Report content

The ESAF Trace report provides a formatted printout of the selected log records.

Start 04Jun2018 19.25.30.00			IMS Performance Analyzer	
			External Subsystem Trace	
Date	Time	Subsystem Id	IMS Id	Event
04Jun2018	19.25.32.60	DB2	IMSJ	External subsystem connected
04Jun2018	20.17.41.33	MQS	IMSK	External subsystem connected
04Jun2018	23.59.11.27	MQS	IMSK	Stop command issued
05Jun2018	01.01.07.14	MQS	IMSJ	External subsystem connected

Figure 176. ESAF Trace report

The sample report shows the following activity:

- At 19.25 external subsystem DB2 was connected.
- At 20.17 external subsystem MQS was connected.
- At 23.59 external subsystem MQS was stopped.
- At 01.01 external subsystem MQS was connected.

User-written reports

IMS PA provides support for up to 21 user-written record processors. These are user-written programs which process log data input and may, but need not, produce customized log reports. The log records processed and program output are completely user-defined.

See “User-Written Record Processors Under IMS PA” in the *IMS Performance Analyzer for z/OS: User's Guide* for information on writing such programs.

IMS PA treats a user-written program as a report in a Report Set in a similar manner to the supplied log reports, providing a dialog for the specification of report options and job submission.

IPIPU1xx: DL/I Call Statistics report

The user program IPIPU1xx produces the DL/I Call Statistics report which details DB and DC call totals and CPU usage by transaction code. This report has been superseded by the **Transaction Resource Usage** report, a Resource Usage and Availability report in the Log Report Set.

See “Transaction Resource Usage report” on page 135.

Log records: The IPIPU1xx report is derived from type 07 log records.

Uses

IPIPU1xx shows at a glance the DB and DC call counts and CPU time for all transactions in the system.

Report options

To request the IPIPU1xx report, select **User-Written Reports** in a Log Report Set, then select an unused (“Not Defined”) slot in the User-Written Record Processors window. On the User Processor edit panel, set the User Program Name to IPIPU1xx.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output data set is controlled by specifying the Report Output DDname.

Log record codes do not need to be set.

An include/exclude Transaction Code Object List (Object-Label TRAN) can be specified to filter the transaction codes reported.

Report content

This is an example of the DL/I Call Statistics report produced by sample user program IPIPU1xx.

Start 04Jun2014 07.51.04.66				IMS Performance Analyzer DL/I CALL STATISTICS								End 04Jun2014 07.56.26.33			
		***** D C		C A L L S		*****		***** D B		C A L L S		*****		TOTAL	
TRANCODE	MSG CNT	GU	GN	ISRT	PURG	GU	GN	GNP	GHU	GHN	GHNP	ISRT	DLET	REPL	CPUTIME
DSFFDE1A	59	110	59	177	0	295	0	0	59	0	0	0	0	59	1.3
DSFFDE1B	53	102	53	159	0	265	0	0	53	0	0	0	0	53	1.2
DSFFDE1C	36	65	36	108	0	180	0	0	36	0	0	0	0	36	.8
DSFFDE1D	48	89	48	144	0	240	0	0	48	0	0	0	0	48	1.1
DSFFDE1E	47	88	47	141	0	235	0	0	47	0	0	0	0	47	1.0
DSFFDE1F	52	97	52	156	0	260	0	0	52	0	0	0	0	52	1.2
DSFFDE1G	48	86	48	144	0	240	0	0	48	0	0	0	0	48	1.1
DSFFDE1H	47	91	47	141	0	235	0	0	47	0	0	0	0	47	1.1
:															
TOTAL	21100	36185	6018	44921	0	114655	70540	295820	24573	0	11473	3809	6097	32237	1,042.0

Figure 177. IPIPU1xx: DL/I Call Statistics report

IPIPPGM2: Transaction Statistics report

The user program IPIPPGM2 produces the Transaction Statistics report which details transaction resource usage, by summarizing type 07 log record accounting

statistics. This report has been superseded by the **Transaction Resource Usage** report, a Resource Usage and Availability report in the Log Report Set.

See “Transaction Resource Usage report” on page 135.

Information included for each transaction code is:

- Scheduling activity
- CPU usage
- DB and DC calls
- Enqueue and Lock activity
- SUBQ 6 (WFI) time

Log records: The IPIPPGM2 report is derived from type 07 log records.

Uses

IPIPPGM2 shows at a glance detailed statistics of all transactions in the system.

Report options

To request the IPIPPGM2 report, select **User-Written Reports** in a Log Report Set, then select an unused (“Not Defined”) slot in the User-Written Record Processors window. On the User processor edit panel, set the User Program Name to IPIPPGM2.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output data set is controlled by specifying the Report Output DDname.

Log record codes do not need to be set.

Include/Exclude Object Lists can be specified for Transaction Code (Object-Label TRANCODE, Object type TRAN), Region ID (Object-Label REGION, Object type RGPST), and Region Jobname (Object-Label REGJBN, Object type RGJOB).

Alternatively, IPIPPGM2 can be run using batch commands which allow greater reporting flexibility.

```
IMSPALOG      USERPGM(IPIPPGM2,
               [INCL(STATS(statistics-list)),]
               [INCL(TRANCODE(list))|EXCL(TRANCODE(list)),]
               [INCL(REGION(list))|EXCL(REGION(list)),]
               [INCL(REGJBN(list))|EXCL(REGJBN(list)),]
               [FROM(yyyy/mm/dd, hh:mm:ss:th),]
               [TO(yyyy/mm/dd, hh:mm:ss:th),]
               [DDNAME(IPIPPGM2)])
```

By default, IPIPPGM2 produces the summary report line only. To get a more detailed breakdown of transaction resource usage, specify the desired STATS options in the format INCL(STATS(DB,DC,DLI,ENQ)) where:

DB	DB Call statistics
DC	DC Call statistics
DLI	Other DL/I Call statistics
ENQ	Enqueue statistics

Report content

This is an example of the Transaction Statistics report produced by the sample user program IPIPPGM2.

IMS Performance Analyzer																			
IMS Transaction Statistics										Page 1									
Report From: 21Jan2018 11:49:21:67										To: 21Jan2018 13:05:39:18									
										Elapsed: 1.16.17.503.664									
TC: TC001A																			
Summary:	CPU	Sched	Trans	DB Calls	DC Calls	DLI Calls	Enqueues	Enq Waits	DB IO Elp	Lock Elap	DB IO Cnt	SUBQ6 Tim							
Totals	442994	8145	8287	404976	31889	21249	173158	262	422345		15	2514545							
/Tran	53.5	1.0	1.0	48.9	3.8	2.6	11.7	0.0	51.0		0.0	495748.0							
/Sched	54.4	1.0	1.0	49.7	3.9	2.6	12.7	0.0	51.9		0.0	1478.3							
/Min	5806.6	106.8	108.6	5308.3	418.0	278.5	5341.7	8.1	5535.9		0.2	19289.3							
% Totl	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%		100.00%	100.00%							
DB Calls:	GU	GN	GNP	GHU	GHN	GHNP	ISRT	DLET	REPL		DEQ	Total							
Totals	148257	224873	5076	11641	68	130	4967	339	9625			404976							
/Tran	17.9	27.1	0.6	1.4	0.0	0.0	0.6	0.0	1.2			48.9							
% DLI	32.36%	49.09%	1.11%	2.54%	0.01%	0.03%	1.08%	0.07%	2.10%			88.40%							
DC Calls:	GU	GN	ISRT	PURG															
Totals	15576	3331	11356	1626															
/Tran	1.9	0.4	1.4	0.2															
% DLI	3.40%	0.73%	2.48%	0.35%															
DLI Call:	CMD	GCMD	CHNG	AUTH	SETO	APSB	DPSB	GMSG	ICMD		RCMD								
Totals	39	115	972	187															
/Tran	0.0	0.0	0.1	0.0															
% DLI	0.01%	0.03%	0.21%	0.04%															
DLI Call:	CHKP	XRST	ROLB	ROLS	SETS	SETU	INIT	INQY	LOG										
Totals	722	2	15	29	2706	15481	981												
/Tran	0.1	0.0	0.0	0.0	0.3	1.9	0.1												
% DLI	0.16%	0.00%	0.00%	0.01%	0.59%	3.38%	0.21%												
Enq/Deq:	Test Enq	T Enq	Wts	Test Deq	Q Cmd Enq	Q Cmd Wts	Q Cmd Deq	Updat Enq	U Enq	Wts	Updat Deq	Exclu Enq	X Enq	Wts	Exclu Deq				
Totals	14931		4					155358		258	82492		2869			8			
/Tran	1.0		0.0					10.5		0.0	5.6		0.2			0.0			
% DB	4.25%		0.00%					44.27%		0.07%	23.51%		0.82%			0.00%			

Figure 178. IPIPPGM2: Transaction Statistics report

IPIPU9xx: Checkpointed IMS Resource Definitions report

The user program IPIPU9xx produces reports on checkpointed IMS resource definitions, including databases, transaction codes, LTERMs, lines/PTERMs or VTAM nodes, and miscellaneous definitions. This report has been superseded by the **Checkpoint** report, a Resource Usage and Availability report in the Log Report Set.

See “System Checkpoint report” on page 225.

Log records: The IPIPU9xx report is derived from type 40 and 70 log records.

Uses

IPIPU9xx details all databases, transactions and terminals defined to IMS.

Report options

To request the IPIPU9xx report, select **User-Written Reports** in a Log Report Set, then select an unused (“Not Defined”) slot in the User-Written Record Processors window. On the User Processor edit panel, set the User Program Name to IPIPU9xx.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output data set is controlled by specifying the Report Output DDname.

Log record codes do not need to be set.

Object filtering is not available.

Report content

The following figure is an example of the Checkpointed IMS Resource Definitions report produced by sample user program IPIPU9xx.

The report has five sections:

- Database definitions
- Transaction definitions
- LTERM/VTAM Node cross-reference
- VTAM Node/LTERM cross-reference
- Miscellaneous definitions

Start 04Jun2018 07.51.08.10												IMS Performance Analyzer											
												DATABASE DEFINITIONS											
DATABASE	RES	INDEX	DATABASE	RES	INDEX	DATABASE	RES	INDEX	DATABASE	RES	INDEX	DATABASE	RES	INDEX	DATABASE	RES	INDEX						
DBD01A	RES		DBD01B			DBD01C			DBD01D			DBD01E			DBD01F								
DBD02A			DBD02AI		INDEX	DBD02C			DBD02D			DBD02E			DBD02EI		INDEX						
DBD03A			DBD03B	RES		DBD03C			DBD03D	RES		DBD03E			DBD03F								
TRANSACTION DEFINITIONS																							
TRANCODE	PROGRAM	S REG T TYP MODE	CLS	NRM	LIM	LIMCT	COUNT	CPU	SIZE	TF	PAR LIMIT	MAX RGN	OPTIONS										
A001	PA001	1 MPP SNGL	8	11	12	2	65535	65535	8000				RESP										
A002	PA002	1 MPP SNGL	8	1	4	3	0	240	3500		1	0	RESP		INQ								
A003	PA003	1 MPP SNGL	32	1	4	3	0	120	4096		1	3	RESP										
A004	PA004	1 MPP SNGL	32	1	4	3	100	120	4096		1	3	RESP										
A005	PA005	1 MPP SNGL	8	1	4	3	0	120	3500		1	3	RESP										
A005	PA005	1 MPP SNGL	1	1	4	3	0	120					RESP		INQ								
B001	PB001	1 BMP SNGL	15	0	0	65535	5	4			65535	0			WFI								
C001	PC001	1 MPP SNGL	1	4	4	65535	3	60						REMOTE									
C002	PC002	1 MPP SNGL	1	4	4	65535	1000	5						NONR	WFI	INQ	REMOTE						
C003	PC003	1 MPP SNGL	5	12	14	5	65535	65535			1	5	RESP	NONR	INQ	RESIDENT							
C004	PC004	1 MPP MULT	5	13	13	65535	65535	65535					RESP	NONR	INQ								
F001	PF001	1 BMP SNGL	31	1	1	33484	65535	65535					RESP	FP XCL									
F002	PF002	1 BMP SNGL	31	1	1	33484	65535	65535					RESP		FP POT								
D001	PD001	1 MPP MULT	1	2	4	2	65535	65535						DOPT									
SORTED IN LTERM SEQUENCE																							
LTERM	VTAMNODE/ LINE TRM		LTERM	VTAMNODE/ LINE TRM		LTERM	VTAMNODE/ LINE TRM		LTERM	VTAMNODE/ LINE TRM		LTERM	VTAMNODE/ LINE TRM		LTERM	VTAMNODE/ LINE TRM							
LTM00004	PTM00004		LTM00005	PTM00005		LTM00006	PTM00006		LTM00007	PTM00007		LTM00008	PTM00008		LTM00009	PTM00009							
LTM00009	PTM00009		LTM00010	PTM00010		LTM00011	PTM00011		LTM00012	PTM00012		LTM00013	PTM00013										
SORTED IN PTERM SEQUENCE																							
VTAMNODE/ LINE TRM		LTERM	VTAMNODE/ LINE TRM		LTERM	VTAMNODE/ LINE TRM		LTERM	VTAMNODE/ LINE TRM		LTERM	VTAMNODE/ LINE TRM		LTERM	VTAMNODE/ LINE TRM		LTERM						
PTM00001		LTM00001	PTM00002		LTM00002	PTM00003		LTM00003	PTM00004		LTM00004	PTM00005		LTM00005	PTM00006		LTM00006						
PTM00006		LTM00006	PTM00007		LTM00007	PTM00008		LTM00008	PTM00009		LTM00009	PTM00010		LTM00010	PTM00011		LTM00011						
MISC DEFINITIONS																							
MISCELLANEOUS DEFINITIONS																							
CPLOG 92																							

Figure 179. IPIPU9xx: Checkpointed IMS Resource Definitions report

Database Definitions

The following column headings appear in this section, six across the page:

DATABASE

Database name

RES Resident DMB

INDEX

Index Database

Transaction Definitions

The following column headings appear in this section:

TRANCODE

Transaction Code

PROGRAM

Program name

ST Schedule Type: 1, 2, 3, or 4

REG TYP

Region Type, MPP or BMP

MODE

Mode: Single or Multiple

CLS Message Class

NRM PRIORITY

The normal priority.

LIM PRIORITY

The limit priority.

LIMCT PRIORITY

The limit count of transactions queued and waiting to be processed. When the number of queued transactions exceeds this count, the transactions' priority is changed from the normal to the limit priority.

PROCLIM COUNT

The number of transactions that a program can process in a single scheduling.

PROCLIM CPU

The amount of CPU time (in seconds) allowable to process a single transaction. For Fast Path, this represents the real time (in hundredths of seconds) allowable to process as a single transaction.

SPA SIZE TF

Length of SPA

PAR LIMIT

The parallel processing threshold value.

MAXRGN

The maximum number of MPP regions that can be concurrently scheduled to process this transaction code.

OPTIONS

RESP Response Mode

NONR Non-recoverable

WFI Wait-For-Input

INQ Inquiry Only

FP POT Fast Path Potential
FP XCL Fast Path Exclusive
REMOTE Remote
DOPT Dynamic Load Option PSB
RESIDENT
Resident PSB

IPIERA30: Deadlock report

The user program IPIERA30 produces a detailed list of deadlocks, including resource information contained in the 67FF SNAP Trace log record. This report has been superseded by the **Deadlock** report, a Resource Usage and Availability report in the Log Report Set.

See “Deadlock report” on page 215.

Log records: The IPIERA30 report is derived from the 67FF SNAP Trace log record.

Report options

To request the IPIERA30 report, select **User-Written Reports** in a Log Report Set, then select an unused (“Not Defined”) slot in the User-Written Record Processors window. On the User processor panel, set the User Program Name to IPIERA30.

A report interval can be specified. This applies to the reduced data file after the Global (or Run-time) report interval is effected.

The report output data set is controlled by specifying the Report Output DDname.

Log record codes do not need to be set.

Object filtering is not applicable.

Report content

The following figure is an example of the Deadlock report produced by sample user program IPIERA30.

PSEUDO ABEND RECORD ABEND NO = 0777 RECNO = F197D9B6 TIME 23:02:03.1 DATE 2018.277

DEADLOCK

```

3339A000 000000 000202C0 40000000 0423DA54 09000034 19806E01 D7000000 00000000 00000000 *....>.P.....*
3339A020 000020 00000000 00000000 00000000 0204F649 2F649060 C9F6F1C1 40404040 00000000 *.....6.....I61A ....*
3339A040 000040 00000000 00000001 00000000 06000008 00D41FE3 31FE3060 00D21FE3 31FE3060 *.....M.T....K.T....*
3339A060 000060 C9F6F1C3 40404040 32020600 00000A00 E5D1D4D7 D5D74040 D4F6F1C3 D5C4F0F3 *I61C .....VJMPNP M61CND03*
3339A080 000080 E5D1D4D7 C1D5D740 E5D1D4D7 E2C3C4C4 E5D1D4D7 E2C3D7F1 30400378 30400358 *VJMPANP VJMPSCDDVJMPSCP1. ....*
3339A0A0 0000A0 03800000 0C840012 00000000 0000000B 00000000 00000000 0003D018 00000000 *.....D.....*
3339A0C0 0000C0 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
3339A0E0 0000E0 TO 3339A180 000180 SAME AS ABOVE
3339A1A0 0001A0 00000000 00000000 00000000 00000000 80000000 04204A3A 090003A0 14806D01 *.....*
3339A1C0 0001C0 D7000000 00000000 00000000 00000000 00000000 00000000 00D41FE3 31FE3060 *P.....M.T....*
3339A1E0 0001E0 C9F6F1C3 40404040 00000000 00000000 00000001 00000000 06000008 0204F649 *I61C .....6.*
3339A200 000200 2F649060 00C2F649 2F649060 C9F6F1C1 40404040 32020600 00000A00 E5D1D4D7 *...-.B6....-I61A .....VJMP*
3339A220 000220 D5D74040 D4F6F1C1 D5C4F0F6 E5D1D4D7 C1D5D740 E5D1D4D7 E2C3C4C4 E5D1D4D7 *NP M61AND06VJMPANP VJMPSCDDVJMP*
3339A240 000240 E2C3C4C4 30400378 30400358 03000000 05840032 00000000 00000009 00000000 *SCDD. ....D.....*
3339A260 000260 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*
3339A280 000280 TO 3339A320 000320 SAME AS ABOVE
3339A340 000340 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 *.....*

```

DEADLOCK ANALYSIS REPORT - LOCK MANAGER IS IRLM

RESOURCE DMB-NAME LOCK-LEN LOCK-NAME - WAITER FOR THIS RESOURCE IS VICTIM
01 OF 02 VJMPSCP1 08 00003419806E01D7

KEY IS ROOT KEY OF DATA BASE RECORD ASSOCIATED WITH LOCK
0000000000D1
KEY=(000000000308)

IMS-NAME	TRAN/JOB	PSB-NAME	PCB--DBD	PST#	RGN	CALL	LOCK	LOCKFUNC	STATE
WAITER I61C	VJMPNP	VJMPANP	VJMPSCDD	00018	MPP	GET	GRIDX	30400358	06-P
BLOCKER I61A	VJMPNP	VJMPANP	-----	00050	MPP	----	-----	-----	06-P

RESOURCE DMB-NAME LOCK-LEN LOCK-NAME
02 OF 02 VJMPSCDD 08 0003A014806D01D7

KEY FOR RESOURCE IS NOT AVAILABLE

IMS-NAME	TRAN/JOB	PSB-NAME	PCB--DBD	PST#	RGN	CALL	LOCK	LOCKFUNC	STATE
WAITER I61A	VJMPNP	VJMPANP	VJMPSCDD	00050	MPP	GET	GRIDX	30400358	06-P
BLOCKER I61C	VJMPNP	VJMPANP	-----	00018	MPP	----	-----	-----	06-P

DEADLOCK ANALYSIS REPORT - END OF REPORT

Figure 180. IPIERA30: Deadlock report

Log Information report

The Log Information report provides a breakdown of the log record types in the input IMS log files. It shows record count, length, rates per second, and volume. Selected record types are broken down further to provide additional information about transaction arrival and processing throughput.

A Log Information report is produced automatically whenever an IMS PA Log report set is run. In this case, no additional batch commands are required. The ddname for the Log Information report is LOGINFO. Users can also generate a stand-alone Log Information report without running a report set using the appropriate batch command (see "Report options" on page 311).

Uses

You can use this report:

- To get a snapshot of record and message counts by type.

- To look at the average length of records, the number of records per second, and the number of bytes per second by record type.
- To quickly determine the size of logfiles and which types of records occupy the most space.

Report options

The LOGINFO operand allows users to produce a stand-alone Log Information report without running a report set. This is a batch-only command and is not generated by an IMS PA dialog. The LOGINFO operand has no additional options.

Report content

The following figure is an example of a Log Information (LOGINFO) report.

Log data From 2014-12-06 11:11:19.457342 To 2014-12-06 11:12:27.736114 Duration 1:08.278772

Code	In				Byte/Sec	MB	%	
	Count	MCNT	Recs/Sec	Avg Len				
01 IN	6,025		88	719	2,170	63,719	4.3	2.3 IMS Message
INPUT	6,025		88	719	2,170	63,719	4.3	2.3 Input message
03 IN	1,412		20	634	799	13,179	0.8	0.5 IMS Message
INPUT	1,412		20	634	799	13,179	0.8	0.5 Input msg (program switch)
03 OUT	11,506		169	627	1,734	106,230	7.2	3.8 IMS Message
OUTPUT	6,899		101	713	1,734	72,408	4.9	2.6 Output message
MSG SWI	4,607		67	499	582	33,821	2.2	1.2 Message switch
07	3,588	7,405	52	456	456	24,060	1.6	0.9 Program schedule end
MPP	3,528	6,919	51	456	456	23,658	1.6	0.8 MPP
QUICK	45	450	0	456	456	301	0.0	0.0 MPP quick reschedule
ABEND	15	36	0	456	456	100	0.0	0.0 Abended transaction
08	3,590		52	156	156	8,235	0.5	0.3 Program schedule start
MPP	3,545		52	156	156	8,132	0.5	0.3 MPP
QUICK	45		0	156	156	103	0.0	0.0 MPP quick reschedule
11	1,078		15	68	68	1,078	0.0	0.0 Start of conversation
12	1,064		15	48	48	751	0.0	0.0 End of conversation
16	707		10	80	80	831	0.0	0.0 Sign On/Off
27	903		13	69	164	917	0.0	0.0 Database extension
28	144		2	56	56	118	0.0	0.0 Phase 1 data communication
31	19,940		293	118	130	34,720	2.3	1.2 GU from the Message Queue
DLI	7,435		109	119	130	13,062	0.8	0.5 DLI (application input)
COMMS	12,505		183	117	120	21,658	1.4	0.8 Communications (output)
33	18,897		277	68	68	18,897	1.2	0.7 Free message
34	53		0	74	74	57	0.0	0.0 Cancel message
35	18,891		277	137	174	38,209	2.5	1.4 Enqueue or re-enqueue a msg
36	12,492		183	163	172	30,053	2.0	1.1 Dequeue/Save/Delete a msg
37	15,819		232	113	128	26,500	1.8	1.0 Syncpoint message transfer
3730	7,560		111	110	124	12,295	0.8	0.4 Syncpoint End of Phase 1
38	100		1	102	112	150	0.0	0.0 Release message after abend
4001	2		0	1,552	1,552	45	0.0	0.0 Checkpoint begin
4003	1,536		22	3,975	3,976	89,806	6.1	3.2 Checkpoint CNT
4004	154		2	3,912	3,960	8,860	0.6	0.3 Checkpoint SMB
4005	116		1	3,841	3,872	6,552	0.4	0.2 Checkpoint CTB
4006	326		4	939	944	4,502	0.3	0.2 Checkpoint DDIR
4007	160		2	961	980	2,261	0.1	0.1 Checkpoint PDIR
4008	8		0	3,504	3,968	412	0.0	0.0 Checkpoint CLB
4009	2		0	28	28	0	0.0	0.0 Checkpoint SMUP
400D	19		0	3,653	3,872	1,020	0.0	0.0 Checkpoint CCB
400F	4		0	2,152	4,032	126	0.0	0.0 Checkpoint LCB
4010	18		0	3,818	4,032	1,010	0.0	0.0 Checkpoint CRB
4012	2		0	44	44	1	0.0	0.0 Checkpoint tran edit routine
4014	1,167		17	4,013	4,024	68,887	4.6	2.5 Checkpoint SQPB
4021	3,436		50	3,962	3,980	200,219	13.6	7.2 Checkpoint VTCB
4022	2		0	32	32	0	0.0	0.0 Checkpoint QAB (LU 6.2)
4031	2		0	52	52	1	0.0	0.0 Checkpoint SIDX
4033	2		0	124	124	3	0.0	0.0 Checkpoint OTMA MTE/MCB
4080	2		0	344	344	10	0.0	0.0 Checkpoint Fast Path begin
4081	22		0	184	184	59	0.0	0.0 Checkpoint 64-bit FP buffer
4082	7,760		114	797	912	90,976	6.1	3.3 Checkpoint EMHB
4083	14		0	843	1,032	173	0.0	0.0 Checkpoint RCTE
4084	314		4	753	808	3,479	0.2	0.1 Checkpoint DMCB
4086	360		5	2,222	4,488	11,766	0.8	0.4 Checkpoint DMHR
4087	64		0	996	1,024	938	0.0	0.0 Checkpoint ADSC
4089	2		0	52	52	1	0.0	0.0 Checkpoint Fast Path end
4098	2		0	40	40	1	0.0	0.0 Checkpoint end
42	3		0	600	600	26	0.0	0.0 Log buffer control
43	4		0	262	262	15	0.0	0.0 Log data set control
4500	2		0	168	168	4	0.0	0.0 Begin statistics
4502	2		0	200	200	5	0.0	0.0 Queue pool stats
4503	2		0	104	104	3	0.0	0.0 Format buffer pool stats
4504	14		0	144	144	29	0.0	0.0 Database buffer pool stats
4505	2		0	136	136	4	0.0	0.0 Variable pool stats
4506	2		0	176	176	5	0.0	0.0 Scheduling stats
4507	2		0	160	160	4	0.0	0.0 Logger stats
4508	26		0	136	136	52	0.0	0.0 VSAM subpool stats
4509	2		0	48	48	1	0.0	0.0 Program isolation stats
450A	2		0	2,148	2,148	63	0.0	0.0 Latch stats
450B	2		0	52	52	1	0.0	0.0 CTL TCB dynamic SAP stats
450C	2		0	4,312	4,312	126	0.0	0.0 DFSCBT00 storage pool stats
450D	2		0	28	28	0	0.0	0.0 Receive-Any buffer stats
450E	18		0	846	1,032	224	0.0	0.0 Fixed pool stats
450F	2		0	4,196	4,196	123	0.0	0.0 Global dispatcher/System stats

Figure 181. Log Information report (Part 1 of 2)

4510	2	0	112	112	3	0.0	0.0	RACF multi-TCB stats
4511	2	0	360	360	10	0.0	0.0	General storage stats
4512	2	0	368	368	10	0.0	0.0	IMODULE stats
4513	852	12	376	376	4,711	0.3	0.2	MSC stats
4514	2	0	56	56	1	0.0	0.0	EWLM stats
4515	2	0	144	144	4	0.0	0.0	64bit storage manager stats
4516	2	0	3,536	3,536	104	0.0	0.0	FP 64bit buffer manager stats
4521	2	0	172	172	5	0.0	0.0	IRLM user stats
4522	2	0	596	596	17	0.0	0.0	IRLM system stats
45FF	2	0	60	60	1	0.0	0.0	End of statistics
47	32	0	1,113	1,194	523	0.0	0.0	Active regions summary
48	8,998	132	58	58	7,674	0.5	0.3	OLDS control information
50	119,835	1,762	216	444	381,537	25.9	13.7	Database Update
5050	103,408	1,520	210	444	319,473	21.7	11.5	Database Update
5051	219	3	174	179	560	0.0	0.0	Database update unsuccessful
5052	16,208	238	258	286	61,503	4.1	2.2	Database insert into KSDS
5607	11,074	162	92	92	14,982	1.0	0.5	Start of UOR
5612	13,402	197	104	104	20,497	1.3	0.7	Syncpoint end of Phase 2
5901	2,458	36	269	374	9,728	0.6	0.3	FP Input Message
5903	2,458	36	286	468	10,350	0.7	0.4	FP Output Message
5910	68	1	116	116	116	0.0	0.0	FP VSO I/O from Dataspace/CF
5912	68	1	116	116	116	0.0	0.0	FP VSO CIs hardened to DASD
5936	2,458	36	146	146	5,277	0.3	0.2	FP output message dequeue
5937	3,594	52	202	202	10,676	0.7	0.4	FP syncpoint
5938	3	0	202	202	8	0.0	0.0	FP syncpoint failure
5950	10,035	147	189	695	27,968	1.9	1.0	FP database update
5953	81	1	191	191	227	0.0	0.0	FP DB update - utilities
5955	78	1	49	49	56	0.0	0.0	FP SDEP CI buffer obtained
5957	32	0	150	150	70	0.0	0.0	FP DB update - DMAC
5958	78	1	49	49	56	0.0	0.0	FP current SDEP CI write
63	699	10	129	200	1,333	0.0	0.0	Init/Term for DTS nodes
66	4,916	72	60	60	4,337	0.2	0.2	Standard 3600
6705	135	1	774	1,040	1,537	0.1	0.1	Termination thread
67FA	23,760	349	4,016	4,016	1,403,237	95.4	50.3	Trace table
67FF	1,980	29	754	1,056	21,977	1.4	0.8	Exception condition SNAP
60	68	1	63	63	63	0.0	0.0	Hot standby surveillance
7201	351	5	336	336	1,734	0.1	0.1	User create
7202	356	5	40	40	209	0.0	0.0	User delete
DE	33	0	392	632	190	0.0	0.0	User record
Total	339,714	4,995	558	4,488	2,788,885	189.6	100.0	
***** BOTTOM OF DATA *****								

Figure 182. Log Information report (Part 2 of 2)

The report provides a breakdown of the log record types in the input IMS log files. The following columns are reported:

Code Record type. Where applicable, records are broken down further into subtypes.

Count Count of each type of record.

MCNT Message count for each type of record.

Recs/Sec
Average number of records processed per second for each type of record.

Ave Len and Max Len
Average length and the maximum length of each type of record.

Byte/Sec
Average number of bytes processed per second for each type of record.

MB Space occupied for each type of record.

% Space occupied by each type of record as a percentage of the whole.

Chapter 5. Understanding IMS log data

To understand the function of IMS Performance Analyzer and to interpret its results properly, some knowledge of IMS log records and their relationship to one another is necessary.

IMS PA analyzes many different types of IMS log records. For details, see Chapter 11, “IMS Log records,” on page 611.

Transit time concepts for Message Queue transactions

In this topic, different types of log records are described and the log record patterns for typical situations that IMS PA analyzes are illustrated.

The IMS PA transit reports identify response time problems within the system. These reports are designed to collect true internal measurements that are not biased or distorted by human operator inefficiencies. Thus measurements begin when a transaction is inserted to the input queue and end with the Get Unique call that removes a response from the output queue.

Transit time versus response time

It is important to distinguish between transit time and response time.

Response time is the time that you see; that is, the time from your input end-of-transmission (EOT) until the first response is received at your terminal. Response time includes line transmission time, terminal and line malfunctions, and operator inefficiency.

Transit time is that part of response time internal to the computing system; that is, the time from when the first incoming message is placed on the message queue to when the first outgoing message to its destination terminal is started.

To help you pinpoint and solve response time problems, IMS PA provides comprehensive transit reports to help identify internal system bottlenecks. IMS PA also provides availability reports to help identify resource availability problems.

Transaction sets

Transit times are based on the concept of the transaction set. A *transaction set* is that set of transactions (the primary transaction and any resulting secondary transactions) invoked in a path from the initiating transaction to the first response back to the initiating logical terminal.

In the simplest case, a transaction that merely reads or updates some records and responds back to its terminal, is the transaction set.

However, if the primary transaction invokes secondary transactions (program switching), the concept can become more complex, as shown in this example:

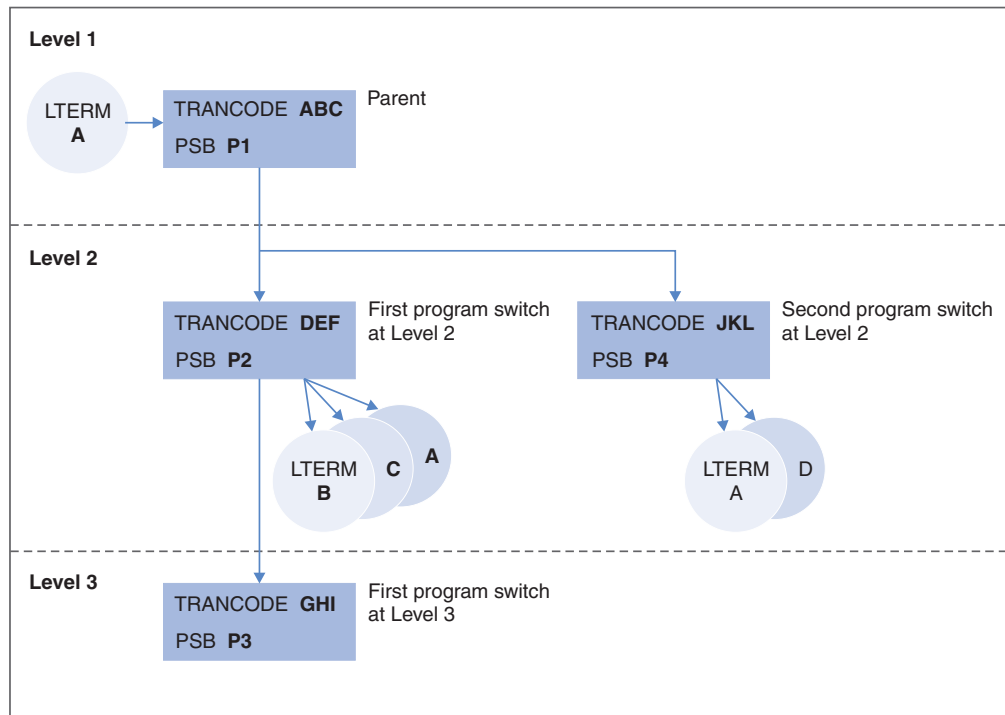


Figure 183. Concept of a Transaction Set

In this example, transaction code ABC is received from logical terminal A, and program P1 is invoked. Program P1, in turn, issues secondary transactions DEF and JKL, which invoke programs P2 and P4, respectively. Program P2 generates transaction GHI, which invokes program P3. Then program P2 sends responses to logical terminals B, C, and A. Program P4 sends responses to logical terminals A and D, but does not generate any additional transactions.

- If program P2 responds first to logical terminal A, the transaction set consists of transactions ABC and DEF, and the reported transit time is the time from the enqueueing of input transaction ABC to the Get Unique for the response from program DEF back to logical terminal A.
- If program P4 responds first to logical terminal A, the transaction set consists of transactions ABC and JKL, and the reported transit time is the time from input to program P1 to response from program P4.

Program P3 is not included in any of the possible transaction sets.

Note: Program switch transactions in a transaction set will not display any LTERM or ORGLTERM values in report output.

Transit times

The transit times reported in the Transaction Transit Analysis and Transaction Transit Statistics reports are based on the concept of transaction sets.

If only a single transaction is invoked, processing time pertains to that transaction, and program switch time is zero. If a secondary transaction is invoked and the initial response is from that secondary transaction, the processing time is the sum of the processing times of both transactions. The program switch time pertains to the enqueue and dequeue of the message between the two transactions. The times

of any secondary transactions that are not in the response path (for example, transaction GHI in Figure 183 on page 316) are not included in the Transaction Transit Analysis and Transaction Transit Statistics reports.

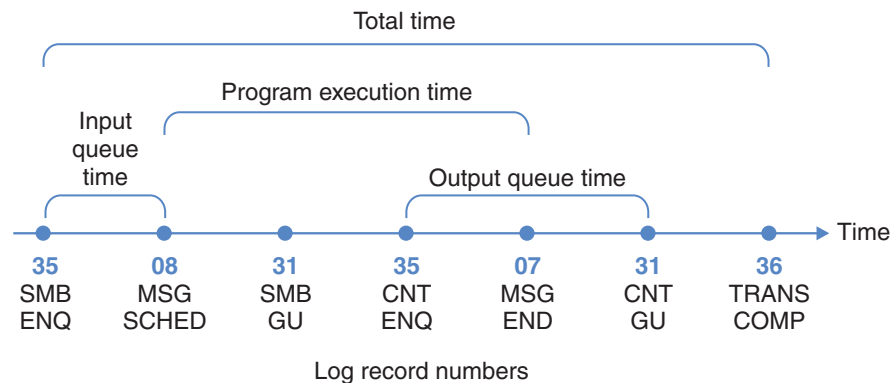
For the Transaction Transit Log report, each individual transaction is reported, with secondary transactions listed under the primary transaction. The primary transactions show input queue times but no program switch times, whereas secondary transactions show program switch times but no input queue times.

Input queue time and program execution time are measured in the same way as in DFSILTA0. Output queue time is measured from program end (normally the time the message is inserted into the permanent output queue at sync point) until the first Get Unique that sends the response to the originating terminal. Thus there is normally no overlap of program execution and output queue times. But when EXPRESS=YES is specified in the alternate PCB statement, output can occur before the end of program execution. In this case, the reported output queue times can be negative.

Special treatment is given to program switching and to transactions that abend and are queued for reprocessing. In addition, there are a number of variations in the sequence of events for normal transactions.

Comparing DFSILTA0 to IMS PA Transit reports

The IMS Log Transaction Analysis utility DFSILTA0 report looks at the times of six events in the life of a transaction.



- 35 SMB ENQ. The time when the incoming message is inserted to the input queue.
- 08 MSG SCHED. Usually the time when the program is scheduled into a message region. In the case of multiple transactions from a single program scheduling, MSG SCHED is the time of the Get Unique to retrieve the message from the input queue (31 record) after the first transaction.
- 31 SMB GU. The time when the program makes a Get Unique call to DL/I to get the message off the message queue.
- 35 CNT ENQ. The time when the response is inserted into the output queue.
- 07 MSG END. The time when the message region is freed (program termination). In the case of multiple transactions, this is the 31 record.
- 31 CNT GU. The time when the response is started from the output queue to the terminal.

36 TRANS COMP. The time when the output response is dequeued from the CNT.

This pattern shows the log record sequence: 35-08-31-35-07-31-36. The diagram shows that, to DFSILTA0, input queue time is the time taken from the 35 record to the 08 record: 35-08. Program execution time is the time taken from the 08 record to the 07 record: 08-31-35-07. Output queue time overlaps and is the time taken from the 35 record to the 31 record: 35-07-31. Total time is the time taken from the first 35 record to the 36 record: 35-08-31-35-07-31-36.

The first five of these times are printed in the report from DFSILTA0. The time for completing response transmission is not explicitly printed. Processing time and output queue time may be overlapping (sometimes a point of confusion), and input queue time, processing time, and output queue time do not add up to total time on this report. These three component times reflect response time components that are internal to the system, whereas total time includes both internal and external response components. Total time is measured from the insertion of the incoming message to the message queue (35 record) to the dequeue of the response from the message queue (36 record). This includes output transmission time, which can be biased by such factors as terminal unavailability, PC problems (for example: poor configuration, memory contention, disk errors, PC hanging), LAN bottlenecks, or telecommunication problems.

The IMS PA Transaction Transit Log, while similar to DFSILTA0, differs from DFSILTA0 in the following ways:

- Only the internal system aspects of transit time are treated. (The IMS PA Resource Availability report and Region Histogram report can be used to help determine external inefficiencies.)
 - A fourth component, program switch time, is included
 - Component times don't overlap
 - Component times add up to total time
- IMS PA provides additional reports, which give tabular and graphical summaries of response times by selectable categories.
- IMS PA provides performance reporting on multiple IMS subsystems running in a sysplex and using shared queues.

Shared Queues in an IMS sysplex

IMS PA can process log files from multiple IMS subsystems in a sysplex environment which uses shared queues. In this topic, the log record patterns, before and after merging the multi-subsystem log input, are illustrated.

All of the IMS subsystems in a sysplex can share a common set of queues for input, output, and Fast Path messages. A message placed on a shared queue can be processed by any IMS subsystem that has access to the shared queue and is capable of processing the message. The Common Queue Server (CQS) is the facility which manages the shared queues.

In general, IMS handles messages in the following manner:

1. IMS subsystems register interest in those queues for which they are able to process messages (work).
2. When an IMS subsystem receives a message and places it on the shared queue, all IMS subsystems that have registered interest in that queue are notified.
3. One IMS subsystem retrieves the message and processes it.

4. The IMS subsystem that processes the message places a response on the queue.
5. The IMS subsystem that submitted the original message is notified that the response message was placed on the queue.
6. The IMS subsystem that submitted the original message sends the response message to the originating terminal.

Note: Without shared queue processing, each IMS subsystem has its own queues for both input and output messages, and has its own Expedited Message Handler for Fast Path messages. The IMS subsystem that receives a message processes it, unless that IMS is set up to send the message to another IMS subsystem using MSC, Message Requeuer, or some other means.

Restrictions for Log reporting

Be aware of the following IMS PA restrictions and cautions for log reporting.

Multiple Systems Coupling (MSC) Transactions. IMS PA supports MSC transactions on a system-by-system basis. Merged MSC logs are not yet supported.

Using the MSC option, transit times within the local system are reported for transactions originating on a remote system. The time between the Get Unique from the input queue and the enqueue to the output queue is reported as process time.

Intersystem Communication (ISC) Transactions. IMS PA supports ISC transactions on a system-by-system basis. Intersystem transit times are not supported.

Batch Message Processing (BMP) Transactions. BMP transactions are supported by all IMS PA reports. However, be careful when including them in the transaction transit reports. BMP transactions are not designed for the rapid responses typical of MPP transactions. A BMP generally has much more I/O and longer execution times than an MPP. Therefore, BMP times could bias IMS PA transit time results and invalidate their use as a measurement and tuning aid for the more critical MPP transactions. **Recommendation:** Use form-based reporting to help isolate these effects.

Polling. Terminal queue times prior to polling cannot be captured.

Comparing IMS PA with other IBM programs

Various IBM programs exist that do a part of the function provided by IMS PA.

IMS PA is the only performance reporting program to support IMS multi-subsystem shared queue processing.

In addition to an extensive suite of standard reports, IMS PA provides the capability to produce customized form-based reports and extracts which can be exported to DB2 or imported into PC spreadsheet and graphing tools.

In the event of an abend in the batch report processing or I/O error in an input data set, IMS PA produces partial reports whereas other programs may terminate with no generated output.

Comparing DFSILTA0

The IMS utilities do some limited log analysis. The IMS Log Transaction Analysis utility DFSILTA0 gives detailed information of individual transaction and processing activities. It provides response times for each transaction processed within a given time period; however, statistical analysis and trends are not easily derived from DFSILTA0's report format.

For additional details, see "Comparing DFSILTA0 to IMS PA Transit reports" on page 317.

Comparing DFSISTS0

IMS PA addresses the need for a single, comprehensive log analysis program that requires a minimum of sorting and system resources.

The Statistical Analysis utility DFSISTS0 provides statistical summary reports of message activity, and reports for lines and terminals, but this utility requires extensive sorting. Installations may have restrictions on the time and resources that can be allocated to do this. Several specialized FDPs exist, primarily for transaction response reporting, and many installations have written their own log processors.

However, with IMS PA, the log is passed once, and there is no sorting.

Comparing DBFULTA0

IMS PA reporting goes beyond the capabilities of DBFULTA0, the Fast Path (FP) Log Analysis utility.

The following DBFULTA0 reports can be generated by IMS PA:

- Detail Listing of Exception Transactions
- Summary of Exception Detail by Transaction Code for IFP Regions
- Overall Summary of Transit Times by Transaction Code for IFP Regions
- Overall Summary of Resource Usage and Contentions for all Transaction Codes and PSBs
- Summary of Region Occupancy for IFP Regions by PST
- Summary of VSO Activity
- Recapitulation of the Analysis

Fast Path reporting capability is extended with additional reports, including:

- "Fast Path Transit Analysis report" on page 242, "Fast Path Transit Log report" on page 246, and "Fast Path Transit Extract by Interval" on page 248 reports
- "Fast Path Database Call Statistics report" on page 266
- "EMH Message Statistics report" on page 270
- "DEDB Update Activity report" on page 271

Fast Path reporting capability is enhanced by providing additional information, more flexibility and better presentation, including:

- Transaction exceptions can be determined by several criteria defined in an Expectation Set.
- "IFP Region Occupancy report" on page 268 provides more detailed analysis of IFP region availability and usage.
- Shared EMHQ statistics have been included in the reports, improving statistical accuracy by merging Log files from multiple IMS subsystems.
- All Fast Path reports are optional, and can be generated with all other IMS PA reports in one pass of the log data.

The “Fast Path Transaction Exception report and extract” on page 249 offers equivalent functionality to DBFULTA0. As with DBFULTA0, this report has several subreports:

- The Fast Path Transaction Exception Log provides detail for every FP transaction. The DB Wait subheading in this report has a column called CB, the number of waits for common buffers. The “Fast Path Buffer Usage report” on page 264 provides a more detailed analysis of FP buffer usage, including a break down of buffer usage by NBA and OBA.
- The Fast Path Transaction Exception Summary summarizes FP transaction activity. The DB Waits subheading in this report has a column called CB, the average and maximum number of waits for common buffers.

For DBFULTA0 and IMS PA alike, the CB wait count is taken from the 5937 FP sync point record, field SYNCBFWT (NUMBER OF WAITS FOR DEDB BUFFERS).

When considering DBFX tuning, see the section titled “IMS Fast Path buffers” in the *IBM IMS Version 7 Performance Monitoring and Tuning Update* (SG24-6404). This may help with tuning the FP buffer parameters, still generally applicable to later releases of IMS. It states, “The DBFX allocation is needed because DEDB writes are deferred until after sync point processing. This specification allows for asynchronous processing where the DEDB updates are held until the associated log buffer is written. The default is 4.”

It then follows that common buffers in the DBFX pool need to be available for transaction sync point processing, otherwise sync point must wait until DBFX CBs become available. If the CB wait count average over a period of time is greater than 0 then this may indicate that DBFX buffers are constrained. However, as DBFX is increased, DBBF (the total number of buffers) should also be increased by the same amount, as DBFX buffers are reserved from the total pool.

Part 3. Monitor reporting

The first topic in this section provides a detailed description of each of the IMS PA Monitor reports, their content and sample output. The reports are discussed in the order in which they are presented in the Monitor Report Set edit panel in the dialog.

This is followed by a description of the Monitor data that provides the input to the IMS PA Monitor reports.

Chapter 6. Analyzing Monitor reports

This topic presents the following information to help you analyze your IMS PA monitor reports.

- “Terminology.” Terms necessary for an understanding of the report output.
- “Monitor report reference tables” on page 326. A handy cross-reference to the report descriptions.
- “Monitor report categories” on page 331. The categories of reports with a brief description of the reports in each category.
- “Guidelines for using Monitor reports” on page 337. Brief description of the ways in which the reports can be useful, with general guidelines on how to use them.
- “Report descriptions” on page 347. The purpose, record codes, report options, content, uses and sample report.

Most of the discussion assumes the reports are requested using the IMS PA dialog, the primary mechanism for requesting reports. Alternatively, you can request reports using batch commands. The dialog can generate the JCL and batch commands for you, or you can do so independently of the dialog. See “Monitor report reference tables” on page 326 for a list of the monitor report commands. For a description and examples of using the batch commands, refer to “Monitor batch interface” in the *IMS Performance Analyzer for z/OS: User’s Guide*.

Terminology

You need to understand the terminology used in IMS PA reports so you can analyze the information appropriately.

Refer to “Essential terminology for Monitor reporting” on page 502 for an explanation of the following terms:

- “ESAF Integration” on page 502
- “Schedule” on page 502
- “Schedule start” on page 503
- “Transaction” on page 503
- “Dependent region activity in progress” on page 503
- “WFI and IFP region activity” on page 503
 - Schedule end
 - Schedule start
 - Region Idle time
- “CPU time” on page 504
- “IWAIT time” on page 504
- “Elapsed time” on page 504
- “Region elapsed time” on page 504
- “Trace interval” on page 504
- “Schedule to first DL/I call” on page 504
- “PCB feedback area” on page 505
- “Overflow values (***)” on page 505

Note: If you are running your reports with ESAF Integration, the interpretation of the following fields changes accordingly (see page “Terminology” on page 342):

- Call

- IWAIT
- Sch-DLI

Monitor report reference tables

The reference tables list the IMS PA monitor reports and commands with cross-references to sample reports, distributions, and object lists.

Table 18. Monitor reports: Batch commands and output examples

Report	IMSPAMON command	Examples
Region Activity Summary reports		
"Schedule/Transaction Summary report" on page 348	SCHEDTRAN	Figure 185 on page 349
"Region Summary report" on page 350	REGSUM	Figure 186 on page 356
"Program Summary report" on page 364	PROGSUM	Figure 190 on page 366
"Database IWAIT Summary report" on page 374	DBIWAITSUM	Figure 193 on page 375
"Database IWAIT Summary report" on page 374: DDgroup	DDGRP(DBIWAITSUM)	Figure 193 on page 375
"Transactions by Time Period report" on page 378	TIMEREPORT	Figure 195 on page 380
Region Activity Analysis reports		
"Region Analysis report" on page 380	REGANAL(...)	
Region Analysis: Region Detail	REGANAL(REGDETL)	Figure 196 on page 383
Region Analysis: Program Summary	REGANAL(PROGSUM)	Figure 196 on page 383
Region Analysis: Database IWAIT Summary	REGANAL(DBIWAITSUM)	Figure 196 on page 383
Region Analysis: Transactions by Time Period	REGANAL(TIMEREPORT)	Figure 196 on page 383
"Application Detail report" on page 388	APPLGRP(...)	
Application Detail: Program Summary	APPLGRP(PROGSUM)	Figure 203 on page 391
Application Detail: Transactions by Time Period	APPLGRP(TIMEREPORT)	Figure 203 on page 391
Application Detail: showing distributions		Figure 203 on page 391
"Database IWAIT Analysis report" on page 393	DBIWAITANAL(...)	
Database IWAIT Analysis: (with distributions)	DBIWAITANAL(DISTRIBUTIONS)	Figure 207 on page 395
"DDgroup report" on page 396	DDGRP(...)	
DDgroup: Database IWAIT Analysis (with distributions)	DDGRP(DBIWAITANAL(DISTRIBUTIONS))	Figure 209 on page 398
"Performance Exception reports" on page 399	EXCEPTION(...)	
Performance Exceptions: Exception Listing	EXCEPTION(LISTING)	Figure 211 on page 401
Performance Exceptions: Intent Failure Summary	EXCEPTION(INTENT)	Figure 213 on page 405
Performance Exceptions: Pool Space Failure Summary	EXCEPTION(POOL)	Figure 214 on page 406
Performance Exceptions: Deadlock Event Summary	EXCEPTION(DEADLOCK)	Figure 215 on page 406
"Enqueue/Dequeue Trace report" on page 407	ENQTRACE(...)	
Enqueue/Dequeue Trace: Detailed Trace	ENQTRACE(TRACE)	Figure 216 on page 407
Enqueue/Dequeue Trace: Summary by Database	ENQTRACE(SUMMDB)	Figure 217 on page 408
Enqueue/Dequeue Trace: Summary by Transaction Code	ENQTRACE(SUMMTC)	Figure 219 on page 409

Table 18. Monitor reports: Batch commands and output examples (continued)

Report	IMSPAMON command	Examples
"Region Histogram report" on page 409	HISTOGRAM	Figure 221 on page 411
System Analysis reports		
"Total System IWAIT Summary report" on page 413 (with distributions)	TSIWAIT(SUMMARY)	Figure 222 on page 414
"Total System IWAIT Detail report" on page 418	TSIWAIT(DETAIL)	
Total System IWAIT Detail: Database IWAITs		Figure 224 on page 420
Total System IWAIT Detail: ACBLIB Block Loading IWAITs		Figure 225 on page 421
Total System IWAIT Detail: ACBLIB Miscellaneous IWAITs		Figure 225 on page 421
Total System IWAIT Detail: MFS Directory I/O		Figure 226 on page 421
Total System IWAIT Detail: MFS Block Read I/O		Figure 226 on page 421
Total System IWAIT Detail: Line/Node Interrupts		Figure 227 on page 422
Total System IWAIT Detail: showing distributions		Figure 228 on page 422
Program Analysis reports		
"Program Activity Detail reports" on page 423	PSBREPORTS(...)	
Program Activity Detail: "PSB Details reports" on page 423	PSBREPORTS(BYREPORT,...)	
Program Activity Detail: PSB Details-PCB Totals	always produced	Figure 230 on page 427
Program Activity Detail: PSB Details by Function Code	PSBREPORTS(BYREPORT,FUNCTION)	Figure 231 on page 428
Program Activity Detail: PSB Details by Function Code-Segment Name	PSBREPORTS(BYREPORT,FUNC-SEGNAME)	Figure 232 on page 429
Program Activity Detail: PSB Details by Segment Name Feedback	PSBREPORTS(BYREPORT,SEGNAME)	Figure 233 on page 430
Program Activity Detail: PSB Details-PCB Totals (DD)	PSBREPORTS(BYREPORT,DDNAME)	Figure 234 on page 431
Program Activity Detail: PSB Details by DDname IWAITed On	PSBREPORTS(BYREPORT,DDNAME)	Figure 235 on page 431
Program Activity Detail: PSB Details by Function Code (DD)	PSBREPORTS(BYREPORT,FUNC-DDNAME)	Figure 236 on page 432
Program Activity Detail: PSB Details by Function Code DDname	PSBREPORTS(BYREPORT,FUNC-DDNAME)	Figure 237 on page 433
Program Activity Detail: "PSB-Transaction Code Analysis report" on page 434	PSBREPORTS(BYPSB,...)	Figure 239 on page 437
Program Activity Detail: "DDname by PSB-Transaction Code report" on page 439	PSBREPORTS(DDNAME-PSB)	Figure 242 on page 440
"Program Trace report" on page 441	TRACE(...)	
Program Trace: Short	TRACE(SHORT)	Figure 243 on page 443
Program Trace: Long	TRACE(LONG)	Figure 244 on page 443
Program Trace: Summary	TRACE(SUMMARY)	Figure 245 on page 444
"Batch VSAM Statistics report" on page 447	VSAMSTAT	Figure 247 on page 448
Resource Usage reports		

Table 18. Monitor reports: Batch commands and output examples (continued)

Report	IMSPAMON command	Examples
"Buffer Pool and Latch Statistics reports" on page 452	STATIS	Figure 248 on page 453
"Communication reports" on page 457	COMMS(...)	
Communication: Communication Summary (with distributions)	COMMS(SUMMARY)	Figure 253 on page 458
Communication: Communication IWAIT (with distributions)	COMMS(IWAIT)	Figure 255 on page 461
Communication: Line Functions (with distributions)	COMMS(LINEFUNC)	Figure 257 on page 464
"MSC reports" on page 466	MSC(...)	
MSC: MSC Summary	MSC(SUMMARY)	Figure 259 on page 467
MSC: MSC Traffic	MSC(TRAFFIC)	Figure 261 on page 468
MSC: MSC Queuing Summary (with distributions)	MSC(QUEUING)	Figure 263 on page 470
"ESAF report" on page 471	ESAF	Figure 264 on page 472
"Synchronous Callout report" on page 474	SYNCCOUT	Figure 268 on page 474
Fast Path Analysis reports		
"DEDB Resource Contention report" on page 475 (summary with distributions)	FPRSCONT	Figure 269 on page 477
"Fast Path Buffer Statistics report" on page 480 (with distributions)	FPBUFFER	Figure 272 on page 482
"BALG/Shared EMHQ Analysis report" on page 484 (with distributions)	FPBALG	Figure 274 on page 485
"OTHRD Analysis report" on page 487 (with distributions)	FPOTHRD	Figure 275 on page 488
"VSO Summary report" on page 490	FPVSOSUM	Figure 276 on page 491
Monitor Data Analysis report		
"Monitor Record Trace report" on page 497	SLOGTRC	Figure 278 on page 498

The following tables show which of the IMS PA monitor reports use Distributions. They also show the applicable sample Distributions.

Table 19. Monitor global options: Distributions

Report Set Global Option	Sample Distributions
Monitor Global	
Monitor Global: Distributions Options	ELAPSCH, ELAPCAL, ELAPIWT, IWTSCAL
Transactions by Time Period	
Application Grouping	
DDname Grouping	
"ESAF Integration" on page 341	
"Alternate Sequencing" on page 343	

Table 20. Monitor reports: Distributions

Report	Sample Distributions
Region Activity Summary reports	
“Schedule/Transaction Summary report” on page 348	
“Region Summary report” on page 350	
“Region Summary report” on page 350 (PSB)	
“Database IWAIT Summary report” on page 374	
“Transactions by Time Period report” on page 378	
Region Activity Analysis reports	
“Region Analysis report” on page 380	
Region Analysis: Region Detail	
Region Analysis: Program Summary	
Region Analysis: Database IWAIT Summary	
Region Analysis: Transactions by Time Period	
“Application Detail report” on page 388	Global Options: ELAPSCH, ELAPCAL, ELAPIWT, IWTSCAL
Application Detail: Program Summary	
Application Detail: Transactions by Time Period	
“Database IWAIT Analysis report” on page 393	DDIWELAP
“Performance Exception reports” on page 399	
Performance Exceptions: Exception Listing	Global Options: ELAPCAL, ELAPIWT, IWTSCAL (upper limits only)
Performance Exceptions: Intent Failure Summary	
Performance Exceptions: Pool Space Failure Summary	
Performance Exceptions: Deadlock Event Summary	
“Enqueue/Dequeue Trace report” on page 407	
“Region Histogram report” on page 409	
System Analysis reports	
“Total System IWAIT Summary report” on page 413	IWTSUMMY
“Total System IWAIT Detail report” on page 418	IWTSUMMY
Program Analysis reports	
“Program Activity Detail reports” on page 423	
Program Activity Detail: “PSB Details reports” on page 423	
Program Activity Detail: “PSB-Transaction Code Analysis report” on page 434	Global Options: ELAPSCH, ELAPCAL, ELAPIWT, IWTSCAL

Table 20. Monitor reports: Distributions (continued)

Report	Sample Distributions
Program Activity Detail: "DDname by PSB-Transaction Code report" on page 439	
"Program Trace report" on page 441	
Program Trace: Short	
Program Trace: Long	
Program Trace: Summary	Global Options: ELAPCAL, ELAPIWT, IWTSCAL
"Batch VSAM Statistics report" on page 447	
Resource Usage reports	
"Buffer Pool and Latch Statistics reports" on page 452	
"Communication reports" on page 457	
Communication: Communication Summary	COMMELP
Communication: Communication IWAIT	COMMIWE
Communication: Line Functions	COMMLFT, COMMLFR
"MSC reports" on page 466	
MSC: MSC Summary	
MSC: MSC Traffic	
MSC: MSC Queuing Summary	MSCQLEN, MSCQELP
"ESAF report" on page 471	
"Synchronous Callout report" on page 474	
Fast Path Analysis reports	
"DEDB Resource Contention report" on page 475 (summary with distributions)	FPRCLIW
"Fast Path Buffer Statistics report" on page 480	FPBSCNT
"BALG/Shared EMHQ Analysis report" on page 484	FPBGQLN, FPBGELP
"OThread Analysis report" on page 487	FPOTACT, FPOTWTA, FPOTBOQ
"VSO Summary report" on page 490	
Monitor Data Analysis report	
"Monitor Record Trace report" on page 497	

The following table shows which IMS PA monitor reports support filtering of monitor records using Selection Criteria. It also shows the applicable Object List types.

Report	Object List Type																			
	AP	BLK					DD	ESS	IMS		LN/	MSG		REC	RG	RG	RT		USER	USR
	GRP	AREA	ID	CLASS	DB	DD	GRP	ID	ID	KEY	LINE	PT	LTERM	ID	NODE	PROG	CD	JOB	PST	CDE
	TRAN	ID	DEF																	
Options																				
Monitor Global	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	-	-	-	-
Transactions by Time Period	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Application Grouping	Y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	-	-	-	-
DDname Grouping	-	-	-	-	-	Y	Y	-	-	-	-	-	-	-	-	-	-	-	-	-
ESAF Integration	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alternate Sequencing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Region Activity Summary reports																				
Schedule/Transaction Summary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y ¹	-	-	-	-
Region Summary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y ¹	-	-	-	-
Program (PSB) Summary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y ¹	-	-	-	-
Database IWAIT Summary	-	-	-	-	-	Y ²	Y ²	-	-	-	-	-	-	-	-	Y ¹	-	-	-	-
Transactions by Time Period	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y ¹	-	-	-	-
Region Activity Analysis reports																				
Region Analysis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y ¹	-	-	-	-
Application Detail	Y ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y ^{1,3}	-	-	-	-
Database IWAIT Analysis	-	-	-	-	-	Y ²	Y ²	-	-	-	-	-	-	-	-	Y ¹	-	-	-	-
Performance Exceptions	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Exception Listing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y ¹	-	-	-	-
Intent Failure Summary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pool Space Failure Summary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Deadlock Event Summary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Enqueue/Dequeue Trace	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Region Histogram	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	-	-
System Analysis reports																				
Total System IWAIT Summary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total System IWAIT Detail	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Program Analysis reports																				
Program Activity Detail	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y ¹	-	-	-	-
Program Trace	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y ¹	-	-	-	-
Batch VSAM Statistics	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Resource Usage reports																				
Buffer Pool and Latch Statistics	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Communication	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ESAF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y ¹	-	-	-	-
Synchronous Callout	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fast Path Analysis reports																				
DEDB Resource Contention Summary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FP Buffer Statistics	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BALG/Shared EMHQ Analysis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OTHRD Analysis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VSO Summary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Monitor Data Analysis report																				
Monitor Record Trace	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Comments:																				
1. Records can be filtered on Program Name (PSB) using the Monitor Global Options Selection Criteria.																				
2. The report uses DDname Groups specified in the DDname Grouping Options.																				
3. The report uses Application Groups specified in the Application Grouping Options.																				

Figure 184. Monitor reports: Selection Criteria (Object Lists).

This table shows which IMS PA monitor reports support filtering of monitor records using Selection Criteria. It also shows the applicable Object List types.

Monitor report categories

IMS PA monitor reports are based on events and values recorded in the IMS Monitor or DB Monitor data sets.

“Monitor report reference tables” on page 326 list IMS PA monitor reports by category, and shows the page number on which a sample report begins. The reports are organized by level of detail and area of analysis. Many options exist to let you tailor the reports for your analysis requirements. Distributions can be specified to obtain graphs showing the distribution (spread) of the values of the main performance measures. For example, the Region Summary, Detail and Analysis reports can produce graphs showing the distribution of the values of elapsed time per schedule, elapsed time per call, elapsed time per IWAIT, and IWAITs per call. “Monitor report reference tables” on page 326 list the IMS PA monitor reports that use Distributions and the available sample Distributions. For

some reports, Selection Criteria can be specified to filter the report data. Object Lists are useful when specifying Selection Criteria. Figure 184 on page 331 lists the IMS PA monitor reports and applicable Object Lists.

Region Activity Summary reports

The Region Activity Summary reports provide a summary and correlation of region, program, transaction, and database activity for the IMS system. These reports give you an overview of IMS system activity and identify problem areas for further investigation using system and program level reports. Use of the summary reports for trend analysis and day-to-day monitoring of the system is facilitated by reporting in terms of rates, ratios, percentages, and elapsed times per event.

The region activity summary reports are:

- **Schedule/Transaction Summary.** A compact summary of total scheduling and transaction counts for all regions for the entire trace period.
- **Region Summary.** A summary analysis of schedule, transaction, call, and IWAIT activity for each active MPP and IFP region, presented for convenient comparison of regions. This report includes average elapsed time per activity, transactions per schedule, calls per transaction, IWAITs per call, analysis of region active and idle time, and elapsed time per schedule distributions.
- **Program (PSB) Summary.** A summary analysis and percentage comparison of schedule, transaction, call, and IWAIT activity for each PSB-transaction code and application group.
- **Database IWAIT Summary.** A summary of the IWAIT activity associated with dependent regions or MPP, IFP, and BMP regions. Activity is reported for each DDname and DDgroup, including the number of IWAITs, average elapsed time per IWAIT, and IWAITs per call.
- **Transactions by Time Period.** For each PSB-transaction code and application group, presents the number or percentage of transactions occurring in specified time periods as well as the overall transaction rate for each time period.

Region Activity Analysis reports

The region activity analysis reports provide information for the detailed analysis of the IMS system. Detail reports are provided for analysis of program activity in each active MPP or IFP region, and for specified application and data set groups. An IWAIT Analysis report is provided for program related IWAIT activity. The Exception Listing report is provided when certain performance monitoring thresholds are exceeded. An Enqueue/Dequeue Trace report (for IMS) identifies program isolation bottlenecks. The Region Histogram report graphically presents the interrelationship of region activity. Distributions are used extensively throughout the reports.

The system analysis reports are:

- **Region Analysis.** Presents the Region Detail, Program Summary, Transactions by Time Period, and Database IWAIT Summary reports for each active region.
- **Region Detail.** An analysis of schedule, transaction, call, and IWAIT activity for each active MPP or IFP region, with all the information for a region presented together. This report includes average elapsed time per activity, transactions per schedule, calls per transaction, IWAITs per call, analysis of region active and idle time, and elapsed time per schedule distributions.

- **Application Detail.** A detailed analysis, comparison of percentages, and summary of the activity of the MPPs and IFPs that comprise user-defined application groups. The following information is reported for each program in the group and summarized for the application group totals:
 - Schedule, transaction, and database activity with appropriate distributions
 - Transactions by time period data
 The application group totals also appear as a line item on the appropriate summary and analysis reports.
- **Database IWAIT Analysis.** An analysis of IWAIT activity and elapsed time per IWAIT distributions for each DDname. This report is provided for the total IWAIT activity associated with both processing program activity and each MPP region.
- **DDgroup.** An analysis of the IWAIT activity on the data sets that comprise user-defined DDgroups based on DDname. IWAIT activity, including number of IWAITs, average elapsed time per IWAIT, IWAITs per call, and elapsed time per IWAIT distributions, is reported for each data set in the group and for the DDgroup totals. This report is produced only as an option in the Database IWAIT Analysis report. DDgroup totals can optionally appear as line items on the Database IWAIT Summary report.
- **Performance Exceptions.** These reports incorporate the Exception Listing, and three reports analyzing IMS events that degrade IMS performance, including Intent failures, Pool Space failures, and Deadlock events.
- **Exception Listing.** A listing of performance threshold violations for the key performance factors of number of IWAITs per call, DL/I call elapsed time, and IWAIT elapsed time. Miscellaneous unusual occurrences are also listed, such as:
 - BMP schedule failures
 - Pseudo-schedules created by IMS PA for schedules in progress
 - Transaction backouts inferred by IMS PA
 - Terminations forced by IMS PA due to incomplete schedules
- **Enqueue/Dequeue Trace.** The monitor records enqueue and dequeue events associated with program isolation. IMS PA identifies each IWAIT resulting from a program isolation-related enqueue by reporting the time it occurred, the database enqueued on, the transaction enqueued, and any other transactions active at enqueue time. The trace is a valuable aid in identifying program isolation bottlenecks.
- **Region Histogram.** A trace of region activity by time interval and a valuable aid in analyzing the interrelationship of program activity in the IMS system. Activity for up to 13 regions is presented in side-by-side format. Periods of region activity and inactivity are graphically portrayed.

System Analysis reports

The System Analysis (Total System IWAIT) reports provide a summary and detailed account of the IWAIT activity of the entire IMS system.

The Total System IWAIT reports are:

- **Total System IWAIT Summary.** A summary of the IWAIT activity for the total IMS system. This report includes system data set, database, block loading, format services, scheduler, and line/node IWAITs, as well as distributions of elapsed time per IWAIT for each reported category.
- **Total System IWAIT Detail.** A detailed breakdown of the system data set, database, block loading, format services, scheduler, and line/node IWAIT activity summarized in the Total System IWAIT Summary report. Elapsed time per IWAIT distributions for each detail line are optionally provided.

Program Analysis reports

The Program Analysis reports provide useful information for investigating performance issues related to application program and database design.

The Program Analysis reports are:

- **Program Activity Detail.** A detailed breakdown of the database activity of each PSB name by PCB name, function code, DDname, and segment name feedback. Alternate report formats present the data organized by PCB name. No sorting of the input data is required to obtain the reports.
- **Program Trace.** A detailed trace of the events associated with a program schedule. A detail line of information is provided for each call and (optionally) each IWAIT occurring in the program schedule or batch program execution. A summary of schedule activity is also provided. Any number of traces can be specified as part of a single IMS PA execution.
- **Batch VSAM Statistics.** A detailed breakdown of VSAM activity for IMS Batch jobs.

Resource Usage reports

The Resource Usage reports provide a detailed analysis of the usage of IMS resources, including Buffer Pools (such as Message Queue, OSAM, VSAM, and Message Formatting), Latches, Communication, MSC, and ESAF.

The resource usage reports are:

- **Buffer Pool and Latch Statistics.** These reports show IMS buffer usage statistics, providing their values when tracing starts and ends, and the difference between these two values. The reports include the Message Queue Pool, Database Buffer Pool, VSAM Buffer Pool, Message Format Buffer Pool, and Latch Statistics Counters.
- **Communication.** These reports show information on lines and nodes. They include the Communication Summary, Communication IWAIT, and Line Functions.
- **MSC.** These reports show the messages sent across systems. They include the MSC Summary, MSC Traffic, and MSC Queuing Summary.
- **ESAF.** A summary of the activity of external subsystems used by IMS programs.
- **Synchronous Callout.** A detailed analysis of sync callout activity in regions and by application programs. Individual subsystem activity is broken down by region and program, with statistics of sync callout activity per transaction.

Fast Path Analysis reports

The Fast Path analysis reports provide an analysis of all Fast Path resources and functions, including Fast Path buffers, BALG and shared EMHQ, OTHREADs, DEDB IWAITs, DEDB resource contention, and VSO. The reports are not available from DB Monitor data.

The Fast Path Analysis reports are:

- **DEDB Resource Contention.** Provides summary information about IWAITs on DEDB locks of various types, including CI, UOW, segment level, area, buffer overflow, MSDB, non-DBRC DB, command and dummy locks.
- **Fast Path Buffer Statistics.** Provides statistical information on activities in the Fast Path buffers, for all regions combined and for each region.

- **BALG/Shared EMHQ.** Provides statistical information on Balancing Group (BALG) activities and the shared Expedited Message Handler queue (EMHQ).
- **OTHREAD Analysis.** A summary analysis of activities in the OTHREAD queue.
- **VSO Summary.** Provides summary information on VSO activity including:
 - VSO preload,
 - VSO I/O activities for the various data base share levels,
 - VSO write IWAITs,
 - VSO area castout operations, and
 - VSO coupling facility I/O wait.

Monitor Record Trace report

This report formats the records in the monitor input file to produce a chronological trace style listing.

Batch program reports

Although the entire collection of IMS PA monitor reports could be obtained from processing a DB Monitor trace, only a subset of the reports are meaningful for DB analysis. The remaining reports are related to the IMS Transaction Monitor and would provide little or no relevant information about the IMS Database Monitor.

Of the monitor reports, the following subset is available for analysis of DB Monitor data:

- **Region Summary and Detail (Region 1).** Statistics and distributions for database calls and IWAITs. Most of this information is also available with the Program Activity Detail reports, however Calls/sec and IWTs/sec are unique values in this report.
- **Database IWAIT Summary (Region 1).** A summary of IWAIT activity for each data set and specified DDgroup.
- **Database IWAIT Analysis with distributions.** A report of IWAIT activity by DDname. This report can be used in place of, or in addition to, the Total System IWAIT reports.
- **DDgroup with distributions.** A report of IWAIT activity by DDname for each user-defined DDgroup.
- **Exception Listing.** A listing of performance threshold violations. The other reports included in the suite of Performance Exception reports are applicable only to TM.
- **Total System IWAIT Summary and Detail with distributions.** A complete accounting of IWAIT activity by data set type (OSAM, VSAM, DEDB, MSDB) and DDname.
- **Program Activity Detail.** A comprehensive collection of reports for database call analysis, plus a detailed trace of batch program IWAIT and CALL events for analysis of program design problems.
- **Program Trace.** A detailed trace of the events associated with a program schedule.
- **Batch VSAM Statistics.** A detailed breakdown of VSAM activity for IMS batch jobs. This is the only IMS PA report that processes DB Monitor data but not IMS Monitor (TM) data. All other reports can process TM data.
- **Buffer Pool and Latch Statistics.** A report on the access status of IMS buffers and the contents of the IMS latch counters.
- **ESAF.** A summary of the external subsystem activity of IMS programs.

- **Monitor Record Trace.** The monitor input records are formatted and reported chronologically.

You should decide which reports best suit your requirements. The following reports are often the most useful:

- Database IWAIT Analysis and distributions
- DDgroup Detail and distributions
- Program Analysis reports (either PSB Details or PSB-Transaction Code Analysis provide the same information)

Note that CPU time is not collected for the batch monitor so it is always zero (0.000) in Program Analysis reports.

If a program or database problem requires more detail, you can do a separate run to obtain the Program Trace report. Use the From and To date and time report options to control the duration of the Program Trace.

DBCTL monitor reports

This section describes the DBCTL events that the IMS Monitor collects and the monitor reports that apply to DBCTL users. Monitoring has different meanings for DBCTL and DB/DC.

DC monitoring refers to transaction monitoring. The end user enters the transaction on a terminal. The transaction is processed by IMS and then returns a result to the user. Transaction characteristics that are monitored include total response time and the occurrences of resource contentions (for example, PSB schedule wait time, and database I/Os).

By contrast, **DBCTL** has neither transactions nor terminal end users. It does, however, work on behalf of transactions entered by CCTL terminal users. DBCTL monitoring provides data about the processing that occurs when a CCTL transaction accesses DBCTL databases. The CCTL gains this access using DRA requests.

A typical sequence of these DRA requests would be:

1. A SCHED request to get a PSB scheduled in DBCTL
2. A DL/I request to make database calls
3. A sync point request, COMMTERM, to commit the updates and release the PSB

The DBCTL process that encompasses these requests is called a unit-of-recovery (UOR).

DBCTL provides monitoring data about UORs, such as: total time UOR existed, wait time for PSB schedule, and I/Os during database calls. This information is very similar to IMS transaction monitor data. In a DBCTL-CCTL system, however, the UOR data represents only part of the total processing of a CCTL transaction. Therefore, CCTL monitor data is necessary to get a total view of CCTL transaction performance.

DBCTL does not change the format or usage of the monitor reports. There are reports and fields within reports that are not applicable to DBCTL. Generally, these are in the transaction manager and communication areas. There are some fields that are interpreted differently in a DBCTL environment.

For reports that do not apply to DBCTL, either a report heading without data is shown or a message issued and no report is produced. The term *region* in monitor reports refers to a PST assigned to a specific dependent region that processes specific IMS transactions. In DBCTL monitor reports, the term *region* still applies to a PST. A PST can service one CCTL thread (transaction) at a time. However, CCTL threads change, resulting in one PST servicing many different CCTL transactions. Since multiple CCTLs can connect to DBCTL, the PST can actually service transactions from different CCTLs.

All of the threads built for a CCTL carry the job name of the CCTL. This appears as the same job name for many regions in the Region Analysis reports.

Within a trace interval, a thread can be assigned to multiple CCTLs, but it can only be assigned to one CCTL at any time. Depending on the number of CCTLs attached to DBCTL, the Region Summary reports can show:

- One region with only one job name.
- One region with different job names.
- Multiple regions with different job names. Some regions can have the same job name and some can have different job names.
- Multiple regions with only one job name.

Any monitor report for a region is a summary of all the CCTLs a thread served during the trace interval (for example, the elapsed time for all CCTLs that a thread has been assigned to during the trace interval).

The Monitor reports are the same for BMPs and non-message BMPs.

UOR elapsed times are spent in DBCTL, not in the DRA. The time spent in the DRA is considered part of the CCTL, therefore the DRA time is not reported by any DBCTL statistics.

The Monitor reports that apply to DBCTL are:

- “Region Activity Summary reports” on page 348
- “Region Activity Analysis reports” on page 380
- “System Analysis reports” on page 412
- “Program Activity Detail reports” on page 423
- “Program Trace report” on page 441
- “Buffer Pool and Latch Statistics reports” on page 452
- “Fast Path Analysis reports” on page 475
- “Monitor Data Analysis report” on page 497

Guidelines for using Monitor reports

This topic describes the various situations in which IMS PA monitor reports can be useful and, in a general way, how to use the reports.

Guidelines for using specific reports and interpreting report content are in the subsections describing individual reports.

Performance management

Use IMS PA monitor reports in conjunction with a regular IMS performance management program.

Performance management requires a dedicated effort, which includes:

- Defining service level objectives or exceptions of response time and throughput

- Establishing application program performance standards
- Monitoring performance to determine whether performance objectives and standards are being met
- Identifying and analyzing performance and capacity problems
- Making tuning changes and problem corrections, as well as verifying the effectiveness of such changes
- Reaching a level of IMS education sufficient to understand your system's behavior (IMS application interrelationships with the operating system, as well as with other applications and subsystems)

IMS PA is not a performance manager. However, IMS PA monitor reports are designed to help with many aspects of IMS performance management.

Performance monitoring and analysis

IMS PA monitor reports are hierarchical in structure. The summary level reports are intended to help with performance monitoring. The Region Summary, particularly, provides many important indications of performance.

By establishing guidelines or thresholds of acceptability for these indicators and then comparing actual values against these thresholds on a regular basis, you can often predict performance problems that develop gradually or immediately identify a performance problem that occurs spontaneously.

IMS PA monitor reports are based solely on data recorded by the IMS and DB Monitors; the reports, therefore, do not provide direct information about operating systems, hardware subsystems, or applications performance. However, IMS PA reports contain information in IMS terms that leads to solutions of IMS problems unique to the installation environment.

Performance threshold values

In the discussions of how to use certain reports, guideline values are occasionally used as a reference for the discussion. Performance threshold values should be established by each installation and the IMS PA reports should be monitored against those thresholds. The threshold values used can be modified as you obtain more experience and knowledge about the system.

Most of the guideline figures mentioned are from the *IMS Performance Guide*. For example, a figure of 30 microseconds for scheduler not-IWAIT time is used to indicate whether the IMS control region is obtaining sufficient CPU resources to do its job.

However, any of the values we provide should be used with care. Each installation must develop knowledge of its own system sufficient to understand what constitutes *normal* performance for that system. The performance figures for one installation can vary dramatically from those for another system due to factors such as the hardware used, the IMS release and maintenance level installed, the application design, and so on.

IMS PA exception reports provide a convenient means of monitoring three key indicators:

- DL/I elapsed time
- IWAIT elapsed time
- Number of IWAITs per call

An exception report entry is printed each time the threshold value for an indicator is exceeded.

Program design standards and documentation

Since application design can have a major impact on apparent IMS performance, each installation should adopt MPP program design standards that must be met before a program is put into production.

In addition to using good programming techniques involving structured design and code, the MPP must be designed to issue as few DL/I calls per transaction as possible; also, those calls should result in a minimum of I/O activity. Specify MOD=SNGL to reduce program isolation enqueue time.

An MPP performance standard can be stated as a maximum number of calls per transaction and a maximum number of IWAITs per call. During acceptability testing for an MPP, IMS PA reports can be used to:

- Verify whether the MPP can be put into production
- Classify the program as an MPP or BMP

The PSB-Transaction Code Analysis and Program Trace reports provide excellent material to help evaluate application performance and to keep as part of the program documentation package.

Choosing Monitor reports

You probably won't want to obtain all available reports on a regular basis unless you are trying to learn about your IMS system/application environment.

Normally, the reports are used to help answer performance questions. Therefore, you should have a list of questions in mind to guide report selection and examination. If no particular clue or problem is being investigated, then you should be monitoring performance against a set of installation-derived performance threshold values.

IMS PA monitor reports are hierarchical in organization. The Region Summary report contains important overall performance indicators. From the Region Summary report, you can pursue successively more detailed information as your examination progresses through the hierarchy. For example, a high IWAITs/Call value in the Region Summary report might lead you to the Database IWAIT Summary report. Here one or more DDnames may show an abnormal rate of IWAIT occurrences and elapsed time. Next, the PSB Details reports, collated first by PCB name and then by DL/I function code and segment name, may show a high IWAIT value caused when a specified PSB issues a particular set of calls (for example, a Get Unique (GU) to the root followed by a Get Next within Parent (GNP)). Finally, a Program Trace of this PSB may identify an inefficient call sequence that can be modified to decrease IWAIT activity.

The following reports are recommended as a standard set to use in performance monitoring:

- "Schedule/Transaction Summary report" on page 348
- "Region Summary report" on page 350
- "Database IWAIT Summary report" on page 374
- "Performance Exception reports" on page 399
- "Enqueue/Dequeue Trace report" on page 407
- "Total System IWAIT Summary report" on page 413
- "Buffer Pool and Latch Statistics reports" on page 452

The recommended reports normally produce 20-30 pages of output. Greater volumes can be caused by a high number of program isolation enqueues, pool space failures, or abnormal IMS monitor record sequences that result in diagnostics.

If information found in this set of reports indicates further examination is required, you should determine what questions you want answered, modify the Report Set to obtain the necessary additional reports, and rerun. See the individual report descriptions for information regarding use of a specific report.

Monitor data collection

Ensure that you run the monitor to collect data appropriate to your reporting requirements.

Monitor data collection and reporting is influenced by the following:

/TRACE command options

Before running IMS PA monitor reports, review the data collection options of the IMS monitor /TRACE command to make sure appropriate options are selected (LA, SCHD, APMQ, or ALL). For example, if the LA option is not selected, then the reports that require Communications Input/Output (CIO) monitor data will contain incomplete data. For a complete set of reports from IMS PA, the ALL option should be specified.

Timing

The time period for data collection by the IMS monitor must be carefully selected to include the events to be analyzed. For some reports, the event must be a complete event. Note the discussion of elapsed time in IMS PA calculations. Also consider the effect of operating system function on Store Clock timing of the measured events. The ideal situation is a non-paging, preloaded, standalone IMS system. This situation produces the most accurate statistics.

The elapsed time of the data collection period must also be planned. The values included in averages, standard deviations, distributions, counts, and so on increase in statistical significance for a longer trace time.

Other relevant information

During data collection, other information should be noted for future reference. Such information might include the IMS log input data, direct-access device layout, system configuration, IMS master console log, and volume of background work.

BMP program reports

BMPs can impact IMS performance. IMS PA includes BMP activity in its reports so that BMP impact can be understood in relation to MPP activity. However, inclusion of BMPs can mask many of the averages you may be interested in examining for MPPs.

To exclude BMPs from monitor reports, specify the global option NOBMP in the batch command. To report only BMPs, specify the global option BMPONLY in the batch command.

Note that removing BMPs from the reports does not remove their impact on certain values such as elapsed times. However, IMS PA reports many values as percentages. Examining percentages of elapsed time, for example, is a valid way of comparing reports with and without BMP reporting.

ESAF Integration

ESAF Integration is a global option that controls whether External Subsystem calls are integrated into the Region and Program/Trancode monitor reports.

The format of the command is:

```
IMSPAMON      ESAFOpts(CALLs|NOCALLs)
```

ESAF Integration is a global option for monitor reporting that allows you to optionally incorporate External Subsystem information into your reports, similar to the IMS Monitor Report Print utility (DFSUTR20). When the ESAF Integration Option is activated, ESAF call statistics are reported for each subsystem and contribute to the total call and IWAIT counts for regions and program/trancodes.

External Subsystem calls are integrated into the following reports:

“Region Summary report” on page 350

Includes an additional report section called “Call data (ESAF)”.

“Program Summary report” on page 364

Includes two additional report sections called “Call Analysis (ESAF)” and “PSB Comparison (ESAF)”.

External Subsystem calls are divided into five categories:

- **Initialization.** Initialize, Identify, Signon, Create Thread
- **Normal Call.** Normal Call
- **Commit Ph1.** Commit Phase 1
- **Commit Ph2.** Commit Phase 2, Commit Verify
- **Termination.** Signoff, Terminate Identify, Abort, Subsystem Not Operational, Terminate Thread

“Region Analysis report” on page 380

Region Detail includes Region and Program (PSB) ESAF sections.

“Application Detail report” on page 388

The Program Summary includes two additional report sections called “Call Analysis (ESAF)” and “PSB Comparison (ESAF)”.

“Performance Exception reports” on page 399

Exception Listing includes ESAF calls that exceed the Call or IWAIT thresholds. For ESAF calls, some fields have different meanings:

- The PCBname field is the External Subsystem name, suffixed with (E) to distinguish it from a DL/I PCB name.
- The Function Code field is the ESAF call type, followed by its associated module ID, and then the return code.

“Program Activity Detail reports” on page 423

Includes external subsystem call activity breakdown, incorporated with the DL/I call activity breakdown. For ESAF calls, some fields have different meanings:

- The PCBname field is the External Subsystem name, suffixed with (E) to distinguish it from a DL/I PCB name.
- The Function Code field is the ESAF call type. For example Signon, Normal Call, Commit Ph2.
- The Status Code field is the ESAF call return code.

“Program Trace report” on page 441

Includes the individual external subsystem calls in the trace, alongside the DL/I and other trace events. For ESAF calls, some fields have different meanings:

- The PCBname field is the External Subsystem name, suffixed with (E) to distinguish it from a DL/I PCB name.
- The PCB Feedback field is the ESAF call type. For example Signon, Normal Call, Commit Ph2.
- The Status Code field is the ESAF call return code.

Note: The “ESAF report” on page 471 is not affected by the ESAF Integration Option. When the ESAF report is requested, it will always be generated regardless of the ESAF Integration Option setting.

Terminology

Be aware that when ESAF Integration is activated, some report field definitions change.

Compare the following definitions of Call, IWAIT and Sch-DLI with those in “Essential terminology for Monitor reporting” on page 502.

Call When ESAF Integration is activated, a Call is a DL/I or external subsystem call. DL/I calls to the Message and EMH queues, Full Function and Fast Path database DL/I calls, and external subsystem calls all contribute to the total call count for regions and programs.

IWAIT

IWAIT time is the elapsed time IMS waits for an event to complete. When ESAF Integration is activated, External subsystem calls are treated as IWAIT events because they occur outside the control of IMS, causing IMS to wait for their completion. DFSUTR20 also treats external subsystem calls as IWAIT events.

Sch-DLI

When ESAF Integration is activated, Sch-DLI is the elapsed time from end of schedule to the first DL/I or external subsystem call. This time is reserved for application program initialization and housekeeping prior to an initial call (DL/I or an external subsystem) that marks the beginning of control program services. It is a measure of processing that is not repeated when multiple transactions are processed in a single scheduling.

Report reference table

ESAF Integration does not apply to all monitor reports. The following table shows which reports are candidates for ESAF Integration and gives a link to examples where External Subsystem calls have been incorporated in the report.

Table 21. ESAF Integration: Applicable monitor reports

Report	Example
“Region Summary report” on page 350	Figure 188 on page 357
“Program Summary report” on page 364 (PSB)	Figure 192 on page 367
“Region Analysis report” on page 380	
Region Analysis: Region Detail	Figure 201 on page 387
Region Analysis: Program Summary	Figure 202 on page 388

Table 21. ESAF Integration: Applicable monitor reports (continued)

Report	Example
"Application Detail report" on page 388: Program Summary	Figure 206 on page 393
"Performance Exception reports" on page 399: Exception Listing	Figure 212 on page 401
"Program Activity Detail reports" on page 423	
Program Activity Detail: PSB Details-PCB Totals	Figure 238 on page 434
Program Activity Detail: PSB Details by Function Code	Figure 238 on page 434
Program Activity Detail: PSB Details by Function Code-Segment Name	
Program Activity Detail: PSB Details by Segment Name Feedback	
Program Activity Detail: PSB-Transaction Code Analysis	Figure 241 on page 439
"Program Trace report" on page 441	
Program Trace: Short	Figure 246 on page 445
Program Trace: Long	
Program Trace: Summary	Figure 246 on page 445

Alternate Sequencing

Alternate Sequencing is a global option that applies to some of the summarized monitor reports. The default sequence of resources is ascending alphabetical order by resource name. For example, by region ID, program name, transaction code, or database name. With alternate sequencing, you can request the report in descending duration order by either resource occupancy, calls (DL/I or other types), or delay (IWAIT).

Also, you can limit the number or percentage of resources reported. For example, the 10 worst performing databases or the busiest 10% of regions.

The format of the command is:

```
IMSPAMON      SORT(
                [NAME|OCCupancy|CALLs|DELAY,]
                [LIMit(nnn[%])])          default 100%
```

Alternate Sequencing strives to place the important performance data at the top of the report, saving you the effort of scanning through the entire report output.

Monitor report data is usually presented in Name sequence, for example by the resource name such as Region ID or Transaction Code. But Name sequence does not take into account the performance characteristics of the resources. The items of interest may be scattered throughout the reports. Alternate Sequencing orders resources by their performance characteristics. There are three alternate reporting sequences: Occupancy, Calls and Delay. The alternate sequencing is applied globally to most of the monitor reports where data is summarized.

Occupancy is defined as the elapsed time that a resource is being used. For example, Region Occupancy is the time that the region spends executing programs to process transactions.

Calls refers to the elapsed time that the resource spends processing DL/I (and other) calls. For example, for transactions, Calls is the time that the transaction spends processing all types of DL/I (and optionally ESAF) calls.

Delay is defined as the elapsed time that the resource waits for IWAIT events to complete. Note that IMS PA classifies an ESAF call as an IWAIT event.

Occupancy, Calls and Delay sequencing is always reported in descending sequence. For example, the regions with the highest occupancy or the worst performing databases are located at the top of the report.

For some resources, not all of the alternate sequences are applicable. In these cases, IMS PA will use a sequence that honors the intent of the request. For example, when Occupancy or Call sequencing is requested, the Database IWAIT report will be ordered by Delay.

When Occupancy, Calls or Delay sequencing is requested, you can specify a **Limit** to control the amount of data reported. The Limit can be:

- A percentage. For example, specify 10% to restrict reporting to the top ten percent of resources being reported. A percentage is useful because a different number is applied appropriate to each report type. For example, the top 10 high occupancy regions from a total region count of 100, or the top 100 worst performing databases from a total database count of 1000.
The numbers are rounded up. For example, 10% of 1 record is reported as 1, 35% and 60% of 3 records is reported as 2.
- A value. For example, specify 50 to restrict reporting to the top fifty resource users. A value can be useful to restrict report output to a maximum of one or two pages.

Reports that are truncated by a Limit have an additional report line identified by "Limit" or "Lim". The Limit line is the total for the reported (or limited) data only.

Following the Limit line is usually the actual or Grand Total. This is unaffected by Limiting and is the total of all (100%) of the data.

Warning

Take care when interpreting report output that is ordered by Occupancy, Calls and Delay, especially when Limit is in effect. Alternate sequencing is only applied to one resource per report, usually the primary resource. For example, the Region Summary report has several subreports that breakdown region activity by scheduling, transactions and DL/I calls. When Delay sequencing is requested, IMS PA first orders the regions (primary resource) by their total IWAIT elapsed time, usually a combination of scheduling, database and other IWAIT events. All subreports are then presented in total Region IWAIT elapsed time sequence.

Consider the following scenario:

- Region 1 has low scheduling IWAITs and high database IWAITs totaling 100 seconds,
- Region 2 has average scheduling IWAITs and average database IWAITs totaling 110 seconds,

- Region 3 has high scheduling IWAITs and low database IWAITs totaling 120 seconds.

The Region Summary report, sequenced by Delay with a limit of 66%, will report Regions 3 then 2 only. Region 1 will not appear in any subreports.

The DL/I call report will not show Region 1 at all, even though it has the most database IWAIT activity.

There are two reasons why IMS PA does this:

- All subreports will appear in the same region sequence, just like the reports do in Name sequence. Then you can compare the resources of one subreport with those of the next subreport, knowing they are for the same region.
- The focus of the report is on all Region IWAIT activity, not just database IWAIT activity. You can review the database IWAITs in the Call data subreport and make an assessment as to whether they are a major contributor to the total Region IWAIT time.

For database IWAIT analysis, you should use the Database IWAIT reports. This is where Delay is calculated on database IWAIT activity only.

Report reference tables

Alternate Sequencing is not applicable to all monitor reports. The following table shows which reports can employ Alternate Sequencing, which type of sequencing is applicable to each report (O=Occupancy, C=Calls, D=Delay), and gives a link to an example.

Table 22. Alternate Sequencing: Applicable monitor reports and sequencing options

Report	Sequencing resource	Sequencing option			Example
		O	C	D	
"Region Summary report" on page 350	Region	O	C	D	Figure 189 on page 358
"Program Summary report" on page 364 (PSB)	Program	O	C	D	Figure 192 on page 367
"Database IWAIT Summary report" on page 374	Database	D	D	D	Figure 194 on page 376
"Region Analysis report" on page 380					
Region Analysis: Program Summary	Program	O	C	D	Figure 202 on page 388
Region Analysis: Database IWAIT Summary	Database	D	D	D	
"Database IWAIT Analysis report" on page 393	Database	D	D	D	Figure 208 on page 396
"Enqueue/Dequeue Trace report" on page 407					
Enqueue/Dequeue Trace: Summary by Database	Database	D	D	D	Figure 218 on page 408
Enqueue/Dequeue Trace: Summary by Transaction Code	Database	D	D	D	Figure 220 on page 409
"Total System IWAIT Summary report" on page 413					
Total System IWAIT: Total System IWAIT Detail: Database IWAITs	Database	D	D	D	Figure 229 on page 423

Table 22. Alternate Sequencing: Applicable monitor reports and sequencing options (continued)

Report	Sequencing resource	Sequencing option			Example
		O	C	D	
Total System IWAIT: Total System IWAIT Detail: ACBLIB Block Loading IWAITs	Data Set	D	D	D	
Total System IWAIT: Total System IWAIT Detail: ACBLIB Miscellaneous IWAITs	Data Set	D	D	D	Figure 229 on page 423
Total System IWAIT: Total System IWAIT Detail: MFS Directory I/O	Data Set	D	D	D	
Total System IWAIT: Total System IWAIT Detail: MFS Block Read I/O	Data Set	D	D	D	
Total System IWAIT: Total System IWAIT Detail: Line/Node Interrupts	Line/Node	D	D	D	Figure 229 on page 423
Total System IWAIT: Total System IWAIT Detail: Database IWAITs	Database	D	D	D	Figure 229 on page 423
"Communication reports" on page 457					
Communication: Communication Summary	Communications	O	O	D	Figure 254 on page 460
Communication: Communication IWAIT	Communications	D	D	D	Figure 256 on page 463
Communication: Line Functions	Communications	O	O	O	Figure 258 on page 466
"MSC reports" on page 466					
MSC: MSC Summary	MSC	C	C	C	Figure 260 on page 467
MSC: MSC Traffic	MSC	C	C	C	Figure 262 on page 469
MSC: MSC Queuing Summary	MSC	D	D	D	
"ESAF report" on page 471	ESAF	C	C	C	Figure 264 on page 472
"Synchronous Callout report" on page 474	SYNCCOUT				Figure 268 on page 474
DEDB Resource Contention	DEDB	D	D	D	Figure 270 on page 479
"Fast Path Buffer Statistics report" on page 480	Fast Path Buffers	C	C	D	Figure 273 on page 484
"VSO Summary report" on page 490					
VSO Summary: I/O Activities (SHARELVL 0/1)	VSO Data Space	C	C	D	
VSO Summary: I/O Activities (SHARELVL 2/3)	VSO CF	C	C	D	Figure 277 on page 493
VSO Summary: DEDB Write IWAIT	DEDB	D	D	D	Figure 277 on page 493
VSO Summary: CF I/O Wait	VSO CF Read/Write	D	D	D	Figure 277 on page 493

Let's look at three examples from the above table:

- The **Region Summary** report can be sequenced by Occupancy (O), Calls (C), or Delay (D). The table shows this with an O, C, and D in their respective columns.

- The **Database IWAIT Summary** report can only be sequenced by Delay (D). Consequently, if you request this report with sequencing by Occupancy (O) or Calls (C), IMS PA will instead sequence the report by the next best option, Delay (D). That is, O and C are translated to D. The table shows this by a D in the D column but also in the O and C columns.
- The **Communication Summary** report can be sequenced by Occupancy (O) or Delay (D). If you request this report with sequencing by Calls (C), IMS PA will instead sequence the report by the next best option, Occupancy (O). That is, C is translated to O. The table shows this by a D in the D column, an O in the O column but also in the C column.

Sequencing resource reference table

The interpretation of Occupancy, Calls and Delay differs according to the resource to which it applies. The following table summarizes the differences.

Table 23. Alternate Sequencing: What the reports are sequenced on

Sequencing Resource	Occupancy (O)	Calls (C)	Delay (D)
Region	Total Scheduled Elapsed Time	Total Call Elapsed Time for Region	Total IWAIT Elapsed Time for Region
Program	Total Scheduled Elapsed Time	Total Call Elapsed Time for Program	Total IWAIT Elapsed Time for Program
Database			Total IWAIT Elapsed Time for Database
Data Set			Total IWAIT Elapsed Time for Data Set
DEDB			Total IWAIT Elapsed Time for DEDB
Line/Node	Total Elapsed Time		Total IWAIT Elapsed Time for Line/Node
Communications	Dispatch Elapsed Time		Dispatch IWAIT Elapsed Time
MSC		Total Enqueue Count	Total IWAIT Elapsed Time
ESAF		Total Call Elapsed Time	
Fast Path Buffers		Total Buffer Requests	Total Buffer Steals
VSO Data Space		Total VSO Read+Write Counts	Total DASD Read+Write Counts
VSO CF		Total VSO Read+Write Counts	Total DASD Read+Write Counts
VSO CF Read/Write			Total Read+Write IWAIT Elapsed Time

Report descriptions

Monitor reports are described by category with an example of the output.

The report descriptions have the following format:

- **Purpose.** Describes the general nature and purpose of the report.
- **Monitor records.** Identifies the monitor record codes used to produce the report.
- **Report options.** Describes how to obtain the report and the available report options.

The IMS PA dialog is the primary mechanism for specifying reports. Alternatively, batch commands may be used. Examples of the dialog panels and the batch commands are given in the *IMS Performance Analyzer for z/OS: User's Guide*.

- **Report content.** Shows an example of the report and describes each field of information in the report. For a definition of terms used in monitor reports, see “Essential terminology for Monitor reporting” on page 502.
- **Uses.** Describes some ways to use the report and key values within the report. The discussion is not exhaustive, and you should use it as introductory material if you are unfamiliar with IMS PA. Guideline figures are for illustration only; they are generally derived from the *IMS Performance Guide*.

The intent of the usage discussions is not to describe how to tune IMS nor interpret every value in the report. It is to provide examples of how to use information from the report, realizing that many questions that arise cannot be answered in this book. The examples should help you expand the logical process of using reports to address the needs of your environment.

The usage discussion for the Region Summary report is the most thorough. The other usage discussions assume that you have read the section “Region Summary report” on page 350, and the guideline values and examples mentioned there, although still applicable, are not repeated.

Region Activity Summary reports

These reports summarize the activity of all dependent regions.

They provide a system-wide overview of the following:

- Region occupancy
- Program scheduling, including IWAITs
- Transaction throughput and response time
- DL/I call activity
- Database IWAITs

Each summary report summarizes the activity of all dependent regions into a single “total system” report. The same information is produced separately for each region by the “Region Analysis report” on page 380. The Schedule/Transaction Summary report is an exception; it presents total system activity only and cannot be requested for a specific region.

Schedule/Transaction Summary report

The Schedule/Transaction Summary report presents a compact summary of total schedulings and transaction counts over all regions for the entire trace period.

Monitor records: This report is derived from monitor records 02-29, 38-39, 47, 56-65.

Report options

To obtain the Schedule/Transaction Summary report, activate the **Schedule/Transaction** summary report in a Monitor Report Set. There are no report-specific options for this report, but monitor global options apply.

Report output is sent to the DDname specified in Summary Report Output DDname on the Monitor Global Options panel.

Report content

This is an example of the Schedule/Transaction Summary report.

Report from 18Jul2014 16:54:09:10	IMS 13.1.0	IMS Performance Analyzer 4.4	Report to 18Jul2014 16:56:09:69		
Schedule/Transaction Summary					
<hr/>					
Schedules completed	259	Transacts=	401	Trans/Schd	1.55
Schedules generated	4	Transacts=	4	Trans/Schd	1.00
Schedules incomplete	0	Transacts=	0	Trans/Schd	.00
WFI-made schedules	561	Transacts=	1,147	Trans/Schd	2.04
Term Rec Tran count	479				
Estimated Backouts =	0				

Figure 185. Schedule/Transaction Summary report

The Schedule/Transaction Summary report contains the following information:

Schedules completed

Number of application program schedulings for which complete IMS monitor information was read from the input data set.

Schedules generated

Number of application programs already executing at the beginning of the trace period. At most, there can be one such event per region.

Schedules incomplete

Number of application programs executing at the end of the trace period. At most, there can be one such event per region. This value includes all BMPs that do not access the message queue. It also includes both the number of schedules in progress and those where no GU is issued to the I/O PCB. For each such occurrence, an entry is printed in the exception report.

WFI-made schedules

Number of times a WFI or IFP dependent region was reactivated after being in IWAIT state for a no-message condition.

For each of the preceding four items, two additional values are given:

Transacts

Associated transaction counts as determined by IMS PA processing logic.

Trans/Schd

Quotient of the number of transactions divided by the number of schedules.

The final two lines of the Schedule/Transaction Summary report are as follows:

Term Rec Tran count

Total number of transactions dequeued from the message queue for scheduling as reported in the IMS monitor termination records.

Estimated Backouts

Number of inferred transaction backouts based on the difference between IMS PA computed transaction dequeue counts and IMS Monitor termination record dequeue counts for individual program schedulings.

Region Summary report

The Region Summary report is an analysis of schedule, transaction, call, and IWAIT activity as well as an analysis of region idle time for each active MPP region. Summary distribution graphs of activity can also be provided.

The report contains the same details as the Region Detail report (part of the Region Analysis report). The Region Summary report groups data by type (for example, schedule data for all regions) to provide convenient comparison of one measure across all regions. The Region Detail report groups data by region, to allow all the measures for a region to be viewed together.

The Region Summary report is not produced from DB Monitor data since control region scheduler records are not available. However, a Region Detail report for region 1 can be produced. See “Region Analysis report” on page 380.

Monitor records: This report is derived from monitor records 02-29, 38-39, 47-49, 56-65.

Uses

The Region Summary report provides a wealth of useful performance information. It is the primary IMS PA report for generally monitoring and assessing overall IMS performance.

If you have a good understanding of your own system, the IMS monitor, and IMS PA, the Region Summary report can help you assess such factors as:

- IMS scheduling pool allocation problems
- I/O data set contention possibilities
- Database organization and design deficiencies
- Application design deficiencies
- Dependent region CPU availability
- CPU loading
- Workload distribution problems

Familiarity with the IMS system in use and regular experience using IMS PA will determine which information is of interest to your installation. This subsection describes items in the Region Summary report as an introduction to new users of IMS monitor data. Specific indicators usually cannot be interpreted outside the context of other values or of the historical perspective of a specific system. Performance indicators can also be distorted or masked by other interacting factors.

Usually, the main consideration when monitoring IMS TM performance is end-user response time. Availability of resources and efficient use of resources by IMS directly affect response time. Efficiency of resource use is significantly affected by MPP and database design, together with user definitions of various IMS system parameters.

To the experienced user, the Region Summary report provides general indications of resource availability, overall workload and its distribution among the regions, efficiency of resource use, and program/database design efficiency.

Performance indicators

Region Summary values are discussed in the following categories:

- Resource utilization indicators for CPU, I/O, and storage
- Database and application efficiency indicators

- Scheduling efficiency and workload indicators

The following discussion describes many but not all of the values in the Region Summary report. Some sample interpretations of the values are offered, together with suggestions for proceeding to related reports. Guideline performance values mentioned are for a single environment and are given for the sake of example only; they must be either adjusted or ignored for a particular installation because of the many variables affecting the guidelines. The intent is to encourage you to develop a systematic approach to analysis and to tailor it to your environment, based on your own unique performance objectives. See the *IMS Performance Guide* for a complete discussion of performance.

CPU Resource Utilization Indicators:

You can use the Region Summary report to ask questions and draw inferences about CPU availability and utilization.

For example: Does the IMS control region have sufficient CPU resource to service its dependent regions in a timely manner? If the average amount of not-IWAIT time (Sched NotIWT) is excessive, then sufficient CPU resources may not be available. Excessive paging or a low dispatching priority may be responsible. The Sched NotIWT value acts as a barometer of system performance. A reasonable value varies with the installation, especially for different CPUs. Probably the best way to determine a good value is to use a run made under low system utilization conditions.

Dependent region controller time is included in the interval from schedule end until the first DL/I call (Sch-DLI). If the value is excessive, one or more of the following could be responsible: swapping, program library activity and location, dispatching priority, and/or paging. Since this interval includes program fetch activities, library search order and module distributions on direct-access devices also influence the time.

I/O Resource Utilization Indicators:

The **Elapsed/IWAIT** distributions at the bottom of the Region Summary report are key indicators of the effectiveness of dependent region I/O activity. The distributions account for both message queue and database IWAITS.

An excessive **average IWAIT time** may indicate database design problems or, more generally, I/O path contention or inefficient seek patterns that could be relieved by better data set placement both within and across the volumes.

An excessive **maximum IWAIT elapsed time** may reflect situations such as OPEN activity for DMBs, shared direct-access lockouts by another system, or a spontaneous operational problem. The report sample value of 15.4 milliseconds for the average elapsed IWAIT falls within normal limits. The maximum IWAIT value bears monitoring to see if a consistent pattern exists. See the Database IWAIT Summary report for detailed IWAIT data for each DDname.

Storage Resource Utilization Indicators:

Misallocation of scheduling pools (DMB, PSB, PSBW) can reduce throughput and increase response times. The most serious effects are caused by pool space failures, which prevent scheduling of transactions.

Pool space failures are identified by a type 82 monitor record. IMS PA prints a separate diagnostic message for each failure, which could result in many pages of output. Pool space failures are a serious problem that must be corrected. A summary of pool space failures can be obtained from the Pool Space Failure report which is one of the Performance Exception reports. After eliminating pool space failures, your next concern should be to balance ACBLIB I/O activity against paging that can result from large pools.

The Region Summary report's **Blk Ldr Busy** column includes both IWAIT time for ACBLIB I/Os requested by the IMS block loader module and non-I/O IWAITs by the scheduler waiting to use the block loader service. These factors are separately identified in the System IWAIT Summary report. The number of non-I/O IWAITs should be very small or a serious scheduling bottleneck may exist. The nominal target for a maximum acceptable number of ACBLIB IWAITs is one per schedule. The report on page Figure 186 on page 356 shows 29 Blk Ldr Busy IWAITs versus 24 schedules, and looks satisfactory. Refer to the Total System IWAIT Summary report to see IWAITs per ACBLIB block type and the Total System IWAIT Analysis reports for IWAIT activity by individual DMB, PSB, and intent list name. An even better indication of the effect of block loading is presented under the **Bldr** portion of the **Percents of Region Idle Time** part of the Region Summary report.

Database buffer pool allocations that are significantly insufficient may be reflected in the **IWTs/Call** value under **DATABASE CALLS** (page Figure 186 on page 356). If this value seems excessive, either of two reports may help verify whether the database buffer pool size is contributing to the IWTs/CALL excess: DDname by PSB-Transaction Code or PSB-Transaction Code Analysis. Either report may show IWAITs for DDnames not used by the specified PSB resulting from buffer wash activity. An optional exception report entry is available each time a DL/I call results in more IWAITs than the maximum limit value of the **IWAITs/Call** distribution at the bottom of the report. In this case, an exception entry is generated if the number of IWAITs for a call exceeds 8, or the IWAITs per Call maximum is specified when selecting the performance exception; if no such calls occurred, no exception entry is generated.

Database and Application Efficiency Indicators:

The two prime indicators of database and application efficiency appear below **DATABASE CALLS** in the **Calls/Tran** and **IWTs/Call** columns. Database and application design objectives should minimize the number of DL/I calls per transaction and the number of IWAITs per DL/I call.

The two prime indicators of database and application efficiency appear below **DATABASE CALLS** in the **Calls/Tran** and **IWTs/Call** columns. Database and application design objectives should minimize the number of DL/I calls per transaction and the number of IWAITs per DL/I call. Inefficient database design leads to both an excessive number of I/Os per call and contention between applications for database records. Applications should be sensitive to their influence on response time and avoid issuing redundant or inefficient call patterns. A high number of DL/I calls per transaction increases response time and indicate inappropriate call patterns for a response-time sensitive environment. Either the application should be a BMP and scheduled as such, or the application should be examined as a candidate for redesign. See the Program Summary report to identify applications that issue many DL/I calls; then see the PSB Details or PSB-Transaction Code Analysis reports for CALL activity for specific databases.

A high number of **IWAITs per DL/I call** also increases response time and indicates several possibilities. First, whatever the acceptable guideline for an installation, IWAITs per call should remain fairly constant with time. This value should be monitored regularly to detect an increasing rate of IWAITs per call, which indicates that:

- Twin chains are developing, signalling the need for reorganization
- The HDAM randomizer algorithm may no longer be effective

DBT can be useful in analyzing these conditions.

A high number of IWAITs per call may also indicate heavy use of logical relationships and/or secondary indexing. Review the PSB Details-PCB Totals report to assess these possibilities. Applications may be responsible for the IWAITs per call rate based on their DL/I call patterns. Look at the Program Summary report for PSBs with high IWAITs per call and then the PSB-Transaction Code Analysis and/or Program Trace reports. Significant performance improvements have been realized through application redesign that eliminates unnecessarily complex or redundant calls.

The report on page Figure 186 on page 356 shows 0.32 IWAITs per call, which is below the guideline figure of 0.5. The Database IWAIT Summary can be examined to identify specific violations of the low IWAITs per call objectives. However, the most convenient way to monitor IWAITs per call violations is to set the maximum value for the IWAITs per call distributions to the installation performance objective; then the Exception Listing report can pinpoint the violations. Refer to the PSB Details reports to examine IWAITs per call data for each PCB/PSB combination.

Scheduling Efficiency and Workload Indicators:

Several values serve as indicators of both workload level and workload distribution. For example: Call/sec, IWTs/sec, Idle time, Elap/Sched, Sch-DLI, PI enqueues.

Call/sec and IWTs/sec

The **Call/sec** and **IWTs/sec** columns in the **Schedule data** section can be used to estimate if the call and I/O load can be handled by the system. If the Call/sec rate is high for the particular installation call mix, then the system may be taxed to capacity regardless of other contradictory factors, such as a low transaction processing rate. This might occur during heavy BMP processing. A given system with a constant average call path length has a maximum Call/sec limit it can handle. Running BMPs, for example, increases the call rate, active time, and response time, and decreases transaction throughput and idle time. Likewise, a given CPU/channel configuration will reach a limit value of IWTs/sec. The danger or saturation level values for Call/sec and IWTs/sec must be derived for a specific installation either from experience or reasonable estimates.

The report on page Figure 186 on page 356 shows a Call/sec value of 7.57. An intuitive estimate for the limit of this system based on experience is 60 to 70 Call/sec. Therefore, the system is only at 12% of the limit.

Another possible use for Call/sec is to get an idea of the average type of database processing. Sequential processing should show a higher call rate than random processing.

Idle time

An analysis of Idle time and related values can help assess whether the transaction load is being efficiently handled and whether either insufficient or excessive message processing regions (MPRs) have been assigned. An MPR is analogous to a single server queue, whose response time decreases rapidly as service time increases from 60%. Therefore, if the **Idle** column for an MPR shows much less than 35% to 40%, then response time is probably slow. In this case, response time may improve by using an additional MPR to distribute the transaction load (assuming other bottlenecks do not exist). Conversely, if the Idle time is high, such as 80% to 90%, there are probably more regions than necessary.

When Idle time is very low, the MPR is processing close to its limits and, therefore, transaction queues are probably growing in length. Queue growth is not necessarily proportional to message arrival rate, but can also occur as a result of program-to-program message switching. Program switching should be reserved for special situations because of the additional overhead incurred. Program switching activity is detectable in the PSB Detail by DDname IWAITd On report when a transaction code appears in the **PCBname** column and **QBLKS**, **LGMSG**, or **SHMSG** appears in the **DDname** column.

Elap/Sched and Sch-DLI

If the **Elap/Sched** and **Sch-DLI** times increase significantly from region to region, then there may be insufficient CPU resource available to the MPRs to warrant additional regions. Reallocation of dispatching priorities relative to non-IMS applications is a possible solution. See the RMF™ reports to verify whether this would be appropriate.

Figure 186 on page 356 shows moderate activity in all regions (**Idle** varies from 0.10% to 77.92%). The **Trans/Schd** column reports 1.17 indicating that, on the average, 0.17 additional transactions are processed during each schedule.

Another aspect of Idle time is how its components are distributed. Ideally, Idle time should be a result of control region scheduler IWAITs due to the absence of transactions to schedule. Check the **Percents of Region Idle Time** section of the Region Summary report. This section shows how the Idle time is spent. Generally, when the dependent regions are not busy, it is because there are no messages to be processed. Now look at the **No Messages** section, which shows how many scheduler IWAITs occurred and the average elapsed time for IWAITs due to no messages. From these values, you can derive overall indications of the message arrival pattern. If the frequency of IWAITs is high and the average elapsed time is low, then the arrival rate is probably fairly even. Conversely, if the IWAIT frequency is low but the times are high, then messages may be arriving in bursts. Periods of activity/inactivity can be seen in the Region Histogram report or, more generally, in the Transactions by Time Period report. Graphic distribution of these IWAIT times is optionally available with the Total System IWAIT Summary report (see "Total System IWAIT Summary report" on page 413). If **Override 'IWAIT for no-message'** is selected on the Monitor Global Options panel, wait-for-input events are not included in the schedule count. WFI, pseudo-WFI, and IFP scheduling is reported in the same way as other scheduling is reported, and the time waiting for no messages is reported as zero. The wait time is, however, included in the transaction elapsed time. All calculations based on the number of schedules or the elapsed time are adjusted accordingly.

Program Isolation and Enqueue/Dequeue

Parallel scheduling efficiency may be reduced by the requirement for simultaneous access to database records. Program isolation (PI) enqueues serialize the accesses and extend the DL/I call elapsed times. In IMS, PI enqueues are specifically identified by the IMS monitor. See both the Total System IWAIT and the Enqueue/Dequeue Trace reports to analyze the effect of these PI enqueues.

Report options

To obtain the Region Summary report, activate the **Region** summary report in a Monitor Report Set. There are no report-specific options for this report, but monitor global options apply.

Report output is sent to the DDname specified in Summary Report Output DDname on the Monitor Global Options panel.

The **ESAF Integration** and **Alternate Sequencing** Options are applicable to this report.

Optionally, to add distribution graphs to the report, on the **Distribution Options** subpanel of Monitor Global Options, specify one or more of the following Distributions:

- **Elapsed Time per Schedule**
- **Elapsed Time per Call**
- **Elapsed Time per IWAIT**
- **IWAITs per Call**

Omission of a Distribution required by a report results in a statistical summary line only. For example: Specifying Distributions for Elapsed Time per Call, Elapsed Time per IWAIT, and IWAITs per Call result in graphical representations of Elapsed/Call, Elapsed/IWAIT, and IWAITs/Call ratios together with a statistical summary line for each; since a Distribution is not supplied for Elapsed Time per Schedule, only a statistical summary line is produced for Elapsed/Schedule.

Report content

The Region Summary report is an analysis of schedule, transaction, call, and IWAIT activity as well as an analysis of region idle time for each active MPP region. Summary distribution graphs of activity can also be provided.

**** Region and Jobname ****

Reg No.	Job Name	Type	Reg No.	Job Name	Type	Reg No.	Job Name	Type	Reg No.	Job Name	Type
1	IFPI1X3	IFP	2	BMPI1X1	BMP	3	BMPH1X2	BMP	4	IFPI1X2	IFP
5	BMPU21A1	BMP	5	MPP1X3	MPP	6	BMPU21A3	BMP	7	BMPU21A6	BMP
8	BMPU21A7	BMP	9	BMPU21A8	BMP						

**** Transaction data ****

Rgn No.	Elapsed Secs.Mil	Scheds	Trans	Trans /Schd	Elap/Sched Sc.Mil.Mic	%ages of Sc-DLI	Regn Active	elapsed Idle	Sch-DLI Mil.Mic	Elap/Tran Sc.Mil.Mic	CPU/Trn Mil.Mic	%ages of CPU	Tran Elapsed Call	IWAIT
1	70.987	14	14	1.00	1.120.025	1.99%	20.09%	77.92%	101.139	1.018.886	0.000	.00%	.45%	.00%
2	55.917	3	3	1.00	15.609.644	83.55%	.20%	16.25%***	15,573	36.382	0.000	.00%	.00%	.00%
3	212.524	1	1	1.00	212.305.464	.52%	99.38%	.10%	1107.893	211.197.571	10.010	.00%	.02%	.00%
4	55.396	1	3	3.00	52.504.911	1.46%	93.32%	5.22%	807.470	17.232.480	0.000	.00%	96.53%	9.83%
5	59.068	1	3	3.00	56.462.127	1.09%	94.50%	4.41%	643.297	18.606.277	0.000	.00%	51.56%	.40%
.
Totl	281.051	24	28	1.17	34.893.763	.00%	.00%	100.00%	2303.949	27.934.127	1.788	.01%	15.53%	1.42%

**** Schedule data ****

Rgn No.	Trans /sec	Call /sec	IWTs /sec	Schd On Q	Percents of NoMsg	Region Bldr	Idle I/CK	Time DBAS	No Messages No.	Avg Elap	Blk Ldr No.	Busy Avg Elap	Sched NotIWT No.	Avg Elap	Synch DB IWTs No.	Avg Elap
1	0.20	0.21	0.00	0.00	.0%	.0%	.0%	.0%	14	3.949.342	0		14	876	0	
2	0.05	0.00	0.00	0.00	14.8%	.9%	.0%	.0%	2	671.793	8	10.042	3	2.554.858	0	
3	0.00	0.12	0.00	0.00	.0%	14.8%	.0%	.0%	0		5	6.694	1	192.945	0	
4	0.05	4.57	0.79	0.00	.0%	4.2%	.0%	.0%	0		5	24.241	1	2.770.720	0	
5	0.05	4.57	0.47	0.00	.0%	.0%	.0%	.0%	0		0		1	2.606.577	0	
.
Totl	0.10	7.57	2.44	0.00	46.2%	.3%	.0%	.0%	16	3.539.648	29	11.977	24	2.732.456	0	

**** Call data ****

Rgn No.	Calls /Tran	IWTs /Tran	IWTs /Call	Calls /Tran	M E S S A G E IWTs /Tran	Q U E U E IWTs /Call	Elap/Call Sc.Mil.Mic	Pct of Call CPY	C A L L S DLA	Elap IWT	Calls /Tran	IWTs /Tran	IWTs /Call	D A T A B A S E Elap/Call Sc.Mil.Mic	Pct of Call CPY	C A L L S DLA	Elap IWT
1	1.1	0.0	0.00	1.1	0.0	0.00	4.294	1.6%	98.4%	.0%	0.0	0.0	0.00	0.000	.0%	.0%	.0%
3	26.0	0.0	0.00	5.0	0.0	0.00	2.492	20.4%	79.6%	.0%	21.0	0.0	0.00	0.937	94.7%	5.3%	.0%
4	84.3	14.7	0.17	55.0	4.7	0.08	1.647	2.5%	97.5%	37.0%	29.3	10.0	0.34	564.016	.0%	.0%	10.0%
5	90.0	9.3	0.10	59.3	3.7	0.06	0.554	9.0%	91.0%	10.0%	30.7	5.7	0.18	311.740	.1%	99.9%	.7%
.
Totl	76.0	24.5	0.32	13.8	1.0	0.08	1.742	4.3%	95.7%	30.1%	62.2	23.5	0.38	69.334	.6%	99.4%	9.0%

**** Call data (FP) ****

Rgn No.	Calls /Tran	IWTs /Call	Calls /Tran	E M H IWTs /Call	C a l l s Elap/Call Sc.Mil.Mic	Pct of IWAIT	Calls /Tran	IWTs /Call	D E E D B Elap/Call Sc.Mil.Mic	Pct of IWAIT	Calls /Tran	IWTs /Call	M S D B Elap/Call Sc.Mil.Mic	Pct of IWAIT
1	9.4	0.13	0.0	0.00	0.000	.0%	9.4	0.34	104.309	2.3%	0.0	0.00	0.000	.0%
2	12.7	0.12	1.7	0.00	0.200	.0%	11.0	0.33	0.320	27.9%	0.0	0.00	0.000	.0%
3	3.0	2.00	0.0	0.00	0.000	.0%	0.0	0.00	0.000	.0%	3.0	0.00	0.156	.0%
.
Totl	6.1	0.33	0.2	0.00	0.200	.0%	5.9	0.34	83.384	2.3%	0.1	0.00	0.156	.0%

Figure 186. Region Summary report

Region Distributions

Average SD/Avg Max-Value			Average SD/Avg Max-Value			Average SD/Avg Max-Value			Average SD/Avg Max-Value		
34.893.763 1.731212.305.464			1.120.025 1.829 6.215.408			15.609.644 1.417 46.793.355			212.305.464 .005212.305.464		
Range	Count in	Elapsed/Schedule	Range	Count in	Elapsed/Schedule	Range	Count in	Elapsed/Schedule	Range	Count in	Elapsed/Schedule
Sc Mil Mic	Range	Totals all Regions	Sc Mil Mic	Range	Region No. 1	Sc Mil Mic	Range	Region No. 2	Sc Mil Mic	Range	Region No. 3
To Maximum	11	*****	To Maximum	3	*****	To Maximum	1	*****	To Maximum	1	*****
1.000.000	0		1.000.000	0		1.000.000	0		1.000.000	0	
500.000	1	**	500.000	1	***	500.000	0		500.000	0	
300.000	1	**	300.000	1	***	300.000	0		300.000	0	
100.000	2	***	100.000	2	*****	100.000	0		100.000	0	
50.000	2	***	50.000	2	*****	50.000	0		50.000	0	
30.000	7	*****	30.000	5	*****	30.000	2	*****	30.000	0	
10.000	0		10.000	0		10.000	0		10.000	0	
5.000	0		5.000	0		5.000	0		5.000	0	
1.000	0		1.000	0		1.000	0		1.000	0	
Total=	24	10 20 30 40 50%	Total=	14	10 20 30 40 50%	Total=	3	10 20 30 40 50%	Total=	1	10 20 30 40 50%

Region Totals											
From 08Jun2018 17.24.58.55 To 08Jun2018 17.29.20.92 Elapsed= 0 Hrs 4 Mins 41.051.167 Secs											
Elapsed/Call			Elapsed/IWAIT			IWAITS/Call					
Average	Std-Dev/Avg	Max Value	Average	Std-Dev/Avg	Max Value	Average	Std-Dev/Avg	Max Value			
58.370	18.205	34.739.656	15.386	8.304	3.303.220	0.32	2.689	10			
Range	Count in	Totals all Regions	Range	Count in	Totals all Regions	Range	Count in	Totals all Regions			
Sc Mil Mic	Range		Sc Mil Mic	Range		Sc Mil Mic	Range				
To Maximum	13		To Maximum	2		To Maximum	1				
1.000.000	1		1.000.000	0		1.000.000	8	0			
500.000	0		500.000	0		500.000	7	1			
300.000	5		300.000	5		300.000	6	0			
100.000	21		100.000	10 *		100.000	5	11			
50.000	48 *		50.000	19 *		50.000	4	37 *			
30.000	146 ***		30.000	155 *****		30.000	3	39 *			
10.000	77 *		10.000	176 *****		10.000	2	93 **			
5.000	206 ****		5.000	261 *****		5.000	1	219 ****			
1.000	1798 *****		1.000	114 *****		1.000	0	1914 *****			
Total=	2,315	10 20 30 40 50%	Total=	742	10 20 30 40 50%	Total=	2,315	10 20 30 40 50%			

Figure 187. Region Summary report: Region Distributions

Report from 25Jun2018 14.45.00.04			IMS 15.1.0		IMS Performance Analyzer 4.4				Report to 25Jun2018 14.54.59.99			
REGION SUMMARY												
** Call data (ESAF) **			(Sorted by Total IWAIT Elapsed time; LIMIT 2)									
			- Initialization -		-- Normal Call --		--- Commit Ph1 ---		--- Commit Ph2 ---		--- Termination --	
Rgn	Calls	ESAF	Calls	Elap/Call	Calls	Elap/Call	Calls	Elap/Call	Calls	Elap/Call	Calls	Elap/Call
No.	/Tran	SSID	/Tran	Sc.Mil.Mic	/Tran	Sc.Mil.Mic	/Tran	Sc.Mil.Mic	/Tran	Sc.Mil.Mic	/Tran	Sc.Mil.Mic
23	3.2	P2I1	1.2	0.304	0.8	25.469	0.8	0.207	0.4	1.109	0.0	0.000
22	2.7	P2I1	1.0	0.330	0.7	26.587	0.7	0.198	0.3	0.905	0.0	0.000
Lim	1.4	P2I1	0.5	0.316	0.4	25.985	0.4	0.203	0.2	1.026	0.0	0.000
Tot	1.4	P2I1	0.5	0.361	0.4	25.196	0.4	0.203	0.2	0.992	0.0	0.063

Figure 188. Region Summary report with ESAF Integration: Sequenced by Delay (with Limit)

R E G I O N S U M M A R Y

** Transaction data **			(Sorted by Total Scheduled Elapsed time)											
Rgn No.	Elapsed Secs.Mil	Scheds	Trans	Trans /Sched	Elap/Sched Sc.Mil.Mic	%ages Sc-DLI	of Regn Active	elapsed Idle	Sch-DLI Mil.Mic	Elap/Tran Sc.Mil.Mic	CPU/Trn Mil.Mic	%ages CPU	of Tran Call	Tran Elapsed IWAIT
40	581.613	1	1	1.00	581.613.438	21.32%	78.68%	.00%***	123,987	457.626.869	0.000	.00%	.01%	.00%
34	582.235	9	9	1.00	43.997.861	52.39%	15.62%	31.99%***	33,894	10.103.650	10.010	.10%	.74%	.60%
22	599.689	571	1,268	2.22	464.681	4.72%	39.52%	55.76%	49.604	186.915	28.512	15.25%	36.76%	26.09%
23	599.921	667	1,310	1.96	364.519	1.75%	38.78%	59.47%	15.747	177.580	12.889	7.26%	35.89%	27.09%
35	599.947	2,361	2,804	1.19	78.762	.02%	30.97%	69.01%	0.059	66.269	4.521	6.82%	99.82%	72.95%
31	596.815	504	742	1.47	319.896	2.87%	24.15%	72.98%	33.964	194.218	23.285	11.99%	28.04%	20.77%
33	599.848	983	1,265	1.29	146.376	1.95%	22.04%	76.01%	11.891	104.505	9.566	9.15%	66.08%	49.43%
30	587.741	88	137	1.56	551.474	2.29%	5.97%	91.74%	152.968	255.974	98.561	38.50%	27.22%	11.81%
37	413.259	30	30	1.00	1.039.166	5.22%	2.33%	92.45%	718.839	320.326	9.676	3.02%	27.49%	22.47%
39	0.232	1	1	1.00	223.202	64.89%	31.03%	4.08%	150.989	72.213	10.010	13.86%	47.54%	26.03%

Tot	599.947	5,215	7,567	1.45	394.451	.00%	.00%	100.00%	102.010	201.543	14.403	7.15%	32.57%	23.77%

Figure 189. Region Summary report: Sequenced by Occupancy

The Region Summary report reflects the activity in all regions. The report has up to seven sections:

1. Region and Jobname
2. Transaction data
3. Schedule data
4. Call data
5. Call data (FP): included only if there was Fast Path activity during the report period
6. Call data (ESAF): included only if there was External Subsystem activity during the report period and the ESAF Integration option is activated
7. Region Distributions: partial or full distribution graphs show program and database activity

For each of the middle sections 2 through 6:

- A line for each region is printed preceded by the region number.
- A **Tot** line is printed for the total of all (100%) of the data.
- If **Alternate Sequencing** is requested:
 - The section header is suffixed by one of the following:
 - **Sorted by Total Scheduled Elapsed time** if the requested sequence is Occupancy
 - **Sorted by Total Call Elapsed time** if the requested sequence is Calls
 - **Sorted by Total IWAIT Elapsed time** if the requested sequence is Delay
 - If a number or percentage (less than 100%) Limit is specified:
 - The section header is also suffixed by **LIMIT nn** or **LIMIT nn%**
 - A **Lim** line is printed for the total of the reported (limited) data only.

Section 1. Region and Jobname

The following items are shown (four across the page) for the regions processed within the reporting period:

Reg No.

The number of the region traced.

Job Name

The region job name.

Type The type of region, either IFP, BMP, or MPP.

Section 2. Transaction data

The following column headings appear in this section:

Rgn No.

Number of the region being summarized. Also, a total entry (**Totl**) defines the total line for all regions.

Elapsed Secs.Mil

Total elapsed time from the start until the end of region activity. The start (end) of region activity is determined from the first (last) occurrence of either a DL/I call in the region or the first (last) occurrence of a scheduling activity (record types 10, 11, 14, 15) in the control region on behalf of the dependent region. The **Totl** line gives the elapsed time from the earliest to the latest activity for the reporting interval as a whole. Maximum value: 2778 hours (115 days)

Scheds

Number of times an application program was scheduled into the region, including those active at the start and end of the reporting interval and those backed out by IMS due to abends for deadlocks. Maximum value: 10,000,000

Trans Number of transactions processed, including those in progress at the start and end of the reporting interval. Maximum value: 10,000,000

Trans/Schd

Average number of transactions processed per application program execution. Maximum value: 999.99

Elap/Sched Sc.Mil.Mic

Sum of active time plus Sch-DLI time divided by the number of program schedules. Maximum value: 1000 seconds

%ages of Regn elapsed

Breakdown of region elapsed time. The values for the following three subheadings total 100%:

Sc-DLI

Percentage of elapsed time from the start of a schedule in the region (message scheduling end is type 11 record) to the first DL/I call (DL/I start is type 60 record). (See "Essential terminology for Monitor reporting" on page 502.)

Active Percentage of time from the first DL/I call (type 60...61 record sequence) until application program termination (message scheduling start is type 10 record).

Idle Percentage of all time in the region not between the start and end of an application program execution.

Sch-DLI Mil.Mic

Average elapsed time per schedule from schedule start until the first DL/I call. Maximum value: 10 seconds

Elap/Tran Sc.Mil.Mic

Average active time per transaction. This is the total elapsed time from the first DL/I call to the end of the schedule for all of the schedules, divided by the number of transactions.

(Elap/Sched minus Sch-DLI) divided by Trans/Schd. Maximum value: 1000 seconds

CPU/Trn Mil.Mic

CPU time per IMS transaction. This value is calculated from the CPU time reported in the message scheduling start type 10 record. The dependent region CPU time is accumulated by the region controller as a function of the STIMER option for each dependent region. This value is reported in the monitor record written when the application program terminates. Maximum value: 10 seconds

%ages of Tran Elapsed

Breakdown of transaction active time (Elap/Tran).

CPU Percent of IMS transaction elapsed time recorded as CPU time. (CPU/Trn divided by Elap/Tran)

Call Percent of transaction elapsed time spent in the DL/I call, including IWAIT time. You might expect the percentages given for CPU and Call to total 100%. However, since CPU time is not computed but simply recorded by the IMS monitor, the two values do not usually total 100%.

IWAIT

Percentage of transaction elapsed time spent in IWAIT state.

The most common mistake made when interpreting “%ages of Tran Elapsed” is that it is supposed to add up to 100%. But it should not be viewed this way because, in total, it does not represent a breakdown of the entire elapsed time.

Each of the three subheadings (CPU, Call and IWT) percentages must be viewed in isolation. Here are three things to consider when analyzing these percentages:

- CPU% indicates the ratio of CPU time to Elapsed time. The higher the percentage, the more CPU service IMS received to process this transaction. CPU% cannot be viewed as a component of total elapsed time. Note that sometimes IMS records a CPU time of 10.010 in the monitor and IMS PA reports this. This indicates that CPU recording was not in effect for this region.
 - MPP regions: CPU is recorded depending on the STIMER setting
 - FP regions: do not record CPU time
- Call% indicates the time the transaction spent processing DLI calls. This allows you to make a judgment on whether the transaction is spending too much or not enough time processing DLI calls, depending on its characteristics.

The DLI Call elapsed time is calculated as Call End time subtract Call Start time, regardless of whether the call had IWAIT activity. That is, there may be some IWAIT time included in the Call time.

- IWT% indicates the time the transaction spent waiting for IWAIT events to complete. IWAIT events commonly occur inside DLI calls, and in this case, the Call% will include this IWAIT time.

Therefore, if the transaction is very DLI call intensive with a lot of IWAITs, it is possible that Call%+IWT% can be greater than 100%. But their combined contribution to the total transaction elapsed time is probably only Call%, which emphasizes that these two percentages must be viewed in context/isolation. A high IWAIT percentage is a good indicator of possible performance degradation and a starting point for further investigation.

Totl Totals of all regions. Descriptions are given only for those columns whose total is not the actual sum of all entries in the column.

Elapsed

Elapsed time from the earliest start of activity for any dependent region until the latest end of activity for any dependent region.

%ages of Regn elapsed

These values are based on the total of all regions elapsed time in order to represent an average weighting for each region by its elapsed time.

Section 3. Schedule data

The following column headings appear in this section:

Rgn No.

Number of the region being summarized. Also, a total entry (**Totl**) defines the total line for all regions.

Trans/sec

Transactions per second of region elapsed time (transactions divided by elapsed time). Maximum value: 1000

Call/sec

Total number of DL/I calls issued by all transactions in this region per second of region elapsed time. Maximum value: 1000

IWTs/sec

Total number of IMS IWAITs encountered by all transactions in this region per second of region elapsed time. Maximum value: 1000

Schd On Q

The data value is the average number of transactions enqueued at the start of dependent region schedule. This average value excludes primed messages, since they are dequeued before dependent region schedule start. Maximum value: 1000

Percents of Region Idle Time

Breakdown of time not assigned to a program schedule. The **Idle** subfield of **%ages of Regn elapsed** is broken down into the following categories, which total 100%:

NoMsg

Waiting for a transaction to schedule into the free region

Bldr IMS I/O IWAIT time loading blocks (intent list, PSB, or DMB) and non-I/O IWAIT time waiting for the block loader service

I/CK Unable to schedule because of INTENT conflict or CHECKPOINT

DBAS Database IWAITs by the scheduler sync point

NtIW Scheduler processing in the control region

No Messages

Waiting for an IMS transaction to schedule into the free region.

For each of the following headings, the number of occurrences (**No.**) and the average elapsed time (**Avg Elap**) in Sec.Mil.Mic are given for the events occurring during region idle time. Maximum values: 100,000 for No., and 10 seconds for Avg Elap

Blk Ldr Busy

IMS I/O IWAIT time loading blocks (intent list, PSB, or DMB) and non-I/O IWAIT time waiting for the block loader service. These combined times are reported separately in the Total System IWAIT Summary report.

Sched NotIWT

Scheduler processing intervals in the control region.

Synch DB IWTs

IWAIT intervals associated with database I/O initiated by sync point processing. These are for IWAITs detected immediately after a message schedule start (type 10 record) and, therefore, are no longer attributable to the specific dependent region with which they are logically connected. If the IWAITs are detected before the message schedule start record, they are reported as dependent region IWAITs associated with the I/O PCB.

Section 4. Call data

The following column headings appear in this section:

Rgn No.

Number of the region being summarized. Also, a total entry (**Totl**) defines the total line for all regions.

Calls/Tran

The average number of message queue and database DL/I calls issued in this region per transaction. Maximum value: 10,000

IWTs/Tran

The average number of IMS IWAITs encountered in this region per transaction. Maximum value: 10,000

IWTs/Call

Ratio of total IWAITs to total calls (IWTs/Tran divided by Calls/Tran). Maximum value: 1000

The following headings appear for **MESSAGE QUEUE CALLS** (those calls issued against the I/O PCB or any other terminal PCB) and are repeated for **DATABASE CALLS** (those calls issued against a database PCB).

Calls/Tran

Number of calls per transaction. Maximum value: 10,000

IWTs/Tran

Number of IWAITs occurring in calls of this type (database or message queue) per transaction. Maximum value: 10,000

Note that not all IWAITs in message queue calls are IWAITs on the queue data sets (LGMSG, SHMSG, QBLKS); certain message queue calls may cause database IWAITs, for example, a GU forcing a sync point.

IWTs/Call

Ratio of IWAITs to DL/I calls. Maximum value: 1000

Elap/Call Sc.Mil.Mic

Average elapsed time per call of this type. Maximum value: 1000 seconds.

Pct of Call Elap

Breakdown of call elapsed time (**Elap/Call**). The values for **CPY** and **DLA** total 100%.

CPY Percentage of IMS call time spent in the COPY routine of DL/I as a result of an interregion copy requirement. For queue calls, this number should be greater than DLA time.

DLA Percentage of call time spent in the DLA routines of DL/I. This includes all IWAIT time and time spent in the control region (if any). For database calls, this number should be larger than COPY time.

IWT Percentage of call time spent in IMS IWAIT.

Section 5. Call data (FP)

The following column headings appear in this section, but only if there was FP activity during the reporting period.

Rgn No.

The number of the region being summarized.

Calls/Tran

The average number of EMH, DEDB, and MSDB calls issued in this region per transaction.

IWTs/Call

The average number of EMH and DEDB IWAITs per DL/I call.

The following headings appear for each of the categories **EMH Calls**, **DEDB Calls**, and **MSDB Calls** and have the same meaning as those described for *Call data*:

Calls/Tran

The number of calls per transaction.

IWTs/Call

The ratio of IWAITs to DL/I calls.

Elap/Call Sc.Mil.Mic

The average elapsed time per call of this type.

Pct of IWAIT

The percentage of total time required for IWAITs to total time required for DL/I calls in the region.

Section 6. Call data (ESAF)

This section is reported only if there was External Subsystem activity during the reporting period and the ESAF Integration option is activated. Field descriptions follow:

Rgn No.

The number of the region being summarized.

Calls/Tran

The number of calls per transaction. When ESAF Integration is activated, a Call is a DL/I or external subsystem call.

DL/I calls to the Message and EMH queues, Full Function and Fast Path database DL/I calls, and external subsystem calls all contribute to the total call count.

ESAF SSID

The external subsystem ID.

The report breaks down external subsystem calls into five categories:

Initialization

Initialize, Identify, Signon, Create Thread

Normal Call

Normal Call

Commit Ph1

Commit Phase 1

Commit Ph2

Commit Phase 2, Commit Verify

Termination

Signoff, Terminate Identify, Abort, Subsystem Not Operational, Terminate Thread

Within each category, the following data is reported:

Calls/Tran

The number of calls per transaction.

Elap/Call Sc.Mil.Mic

The average elapsed time per call of this type.

Section 7. Distributions

Elapsed time per schedule distributions are provided for each region and for the system total. Elapsed time per call, elapsed time per IWAIT, and IWAITs per call distributions for the system totals are also provided. They may appear on the same page as the region summary or on a separate page. If the associated Distributions are specified, they are used to produce the graphs. If not, only the summary statistics line (**Average**, **SD/Avg**, and **Max-Value**) is shown.

Program Summary report

The Program Summary report is an analysis of schedule, transaction, and call activity for each PSB-transaction code and each specified application group. A percentage comparison of the activities for each PSB-transaction code is also provided.

The Program Summary report is not produced from DB Monitor traces.

Monitor records: This report is derived from monitor records 02–29, 38–39, 47–49, 56–65.

Uses

The basic intent of the Program Summary report is to identify programs and related activities for which further investigation might be fruitful. It provides a quick look at a number of performance related factors at the PSB level. Such factors are the time from schedule to first DL/I call, the number of IWAITs per call, the number of calls per transaction, and database and message queue call components.

You should have a good working knowledge of your applications to evaluate whether the values indicate good or bad application and database performance. Given this knowledge, you can scan the report and quickly identify the most active programs and potential problems for investigation.

Suspicious performance values can be observed in the **Program Analysis**, **Call Analysis**, **Call Analysis (FP)** and **Call Analysis (ESAF)** sections, while the **PSB Comparison**, **PSB Comparison (FP)** and **PSB Comparison (ESAF)** sections identify what percent of overall activity is represented by each PSB. If a PSB has a bad performance profile but also has a very low activity percentage, further investigation might not be worthwhile. Conversely, better performing but very active PSBs might bear further investigation.

Another use of the Program Summary report is to compare the performance and activity levels of PSB groups. If **Application Groups** is activated on the Monitor Report Set panel, a separate Program Summary is presented for each specified application group, wherein each section of the report contains a summary line for each group. For further discussion of groups, see “Application Detail report” on page 388.

Report options

To obtain the Program Summary report, activate the **Program** summary report in a Monitor Report Set. There are no report-specific options for this report, but monitor global options apply.

Report output is sent to the DDname specified in Summary Report Output DDname on the Monitor Global Options panel.

The **ESAF Integration** and **Alternate Sequencing** Options are applicable to this report.

To produce separate line items and reports for specified application groups, activate **Application Grouping** Options and specify an **Application Groups** or **Program** Object List that defines the groups to be included in the report. For further discussion of groups, see “Application Detail report” on page 388.

Report content

The Program Summary report is an analysis of schedule, transaction, and call activity for each PSB-transaction code and each specified application group.

Region Totals From 08Jun2018 13.06.21.86 To 08Jun2018 13.09.52.04 Elapsed= 0 Hrs 4 Mins 26.545.110 Secs														
** Program Analysis **														
PSBname	TranCode	Scheds	Trans	Trans /Sched	Scd-DLI Mil.Mic	DLI-Term Sc.Mil.Mic	on Q	Calls	IWTs	Elapsed Sc.Mil.Mic	CPUtime Mil.Mic	Pct of Tran	Elap CPU	IWT
BMPFPE05	TXCDDL00	1	1	1.00	103.895	5.210.432	.0	18.0	.0	5.210.432	10.010	.2%	.0%	.0%
BMPFPE06	TXCDDL01	3	3	1.00	75.383	9.488.192	.0	21.7	.0	9.488.192	10.010	.1%	9.1%	.0%
BMPFPE07	TXCDDL02	1	4	4.00	20.176	6.660.503	.0	6.5	.0	1.665.126	2.503	.2%	.0%	.0%
BMP255		1	1	1.00	327.885	1.936.357	.0	292.0	.0	1.936.357	10.010	.5%	.2%	.0%
DDLTD01	TXCDDS01	4	12	3.00	10.170	5.747.907	.0	5.8	.0	1.915.969	0.000	.0%	5.0%	.0%
DDLTFPE3	TXCDDS03	1	1	1.00	428.989	10.364.899	.0	182.0	.0	10.364.899	10.010	.1%	.0%	.0%
DDLTFPE4	TXCDDS04	6	6	1.00	15.158	2.433	.0	1.0	.0	2.433	10.010	411%	1.8%	.0%
DDLTL20	TXCDLM20	1	4	4.00	5247.285	5.657.413	2.0	9.3	.5	1.414.353	2.503	.2%	8.8%	.3%
DDLTRN14	TXCDRN14	2	5	2.50	10.095	12.928.862	.0	5.4	.0	5.171.545	0.000	.0%	.0%	.0%
DDLTRN24	TXCDRN24	1	3	3.00	20.318	5.142.431	.0	3.3	.0	1.714.144	0.000	.0%	.0%	.0%
**Grand* *TOTALS*		22	41	1.86	9029.407	5.104.575	.1	17.9	.0	2.739.040	3.662	.1%	3.8%	.0%
**Group BMP		6	9	1.50	3472.329	7.045.311	.0	44.6	.0	4.696.874	6.673	.1%	6.1%	.0%
Group DDL		15	31	2.07	*11,854	4.668.580	.1	10.7	.1	2.258.990	2.583	.1%	2.4%	.0%
** Call Analysis **														
----- Message Queue Calls -----														
PSBname	TranCode	Calls /Tran	IWTs /Tran	IWTs /Call	CPY Elp Mil.Mic	DLA Elp Mil.Mic	Elp/IWT Mil.Mic	Calls /Tran	IWTs /Tran	IWTs /Call	CPY Elp Mil.Mic	DLA Elp Mil.Mic	Elp/IWT Mil.Mic	Pct DB Call Elap
BMPFPE05	TXCDDL00	2.0	.0	.00	0.007	0.140	0.000	13.0	.0	.00	0.014	0.019	0.000	41.7% 58.3% .0%
BMPFPE06	TXCDDL01	2.3	.0	.00	0.007	7.347	0.000	14.0	.0	.00	0.054	60.443	0.000	.1% 99.9% .0%
BMPFPE07	TXCDDL02	2.5	.0	.00	0.012	0.177	0.000	3.3	.0	.00	0.013	0.021	0.000	37.0% 63.0% .0%
BMP255		18.0	.0	.00	0.010	0.164	0.000	13.0	.0	.00	0.014	0.017	0.000	45.7% 54.3% .0%
DDLTD01	TXCDDS01	.3	.0	.00	0.020	0.062	0.000	2.3	.0	.00	0.020	42.514	0.000	.0% .0% .0%
DDLTFPE3	TXCDDS03	21.0	.0	.00	0.008	0.133	0.000	.0						
DDLTFPE4	TXCDDS04	1.0	.0	.00	0.002	0.043	0.000	.0						
DDLTL20	TXCDLM20	2.8	.3	.09	0.014	0.598	0.055	5.5	.3	.05	0.017	22.280	14.541	.1% 99.9% 3.0%
DDLTRN14	TXCDRN14	.4	.0	.00	0.029	0.077	0.000	2.6	.0	.00	0.011	0.015	0.000	42.7% 57.3% .0%
DDLTRN24	TXCDRN24	2.3	.0	.00	0.019	0.140	0.000	.0						
**Grand* *TOTALS*		2.1	.0	.01	0.011	0.766	0.055	3.5	.0	.01	0.027	29.214	14.541	.1% 99.9% .3%
**Group BMP		4.1	.0	.00	0.010	1.525	0.000	9.0	.0	.00	0.034	31.350	0.000	.1% 99.9% .0%
**Group DDL		1.6	.0	.02	0.012	0.216	0.055	2.0	.0	.02	0.017	26.423	14.541	.1% 99.9% .9%
** Call Analysis (FP) **														
----- E M H C a l l s -----														
PSBname	TranCode	Calls /Tran	IWTs /Call	Elap/Call Sc.Mil.Mic	Pct of IWAIT	----- D E D B C a l l s -----				----- M S D B C a l l s -----				
BMPFPE05	TXCDDL00	0.0				Calls /Tran	IWTs /Call	Elap/Call Sc.Mil.Mic	Pct of IWAIT	Calls /Tran	IWTs /Call	Elap/Call Sc.Mil.Mic	Pct of IWAIT	
BMPFPE06	TXCDDL01	0.0				3.0	1.00	4.562	10.3%	0.0				
BMPFPE07	TXCDDL02	0.0				3.0	1.00	3.365	76.4%	2.3	0.00	0.994	.0%	
BMP255		0.0				0.8	0.67	502.423	.8%	0.0				
DDLTD01	TXCDDS01	1.8	0.00	1.309	.0%	261.0	0.09	6.867	5.6%	0.0				
DDLTFPE3	TXCDDS03	0.0				1.1	1.00	852.937	.4%	0.3	0.00	1.454	.0%	
DDLTFPE4	TXCDDS04	0.0				161.0	0.45	63.809	1.3%	0.0				
DDLTL20	TXCDLM20	0.0				0.0				0.0				
DDLTRN14	TXCDRN14	1.8	0.00	0.067	.0%	1.0	0.25	3.956	.8%	0.0				
DDLTRN24	TXCDRN24	0.0				0.6	1.00	237.539	1.8%	0.0				
**Grand* *TOTALS*		0.8	0.00	0.949	.0%	1.0	1.00	4.962	86.7%	0.0				
**Group BMP		0.0				11.2	0.28	55.322	1.3%	0.2	0.00	1.132	.0%	
**Group DDL		1.0	0.00	0.949	.0%	30.7	0.13	12.114	4.1%	0.8	0.00	0.994	.0%	

Figure 190. Program Summary report: Program Analysis, Call Analysis

Report from 08Jun2018 13.06.12.71		IMS 15.1.0		IMS Performance Analyzer 4.4				Report to 08Jun2018 13.10.39.26							
P R O G R A M S U M M A R Y															
Region Totals		From 08Jun2018 13.06.21.86 To 08Jun2018 13.09.52.04				Elapsed= 0 Hrs 4 Mins 26.545.110 Secs									
** PSB Comparison **		*** All values are percents of total ***													
		----- Data Base Calls -----				----- Msg Que Calls -----									
PSBname	TranCode	Schds	Trans	Sc-Dl	Dl-Tm	CPUtm	Calls	CPYE1	DLAE1	IWTs	IWE1p	Calls	C1E1p	IWTs	IWE1p
BMPFPE05	TXCDDL00	4.55%	2.44%	.05%	4.64%	6.67%	9.09%	4.58%	.01%	.00%	.00%	2.27%	.43%	.00%	.00%
BMPFPE06	TXCDDL01	13.64%	7.32%	.11%	25.35%	20.00%	29.37%	58.86%	60.77%	.00%	.00%	7.95%	75.25%	.00%	.00%
BMPFPE07	TXCDDL02	4.55%	9.76%	10.16%	5.93%	6.67%	9.09%	4.24%	.01%	.00%	.00%	11.36%	2.76%	.00%	.00%
BMP255		4.55%	2.44%	.17%	1.72%	6.67%	9.09%	4.87%	.01%	.00%	.00%	20.45%	4.57%	.00%	.00%
DDLDS01	TXCDS01	18.18%	29.27%	20.48%	20.47%	.00%	18.88%	13.95%	27.48%	.00%	.00%	4.55%	.48%	.00%	.00%
DDLTFPE3	TXCDS03	4.55%	2.44%	.22%	9.23%	6.67%	.00%	.00%	.00%	.00%	.00%	23.86%	4.34%	.00%	.00%
DDLTFPE4	TXCDS04	27.27%	14.63%	45.78%	.01%	40.00%	.00%	.00%	.00%	.00%	.00%	6.82%	.39%	.00%	.00%
DDLTLM20	TXCDLM20	4.55%	9.76%	2.64%	5.04%	6.67%	15.38%	9.82%	11.73%	100.00%	100.00%	12.50%	9.85%	100.00%	100.00%
DDLTRN14	TXCDRN14	9.09%	12.20%	10.16%	23.03%	.00%	9.09%	3.67%	.00%	.00%	.00%	2.27%	.31%	.00%	.00%
DDLTRN24	TXCDRN24	4.55%	7.32%	10.23%	4.58%	.00%	.00%	.00%	.00%	.00%	.00%	7.95%	1.63%	.00%	.00%
**Grand*	*TOTALS*	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
**Group	BMP	27.27%	21.95%	10.49%	37.64%	40.00%	56.64%	72.56%	60.79%	.00%	.00%	42.05%	83.00%	.00%	.00%
**Group	DDL	68.18%	75.61%	89.51%	62.36%	53.33%	43.36%	27.44%	39.21%	100.00%	100.00%	57.95%	17.00%	100.00%	100.00%
** PSB Comparison (FP) ***** All values are percents of total ***															
		----- E M H C a l l s -----				----- D E D B C a l l s -----				----- M S D B C a l l s -----					
PSBname	TranCode	Calls	C1E1p	IWTs	IWE1p	Calls	C1E1p	IWTs	IWE1p	Calls	C1E1p	IWTs	IWE1p	Calls	C1E1p
BMPFPE05	TXCDDL00	.00%	.00%	.00%	.00%	.65%	.05%	2.33%	.41%	.00%	.00%	.00%	.00%	.00%	.00%
BMPFPE06	TXCDDL01	.00%	.00%	.00%	.00%	1.96%	.12%	6.98%	6.80%	70.00%	61.47%	.00%	.00%	.00%	.00%
BMPFPE07	TXCDDL02	.00%	.00%	.00%	.00%	.65%	5.92%	1.55%	3.34%	.00%	.00%	.00%	.00%	.00%	.00%
BMP255		.00%	.00%	.00%	.00%	56.74%	7.04%	17.83%	29.72%	.00%	.00%	.00%	.00%	.00%	.00%
DDLDS01	TXCDS01	70.97%	97.94%	.00%	.00%	2.83%	43.57%	10.08%	13.77%	30.00%	38.53%	.00%	.00%	.00%	.00%
DDLTFPE3	TXCDS03	.00%	.00%	.00%	.00%	35.00%	40.37%	55.81%	38.32%	.00%	.00%	.00%	.00%	.00%	.00%
DDLTFPE4	TXCDS04	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%
DDLTLM20	TXCDLM20	.00%	.00%	.00%	.00%	.87%	.06%	.78%	.04%	.00%	.00%	.00%	.00%	.00%	.00%
DDLTRN14	TXCDRN14	29.03%	2.06%	.00%	.00%	.65%	2.80%	2.33%	3.81%	.00%	.00%	.00%	.00%	.00%	.00%
DDLTRN24	TXCDRN24	.00%	.00%	.00%	.00%	.65%	.06%	2.33%	3.79%	.00%	.00%	.00%	.00%	.00%	.00%
**Grand*	*TOTALS*	100.00%	100.00%	.00%	.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	.00%	.00%	.00%	.00%
**Group	BMP	.00%	.00%	.00%	.00%	60.00%	13.14%	28.68%	40.27%	70.00%	61.47%	.00%	.00%	.00%	.00%
**Group	DDL	100.00%	100.00%	.00%	.00%	40.00%	86.86%	71.32%	59.73%	30.00%	38.53%	.00%	.00%	.00%	.00%

Figure 191. Program Summary report: PSB Comparison

Report from 25Jun2018 14.45.00.04			IMS 15.1.0 IMS Performance Analyzer 4.4						Report to 25Jun2018 14.54.59.99					
P R O G R A M S U M M A R Y														
** Call Analysis (ESAF) **			(Sorted by Total Scheduled Elapsed time; LIMIT 30%)											
			- Initialization -				-- Normal Call --		--- Commit Ph1 ---		--- Commit Ph2 ---		--- Termination --	
PSBname	Trancode	ESAF	Calls	Elap/Call	Calls	Elap/Call	Calls	Elap/Call	Calls	Elap/Call	Calls	Elap/Call	Calls	Elap/Call
		SSID	/Tran	Sc.Mil.Mic	/Tran	Sc.Mil.Mic	/Tran	Sc.Mil.Mic	/Tran	Sc.Mil.Mic	/Tran	Sc.Mil.Mic	/Tran	Sc.Mil.Mic
RMZIOIS1	RMZITIS1	P2I1	1.3	0.324	0.9	26.357	0.9	0.203	0.4	0.980				
RMZIOIR1	RMZITIR1	P2I1	1.5	0.265	0.9	22.529	0.9	0.205	0.6	1.010				
**Limit*			P2I1	0.6	0.304	0.4	25.196	0.4	0.203	0.2	0.992			
**Grand* *TOTALS*			P2I1	0.5	0.361	0.4	25.196	0.4	0.203	0.2	0.992	0.0	0.063	
...														
** PSB Comparison (ESAF) **			*** All values are percents of total *** (Sorted by Total Scheduled Elapsed time; LIMIT 30%)											
			Total		---- Init ----		--- Normal ---		-- Commit 1 --		-- Commit 2 --		--- Term ----	
PSBname	TranCode	SSID	Calls	Elaps	Calls	Elaps	Calls	Elaps	Calls	Elaps	Calls	Elaps	Calls	Elaps
RMZIOIS1	RMZITIS1	P2I1	65.99%	64.60%	57.98%	69.69%	72.90%	69.70%	69.43%	57.93%	57.19%	.00%	.00%	
RMZIOIR1	RMZITIR1	P2I1	32.77%	33.52%	24.66%	30.31%	27.10%	30.30%	30.57%	42.07%	42.81%	.00%	.00%	
**Limit*			P2I1	98.76%	98.12%	82.64%	100.00%	100.00%	100.00%	100.00%	100.00%	.00%	.00%	
**Grand* *TOTALS*			P2I1	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	

Figure 192. Program Summary report with ESAF Integration: Sequenced by Occupancy (with Limit)

The Program Summary report has up to seven sections:

1. Program Analysis
2. Call Analysis
3. Call Analysis (FP)
4. Call Analysis (ESAF)
5. PSB Comparison
6. PSB Comparison (FP)
7. PSB Comparison (ESAF)

Sections 3 and 6, Call Analysis (FP) and PSB Comparison (FP), are included only if there is FP activity in the report period.

Sections 4 and 7, Call Analysis (ESAF) and PSB Comparison (ESAF), are included only if there is External Subsystem activity in the report period and the ESAF Integration Option is activated.

Within each section:

- A detail line for each PSB-Transaction code is printed.
- A detail line is also printed for each Application Group defined by the Application Grouping Options.
- A ****Grand* *TOTALS*** line is printed for the total of all (100%) of the data.
- If Alternate Sequencing is requested:
 - The section header is suffixed by one of the following:
 - **Sorted by Total Scheduled Elapsed time** if the requested sequence is Occupancy
 - **Sorted by Total Call Elapsed time** if the requested sequence is Calls
 - **Sorted by Total IWAIT Elapsed time** if the requested sequence is Delay
 - If a number or percentage (less than 100%) Limit is specified:
 - The section header is also suffixed by **LIMIT nn** or **LIMIT nn%**
 - A ****Limit*** line is printed for the total of the reported (limited) data only.

The heading appears on the top of each page of the Program Summary report and contains the following:

Region Totals or Region No. *nn*

Region Totals

Designates that the report is a summary of system activity.

Region No. *nn*

Designates that the report is a summary of region activity for region *nn*.

From Start time of region activity in the reporting period.

To End time of region activity in the reporting period.

Elapsed

Elapsed time from start until end of region activity in the reporting period.

Section 1. Program Analysis:

The first part of the program summary is the schedule summary, which provides information in two categories: per schedule and per transaction.

The column headings are as follows:

PSBname

Name of the PSB whose activity is being summarized. Any PSB schedules in progress at the start of the reporting period are assigned names in the format %PSB0nnn, where *nnn* is the region number.

TranCode

Transaction code whose activity is being summarized.

Scheds

Number of schedules processed for this PSB-transaction code, including those active at the start and end of the trace interval and those backed out by IMS due to abends or deadlocks. Maximum value: 10,000,000

Trans

Number of transactions processed, including those in progress at the start and end of the trace interval and those backed out by IMS due to abends or deadlocks. Maximum value: 10,000,000

The following information is presented on a **Per Schedule** basis:

Trans/Schd

Number of transactions per schedule. Maximum value: 999.99

Scd-DLI Mil.Mic

Average elapsed time per schedule from the start of a schedule in a region (message scheduling end is type 11 record) to the first DL/I call (DL/I start is type 60 record). This value is normally referred to as the program load and initialization time (see "Essential terminology for Monitor reporting" on page 502). Maximum value: 10 seconds

DLI-Term Sc.Mil.Mic

Average elapsed time per schedule from the first DL/I call until program termination (message scheduling start is type 10 record).

Schd on Q

Average number of transactions on the queue at the beginning of the schedule, excluding primed messages. Maximum value: 1000

The following information is presented on a **Per Transaction** basis:

Calls

Average number of calls per transaction. This includes database, message queue, and buffer prime calls. Maximum value: 10,000

IWTs

Average number of IWAITs per transaction. Maximum value: 10,000

Elapsed Sc.Mil.Mic

Average active time per transaction. This is the total elapsed time from the first DL/I call to the end of the schedule for all schedules for this PSB-transaction code, divided by the number of transactions. Maximum value: 1000 seconds

CPUtime Mil.Mic

Average CPU time per transaction. This value is the CPU time as reported in the message scheduling start type 10 record. The CPU time is not available for IFP regions. Maximum value: 10 seconds

Pct of Tran Elap

Breakdown of transaction active time (elapsed) as follows:

CPU

Percentage of transaction elapsed time recorded as CPU time (CPUtime divided by Elapsed)

CALL

Percentage of transaction elapsed time spent in the DL/I call

IWT Percentage of transaction elapsed time spent in IMS IWAIT

Section 2. Call Analysis:

The second part of the Program Summary report is the call summary, which provides information in two areas: message queue calls and database calls.

The column headings are as follows:

PSBname

Name of the PSB whose activity is being summarized.

TranCode

Transaction code whose activity is being summarized.

The following information is presented for **Message Queue Calls**:

Calls/Tran

Number of message queue calls per transaction, including buffer primes.
Maximum value: 10,000

IWTs/Tran

Number of IWAITs occurring in message queue calls per transaction.
Maximum value: 10,000

Note: Not all IWAITs in message queue calls are IWAITs on the queue data sets (LGMSG, SHMSG, QBLKS). Certain message queue calls may cause database IWAITs, for example, a Get Unique that forces a sync point.

IWTs/Call

Ratio of IWAITs occurring in message queue calls to message queue calls.
Maximum value: 1000

CPY Elp Mil.Mic

Average elapsed time per message queue call spent in the IMS interregion COPY routines of DL/I. Maximum value: 10 seconds

DLA Elp Mil.Mic

Average elapsed time per message queue call spent in the DLA routines of DL/I. This includes all IWAIT time and time spent in the control region (if any). Maximum value: 10 seconds

Elp/IWT Mil.Mic

Average elapsed time per IWAIT occurring in message queue calls.

The following information is presented for **Database Calls**:

Calls/Tran

Number of database calls per transaction, including buffer primes.
Maximum value: 10,000

IWTs/Tran

Number of IWAITs occurring in database calls per transaction. Maximum value: 10,000

IWTs/Call

Ratio of IWAITs occurring in database calls to database calls. Maximum value: 1000

CPY Elp Mil.Mic

Average elapsed time per IMS database call spent in the interregion COPY routines of DL/I. Maximum value: 10 seconds

DLA Elp Mil.Mic

Average elapsed time per database call spent in the DLA routines of DL/I.
This includes all IWAIT time and time spent in the control region (if any).
Maximum value: 10 seconds

Elp/IWT Mil.Mic

Average elapsed time per IWAIT occurring in database calls.

Pct DB Call Elap

Breakdown of database call elapsed time as follows:

CPY Percentage of elapsed time spent in IMS interregion COPY routines of DL/I

DLA Percent of elapsed time spent in DLA routines of DL/I

IWT Percent of elapsed time spent in IMS IWAIT

Section 3. Call Analysis (FP):

The third part of the Program Summary report is the Fast Path call summary which provides information on EMH, MSDB, and DEDB calls. It is shown only if there is Fast Path activity in the report period.

PSBname

The name of the PSB whose activity is being summarized.

TranCode

The transaction code whose activity is being summarized. This is a CICS transaction code, if, in the DBCTL environment, a DL/I call is issued against the DEDB in a CICS application program.

Details of DL/I calls against EMH, DEDB, and MSDB are presented. The following information is shown for **EMH Calls**, **DEDB Calls**, and **MSDB Calls**:

Calls/Tran

The number of calls per transaction.

IWTs/Call

The ratio of IWAITs occurring for calls of this type to total number of calls of this type.

Elap/Call Sc.Mil.Mic

The average elapsed time per call.

Pct of IWAIT

The percentage of call elapsed time spent on IWAITs.

Section 4. Call Analysis (ESAF):

The fourth part of the report is present only if there is External Subsystem activity during the reporting period and the ESAF Integration option is activated.

Field descriptions follow:

PSBname

The name of the PSB whose activity is being summarized.

TranCode

The transaction code whose activity is being summarized.

ESAF SSID

The external subsystem ID.

The report breaks down external subsystem calls into five categories:

Initialization

Initialize, Identify, Signon, Create Thread

Normal

Normal Call

Commit Ph1

Commit Phase 1

Commit Ph2

Commit Phase 2, Commit Verify

Termination

Signoff, Terminate Identify, Abort, Subsystem Not Operational, Terminate Thread

Within each category, the following data is reported:

Calls/Tran

The number of calls per transaction.

Elap/Call Sc.Mil.Mic

The average elapsed time per call of this type.

Section 5. PSB Comparison:

The fifth part of the Program Summary report provides a comparison of each PSB-transaction code by listing the percentage of total reported activity for several variables for each PSB-transaction code.

The following data is reported:

PSBname

Name of the PSB whose activity is being summarized.

TranCode

Transaction code whose activity is being summarized.

Schds Number of schedules.

Trans Number of transactions.

Sc-Dl Elapsed time from schedule start to first DL/I call.

Dl-Tm

Elapsed time from first DL/I call to schedule end.

CPUtm

CPU time.

The following percentages are provided for **Database Calls:**

Calls Number of database calls.

CPYEI Elapsed time of IMS database calls in interregion COPY routines of DL/I.

DLAEI

Elapsed time of database calls in DLA routines of DL/I.

IWTs Number of IWAITs occurring in database calls.

IWEIp Elapsed time of IWAITs occurring in database calls.

The following percentages are provided for **Msg Que Calls:**

Calls Number of message queue calls, including buffer primes.
CIElp Elapsed time for message queue calls.
IWTs Number of IWAITs occurring in message queue calls.
IWElp Elapsed time for IWAITs occurring in message queue calls.

Section 6. PSB Comparison (FP):

The sixth part of the Program Summary report presents the following items in terms of the percentage of each PSB to the total of all PSBs for Fast Path. It is shown only if there is Fast Path activity in the report period.

PSBname

Name of the PSB whose activity is being summarized.

TranCode

Transaction code whose activity is being summarized.

Under the headings of **EMH Calls**, **DEDB Calls**, and **MSDB Calls**, the number of calls against EMH, DEDB, and MSDB in each PSB are presented as a percentage of the total number of calls of these types:

Calls The number of calls of this type.
CIElp The average elapsed time of calls of this type.
IWTs The number of IWAITs occurring in calls of this type.
IWTElp The elapsed time of IWAITs occurring in calls of this type.

Section 7. PSB Comparison (ESAF):

The seventh part of the report is present only if there is External Subsystem activity during the reporting period and the ESAF Integration option is activated.

Field descriptions follow:

PSBname

The name of the PSB whose activity is being summarized.

TranCode

The transaction code whose activity is being summarized.

SSID The external subsystem ID.

Total Calls

The total number of calls. When ESAF Integration is activated, a Call is a DL/I or external subsystem call.

DL/I calls to the Message and EMH queues, Full Function and Fast Path database DL/I calls, and external subsystem calls all contribute to the total call count.

The report breaks down external subsystem calls into five categories:

Init Initialize, Identify, Signon, Create Thread

Normal

Normal Call

Commit 1

Commit Phase 1

Commit 2

Commit Phase 2, Commit Verify

Term Signoff, Terminate Identify, Abort, Subsystem Not Operational, Terminate Thread

Within each category, the following data is reported:

Calls The number of calls of this type.

Elaps The average elapsed time per call of this type.

Database IWAIT Summary report

The Database IWAIT Summary report is a summary of IWAIT activity for each data set and specified DDgroup.

The report includes number of IWAITs, average elapsed time per IWAIT, and IWAITs per call. Only database and message queue IWAITs directly associated with dependent region activity are included in this report; the Total System IWAIT Summary report includes all IWAITs.

The Database IWAIT Summary report is not produced from DB Monitor traces. However, a Database IWAIT Summary report for region 1 can be produced.

Monitor records: This report is derived from monitor records 20–29, 56–61.

Uses

The Database IWAIT Summary report presents the key IWAIT performance indicators:

- Number of IWAITs per call
- IWAIT elapsed times for each DDname

It also presents percentage breakdowns to help assess both potential IWAIT-related performance problems (contention, seek patterns, chains, and so on) and their total effect on performance. The report helps you quickly select data sets for further analysis. High values on IWAITs/call may indicate long twin chains, which may require reorganization or redesign of the database.

In addition, a summary line is printed for each DDgroup specified. This helps you assess the effect of such variables as data set placement and database access method.

Another consideration for I/O performance analysis is the impact of multiple regions that access one or more of the same databases. The Database IWAIT Summaries for each region help you assess the effect of such interrelationships. For further details, see “Region Analysis report” on page 380.

You can get additional detail on each DDname and DDgroup by examining their individual distributions. See “Database IWAIT Analysis report” on page 393 for more information.

Other reports that can be useful, along with the Database IWAIT Summary report, are the various PSB Details reports that include DDname information. See “PSB Details reports” on page 423.

Report options

To obtain the Database IWAIT Summary report, activate the **Database IWAIT** summary report in a Monitor Report Set.

There are no report-specific options for this report, but monitor global options apply.

Report output is sent to the DDname specified in Summary Report Output DDname on the Monitor Global Options panel.

The **Alternate Sequencing** Options are applicable to this report.

To also produce a detail line for specified data set groups, activate **DDname Grouping** Options and specify a **DDname** or **DDname Groups** Object List, defining the data set groups to include in the report.

Report content

This is an example of the Database IWAIT Summary report.

Report from 08Jun2018 11.26.43.33		IMS 15.1.0		IMS Performance Analyzer 4.4				Report to 08Jun2018 11.29.50.88					
Database IWAIT Summary													
Region Totals		From 08Jun2018 11.26.43.33		To 08Jun2018 11.29.50.88		Elapsed=		0 Hrs 2 Mins 07.551.097 Secs					
DDname	Type	IWAITs	Elap/IWAIT	StdDev	Max IWAIT	Calls	IWAITs	Pct Tot		Pct Tot	Pct Tot	Pct Tot	
			Sc.Mil.Mic	X Avg	Sc.Mil.Mic	Waiting	/Call	Calls		IWAITs	IWTElp	DLAE1p	
DB21AR3	DEDB	16	4.145	1.806	26.324	15	1.07	1.56%		1.12%	1.142%	.515%	
DB21AR6	DEDB	17	1.427	3.660	22.319	15	1.13	1.56%		2.81%	1.877%	.188%	
DB21AR8	DEDB	5	4.076	1.911	19.657	4	1.25	.42%		0.78%	.379%	.158%	
DB21AR9	DEDB	2	0.177	.405	0.248	1	2.00	.10%		0.29%	.246%	.003%	
DD01AR0	DEDB	5	3.943	1.187	9.783	4	1.25	.42%		0.47%	13.716%	.153%	
PDHDOJAA	OSAM	752	0.194	1.310	5.421	751	1.00	2.18%		31.09%	6.473%	.179%	
PDHDOKAA	OSAM	1,165	0.264	1.557	8.069	1,050	1.11	3.05%		48.16%	43.622%	.376%	
PDHDOKBA	OSAM	100	2.977	6.656	198.123	81	1.23	.24%		4.13%	13.190%	.364%	
PDHDOKCA	OSAM	100	1.086	2.940	30.345	79	1.27	.23%		4.13%	4.810%	.133%	
PDHDOKDA	OSAM	92	0.909	1.676	7.950	70	1.31	.20%		3.80%	3.704%	.102%	
POHIDKAA	OSAM	7	0.909	2.043	5.455	6	1.17	.02%		.29%	.282%	.008%	
POHIDKDA	OSAM	42	0.458	2.467	5.597	41	1.02	.12%		1.74%	.852%	.024%	
PVHDJ5AA	VSAM	112	7.913	.202	20.180	84	1.33	.24%		4.63%	39.263%	1.083%	
PVHDJ5BA	VSAM	13	7.889	.082	9.591	12	1.08	.03%		.54%	4.543%	.125%	
PVHDJ5CA	VSAM	12	7.466	.025	7.900	11	1.09	.03%		.50%	3.969%	.109%	
PVHDJ5DA	VSAM	24	8.741	.370	20.371	22	1.09	.06%		.99%	9.293%	.256%	
**Grand*	*Tot	2,464	0.933	4.911	198.123	2,207	1.10	6.42%		100.00%	100.00%	2.759%	
DB2	*Grp	40	2.234	2.845	26.324	35	1.37	1.84%		28.81%	3.329%	.237%	
PDH	*Grp	1,843	0.276	1.436	198.123	1,467	1.24	3.72%		57.54%	46.837%	.324%	

Figure 193. Database IWAIT Summary report

Region Totals		From 25Jun2018 14.45.00.04 To 25Jun2018 14.54.59.99 Elapsed= 0 Hrs 9 Mins 59.947.324 Secs									
DDname	Type	IWAITs	Sc.Mil.Mic	X Avg	Max IWAIT	Waiting	IWAITs /Call	Pct Tot		Pct Tot	Pct Tot
RMZILGDP	VSAM	6,942	19.799	.568	143.760	4,393	1.58	3.51%		39.88%	38.104%
RMMSSNDX	VSAM	3,392	20.925	.634	143.596	2,203	1.54	1.76%		19.48%	19.678%
RMZILGDI	VSAM	2,612	20.098	.814	657.201	2,512	1.04	2.01%		15.00%	14.554%
RMCS192	VSAM	172	20.944	.335	44.861	154	1.12	.12%		.99%	.999%
RMCS212	VSAM	140	25.698	.429	60.893	125	1.12	.10%		.80%	.997%
**Limit*		13,258	20.223	.638	657.201	9,387	1.41	7.50%		76.16%	74.332%
**Grand* *Tot		17,409	20.719	.599	657.201	13,113	1.33	10.48%		100.00%	100.00%

Figure 194. Database IWAIT Summary report: Sequenced by Delay (with Limit)

The Database IWAIT Summary report provides a detail line for each data set for which there is IWAIT activity, and a total line of all (100%) activity. If the **DDname Grouping** Option is activated, a detail line is also produced for each data set group specified. See Figure 193 on page 375 for an example of this report with DDname grouping.

Figure 194 is a sample report demonstrating Alternate Sequencing. Note that Alternate Sequencing does not apply to DDname grouping. The report shows:

- A detail line for each data set for which there is IWAIT activity.
- A ****Grand* *Tot** line for the total of all (100%) activity.
- The report header is suffixed by **Sorted by Total IWAIT Elapsed time** if the requested sequence was Occupancy, Calls or Delay, since only Delay is relevant to this report.
- If a number or percentage (less than 100%) Limit is specified:
 - The report header is also suffixed by **Limit nn** or **Limit nn%**
 - A ****Limit*** line is printed for the total of the reported (limited) data only.

Reporting of VSAM IWAITs is controlled by **Min VSAM IWAIT** specified on the Monitor Global Options panel. Any VSAM IWAIT whose elapsed time is less than the specified minimum VSAM IWAIT value is considered a non-I/O IWAIT and is excluded from the Database IWAIT Summary report. These excluded non-I/O IWAITs are accounted for in the Total System IWAIT Summary report.

The following heading appears at the beginning of the Database IWAIT Summary report:

Region Totals or Region No. *nn*

Region Totals

The report is a summary of all dependent region activity.

Region No. *nn*

The report is a summary of activity for the specific dependent region *nn*.

From Start time of region activity in the reporting period.

To End time of region activity in the reporting period.

Elapsed

Elapsed time from start until end of region activity.

The following column headings appear in the IWAIT Summary report:

DDname

DDname of data sets that have IWAIT activity reported.

Type Database access method for the data set. This is either OSAM, VSAM, HSAM, QUE (message queue), DEDB, or MSDB.

IWAITs

Number of IWAITs against the data set. Maximum value: 10,000,000

Elap/IWAIT Sc.Mil.Mic

Average elapsed time per IWAIT. Maximum value: 1000 seconds

StdDev X Avg

The standard deviation of the elapsed IWAIT time expressed as a multiple of the average IWAIT elapsed time.

To obtain the standard deviation in units of the mean, multiply the **Elap/IWAIT** value by the **StdDev** value.

Max IWAIT Sc.Mil.Mic

Maximum elapsed time of all the IWAITs on this data set. Maximum value: 1000 seconds

Calls Waiting

The number of calls that resulted in reported IWAITs.

The total of this column is the sum of the detail lines. This may be greater than the actual number of calls that resulted in IWAITs, since a call may result in IWAITs on more than one DDname.

IWAITs/Call

Average number of IWAITs per call for those calls that issued the reported IWAITs (**IWAITs** divided by **Calls Waiting**). Notice the difference between the IWTs/Call value on the Region Summary and Program Summary reports; the latter report includes calls not resulting in IWAITs.

Pct Tot Calls

The number of calls resulting in IWAITs as a percentage of the total number of calls.

The next three columns are blank in the Total System IWAIT Summary report, and appear only in the reports by region:

Pct Rgn IWAITs

The number of IWAITs on this data set as a percent of the total number of IWAITs reported for this region.

Pct Rgn IWTElp

The elapsed time for IWAITs on this data set as a percentage of the total elapsed time for the IWAITs reported for this region.

Pct Rgn DLAElp

The elapsed time of IWAITs on this data set as a percentage of the total time spent in the DLA routines of DL/I for this region.

Pct Tot IWAITs

The IWAITs on this data set as a percentage of all reported IWAITs.

Pct Tot IWTElp

The elapsed time of IWAITs on this data set as a percentage of the total elapsed time for the reported IWAITs.

Pct Tot DLAEIp

The elapsed time of IWAITs on this data set as a percentage of the total time spent in the DLA routines of DL/I.

Transactions by Time Period report

The Transactions by Time Period report presents for each PSB-transaction code (or application-transaction code if application groupings are active) the number or percentage of transactions occurring in the specified time periods. The overall transaction rate for each time period is also reported.

The Transactions by Time Period report is not produced from DB Monitor traces.

Monitor records: This report is derived from monitor records 02–29, 38–39, 47, 56–65.

Uses

The Transactions by Time Period report identifies peak transaction processing periods. For long IMS monitor traces, it can show peak periods during the processing day. Occasionally, you may want to know the “peak of the peak”. In this case, the time slots reported can be selected for fine grain peak identification.

The transaction processing rate is reported and does not necessarily reflect the message arrival rate during the same time period. If it does not, it could signal other performance problems or factors to be investigated. For example, if the processing rate is significantly lower than the arrival rate for the same time period, then transaction queueing and resulting response time problems may have to be investigated. Conversely, if the processing rate seems higher than the arrival rate for the corresponding time period, then there could be either a lot of program switching, or late starting regions could be catching up.

In general, the Transactions by Time Period report identifies those time periods to be selected as trace periods on a regular basis so that peak period activity can be identified and, thereafter, monitored for analysis. This report can also be used to monitor operation workload balancing for the application grouping feature. If applications must be scheduled to run during certain time periods only, this report can verify whether operations rules are being followed.

Report options

The Transactions by Time Period report is optionally produced with the Application Detail report and the Region Detail (Region Analysis) report.

To request the Transactions by Time Period report, activate the **Transactions by Time Period** global option in a Monitor Report Set and specify the time periods and associated report options. Then to request the report by region, select the Transactions by Time Period option in the “Region Analysis report” on page 380, or to request the report by application, select the Transactions by Time Period option in the “Application Detail report” on page 388.

The Transactions by Time Period report options are:

- The report period
- COUNT or PERCENT: Show a count of transactions or show the number in each time period as a percentage of the total in the report period
- Up to 14 successive time periods on the 24-hour clock within which transaction activity is to be reported

Normally the report shows counts for each PSB-trancode combination. To show counts for each application-trancode combination, activate the **Application Grouping** Option and specify an **Application Groups** or **Program Object List** which defines the application groups to use.

Example:

```
[IMSPAMON DDNAME(ddname1),] default SUMMRPT
DETAILDDNAME(ddname2),] default DETLRPT
IMSPAMON TIMEREPORT(
COUNT, or PERCENT
TIMES(00:00,07:00,08:00,09:00,
10:00,11:00,12:00,13:00,14:00,
15:00,16:00,17:00,18:00,23:59:59))
IMSPAMON REGANAL(
TIMEREPORT)
IMSPAMON APPLGRP(
TIMEREPORT)
IMSPAMON EXECUTE
```

Report content

The Transactions by Time Period report contains one detail line for each PSB-transaction code. The report shows transaction activity for up to 14 time periods during the day for each transaction code within PSB name.

The report columns are the PSB name, the transaction code, and the requested time periods. The report shows the number of transactions within each time period for each PSB-transaction code. Alternatively, you can request that the count instead be shown as a percentage of the total number of transactions. The last lines of the report show, for each time period, the total number of transactions and the number of transactions per second.

Region Totals		From 14May2018 9.24.33.25 To 14May2018 15.07.01.37 Elapsed= 5 Hrs 43 Mins 20.063.048 Secs													
		Midnite	07.00	08.00	09.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00	18.00	
		-07.00	-08.00	-09.00	-10.00	-11.00	-12.00	-13.00	-14.00	-15.00	-16.00	-17.00	-18.00	-19.00	
PSBNAME	Trancode														
%PSB0001	%Tran	0	0	0	22	21	7	14	11	1	0	0	0	0	
%PSB0003	%Tran	0	0	0	1	0	0	0	0	0	0	0	0	0	
DRC@CTL0	DRC@TR01	0	0	0	2	1	1	0	0	0	0	0	0	0	
DRC@CTL0	DRC@TR02	0	0	0	0	3	3	1	0	0	0	0	0	0	
DRC@CTL0	DRC@TR03	0	0	0	4	6	2	0	0	0	0	0	0	0	
DRC@CTL0	DRC@TR04	0	0	0	4	4	1	0	1	0	0	0	0	0	
DRC@CTL0	DRC@TR1D	0	0	0	2	1	1	0	0	0	0	0	0	0	
DRC@CTL0	DRC@TR1E	0	0	0	2	1	1	0	0	0	0	0	0	0	
DRC@CTL0	DRC@TR1F	0	0	0	0	2	0	0	0	0	0	0	0	0	
DRC@CTL0	DRC@TR20	0	0	0	2	0	1	0	0	0	0	0	0	0	
RCLBDBK	CLBDBK	0	0	0	1	0	0	0	0	0	0	0	0	0	
RCLBDDS	CLBDDS	0	0	0	5	0	0	0	0	0	0	0	0	0	
RCLBDDS	ZRCLBFDS	0	0	0	6	6	2	0	0	0	0	0	0	0	
RCLBDEN	CLBDEN	0	0	0	13	1	4	0	0	0	0	0	0	0	
RCLBDEN	CLDC	0	0	0	15	7	4	0	0	0	0	0	0	0	
RCLBDEN	ZRCLBFEN	0	0	0	6	40	2	0	0	0	0	0	0	0	
RCLBDFN	CLBDFN	0	0	0	10	1	2	0	0	0	0	0	0	0	
:															
ZRPRW01	ZRPRW01	0	0	0	2	4	2	0	0	0	0	0	0	0	
ZRPRW01	ZRPRW02	0	0	0	2	2	1	0	0	0	0	0	0	0	
ZRSCQCS	RSCQCS	0	0	0	2	0	0	0	0	0	0	0	0	0	
ZRSCXDR	RSCXDR	0	0	0	2	0	0	0	0	0	0	0	0	0	
ZRSC2DR	ZRSC2DR	0	0	0	4	0	0	0	0	0	0	0	0	0	
ZRTDD	ZRTDD	0	0	0	10	0	0	0	0	0	0	0	0	0	
ZRWAD	ZRWAD	0	0	0	10	2	4	0	0	0	0	0	0	0	
ZSUTIL10	ZSUTIL10	0	0	0	0	0	0	0	0	0	1	0	0	0	
**Grand*	*TOTALS*	0	0	0	990	364	167	17	12	1	1	0	0	0	
**Grand*	*TOTALS*/Sec	.00	.00	.00	.28	.10	.05	.00	.00	.00	.00	.00	.00	.00	

Figure 195. Transactions by Time Period report

Region Activity Analysis reports

The Region Activity Analysis reports provide a detailed analysis of all dependent regions.

These reports provide a dependent region analysis of the following:

- Region occupancy
- Program scheduling, including IWAITs
- Transaction throughput and response time
- DL/I call activity
- Database IWAITs

Region Analysis report

The Region Analysis reports are a set of reports (Region Detail, Program Summary, Transactions by Time Period, Database IWAIT Summary) for each dependent region.

These reports are in the same format as the corresponding Summary reports described in "Region Activity Summary reports" on page 348, except that they apply to each dependent region. The Summary reports group data by type to provide convenient comparison of one measure across all regions; for example, schedule data for the total system. The Region Analysis reports group data by region, to allow all the characteristics of a region to be viewed together.

From **DB Monitor** data, the Region Detail report cannot be produced for all regions since control region scheduler records are not available; however, it can be produced for region 1. If requested, the Program Summary and Database IWAIT Summary reports can be produced for region 1; however, the Program Summary is of no value. The Transactions by Time Period report is not produced from DB Monitor data.

Monitor records: This report is derived from monitor records 02–29, 38–39, 47–49, 56–65.

Uses

The various Region Analysis reports have the same basic use as the corresponding Summary reports. In addition, they allow analysis of the effect of multiregion activity. The effects of region dispatching priority and relative CPU availability can be inferred from successively increasing elapsed times for the same PSB-transaction code or DDname activities as the region decreases in priority.

The regional Program Summary report, in conjunction with the Region Histogram, Exception Listing, and Enqueue/Dequeue Trace, are a good source of information for analyzing the effectiveness of various scheduling options. Such options are transaction class and priority, number of regions, parallel scheduling of transactions, program preload, and so on.

Report options

To obtain the Region Analysis reports, activate the **Region Analysis** report in a Monitor Report Set and select one or more of the options to produce the corresponding report by region: **Region Detail**, **Program Summary**, **Database IWAIT Summary**, **Transactions by Time Period**.

For the Region Detail report, distribution graphs can optionally be included. From the Monitor Global Options panel, select **Include Distributions in Reports** and specify one or more of the following Distributions to produce the corresponding Region Detail graph:

- **Elapsed Time per Schedule**
- **Elapsed Time per Call**
- **Elapsed Time per IWAIT**
- **IWAITs per Call**

For the Transactions by Time Period report, also activate the **Transactions by Time Period** global option and specify the time periods in which to report transaction activity.

If no reports are selected, the default is Region Detail, Program Summary and Database IWAIT Summary reports.

Optionally, the Program Summary and the Transactions by Time Period reports can include application grouping. Activate the **Application Grouping** Option in the Monitor Report Set and specify an **Application Groups** or **Program** Object List which defines the application groups to include in the report.

Report output is sent to the DDname specified in Detail Report Output DDname on the Monitor Global Options panel.

The **ESAF Integration** and **Alternate Sequencing** Options are applicable to this report.

Report content

The Region Detail report has two sections for each active MPP region, one showing an analysis of schedule, transaction, call, and IWAIT activity, as well as region idle time, and the second, if requested, showing distribution graphs of activity in the region.

The format of the Region Analysis reports for each region is the same as that described for the corresponding Summary reports. For further details of these reports, refer to the following descriptions:

- "Region Summary report" on page 350
- "Program Summary report" on page 364
- "Database IWAIT Summary report" on page 374
- "Transactions by Time Period report" on page 378

If ESAF Integration is requested:

- The Region Detail report includes a **Call data (ESAF)** section.
- The Program Summary report includes **Call Analysis (ESAF)** and **PSB Comparison (ESAF)** sections.

If Alternate Sequencing is requested:

- The Program Summary report includes:
 - The section headers suffixed by one of the following:
 - **Sorted by Total Scheduled Elapsed time** if the requested sequence is Occupancy
 - **Sorted by Total Call Elapsed time** if the requested sequence is Calls
 - **Sorted by Total IWAIT Elapsed time** if the requested sequence is Delay
 - If a number or percentage (less than 100%) Limit is specified:
 - The section headers are also suffixed by **LIMIT nn** or **LIMIT nn%**
 - A ***LIMIT *** line is printed for the total of the reported (limited) data only.
- The Database IWAIT Summary report includes:
 - The report header suffixed by **Sorted by Total IWAIT Elapsed time** if the requested sequence is Occupancy, Calls or Delay, since only Delay is relevant to this report.
 - If a number or percentage (less than 100%) Limit is specified:
 - The report header is also suffixed by **LIMIT nn** or **LIMIT nn%**
 - A ***Limit *** line is printed for the total of the reported (limited) data only.

Report from 08Jun2018 13.06.12.71				IMS 15.1.0		IMS Performance Analyzer 4.4				Report to 08Jun2018 13.10.39.26							
R E G I O N D E T A I L																	
Region No. 1		From 08Jun2018 13.06.21.86		To 08Jun2018 13.09.52.04		Elapsed= 0 Hrs 3 Mins 30.174.694 Secs											
** Transaction data **																	
Rgn No.	Elapsed Secs.Mil	Scheds	Trans	Trans /Sched	Elap/Sched Sc.Mil.Mic	%ages of Sc-DLI	Regn Active	elapsed Idle	Sch-DLI Mil.Mic	Elap/Tran Sc.Mil.Mic	CPU/Trn Mil.Mic	%ages of CPU	Tran Call	Elapsed IWAIT			
1	210.174	12	26	2.17	12.847.101	39.08%	34.27%	26.65%	6845.365	2.770.032	2.310	.08%	2.30%	.02%			
** Schedule data **																	
Rgn No.	Trans /sec	Call /sec	IWTs /sec	Schd On Q	Percents of Region Idle Time					No Messages		Blk Ldr Busy		Sched NotIWT		Synch DB IWTs	
					NoMsg	Bldr	I/CK	DBAS	NtIW	No.	Avg Elap	No.	Avg Elap	No.	Avg Elap	No.	Avg Elap
1	0.12	0.70	0.01	0.17	43.5%	.2%	.0%	.0%	1.3%	5	3.900.353	19	5.360	12	47.374	0	
** Call data **																	
----- M E S S A G E Q U E U E C A L L S -----																	
Rgn No.	Calls /Tran	IWTs /Tran	IWTs /Call	Calls /Tran	IWTs /Tran	IWTs /Call	Elap/Call Sc.Mil.Mic	Pct of Call Elap			Calls /Tran	IWTs /Tran	IWTs /Call	Elap/Call Sc.Mil.Mic	Pct of Call Elap		
								CPY	DLA	IWT					CPY	DLA	IWT
1	5.7	0.1	0.01	2.3	0.0	0.02	0.232	4.7%	95.3%	.4%	3.4	0.0	0.01	18.638	.1%	99.9%	.9%
** Call data (FP) **																	
----- E M H C a l l s -----																	
Rgn No.	Calls /Tran	IWTs /Call	Calls /Tran	IWTs /Call	Elap/Call Sc.Mil.Mic	Pct of IWAIT		Calls /Tran	IWTs /Call	Elap/Call Sc.Mil.Mic	Pct of IWAIT		Calls /Tran	IWTs /Call	Elap/Call Sc.Mil.Mic	Pct of IWAIT	
1	18.4	0.24	1.2	0.00	0.949	.0%		17.1	0.26	53.698	1.2%		0.1	0.00	1.454	.0%	

Figure 196. Region Analysis report: transactions, schedules, calls, FP calls

REGION DETAIL

Region No. 1 From 08Jun2018 13.06.21.86 To 08Jun2018 13.09.52.04 Elapsed= 0 Hrs 3 Mins 30.174.694 Secs

<u>Elapsed/Schedule</u>					
Average	Std-Dev/Avg	Max Value			
12.847.101	1.171	46.027.278			
Range	Count in				
Sc Mil Mic	Range				
To Maximum	8	*****			
1.000.000	0				
500.000	0				
300.000	0				
100.000	0				
50.000	0				
30.000	3	*****			
10.000	0				
5.000	0				
1.000	1	***			

Total=	12	10 20 30 40 50%			

<u>Elapsed/Call</u>			<u>Elapsed/IWAIT</u>			<u>IWAITs/Call</u>		
Average	Std-Dev/Avg	Max Value	Average	Std-Dev/Avg	Max Value	Average	Std-Dev/Avg	Max Value
40.803	8.254	4.988.810	2.628	1.791	19.950	0.19	2.488	4
Range	Count in		Range	Count in		Range	Count in	
Sc Mil Mic	Range		Sc Mil Mic	Range		Count	Range	
To Maximum	14	*	To Maximum	0		To Maximum	0	
100.000	1		100.000	0		8	0	
50.000	1		50.000	0		7	0	
25.000	4		25.000	0		6	0	
20.000	4		20.000	1		5	0	
15.000	10	*	15.000	12	****	4	1	
10.000	19	*	10.000	15	*****	3	1	
5.000	7		5.000	0		2	11	*
2.000	2		2.000	0		1	88	*****
1.000	565	*****	1.000	89	*****	0	526	*****
-----			-----			-----		
Total=	627	10 20 30 40 50%	Total=	117	10 20 30 40 50%	Total=	627	10 20 30 40 50%

Figure 197. Region Analysis report: distributions

PROGRAM SUMMARY

Region No.	1	From 08Jun2018 13.06.21.86	To 08Jun2018 13.09.52.04	Elapsed=	0 Hrs	3 Mins	30.174.694 Secs										
** Program Analysis **																	
		----- Per Schedule ----- ----- Per Transaction -----															
PSBname	TranCode	Scheds	Trans	Trans /Schd	Scd-DLI Mil.Mic	DLI-Term Sc.Mil.Mic	Schd on Q	Calls	IWTs	Sc.Mil.Mic	Elapsed CPUtime	Mil.Mic	Pct of Tran	Elap			
BMPFPE05		1	1	1.00	103.895	5.210.432	.0	18.0	.0	5.210.432	10.010	.2%	.0%	.0%			
BMP255		1	1	1.00	327.885	1.936.357	.0	292.0	.0	1.936.357	10.010	.5%	.2%	.0%			
DDLTDS01	TXCDDS01	4	12	3.00	***10,170	5.747.907	.0	5.8	.0	1.915.969	0.000	.0%	5.0%	.0%			
DDLTPE3	TXCTFPE3	1	1	1.00	428.989	10.364.899	.0	182.0	.0	10.364.899	10.010	.1%	.0%	.0%			
DDLTPE4	TXCTFPE4	1	1	1.00	***15,164	2.293	.0	1.0	.0	2.293	10.010	437%	2.1%	.0%			
DDLTLM20	TXCDLM20	1	4	4.00	5247.285	5.657.413	2.0	9.3	.5	1.414.353	2.503	.2%	8.8%	.3%			
DDLTRN14	TXCDRN14	2	5	2.50	***10,095	12.928.862	.0	5.4	.0	5.171.545	0.000	.0%	.0%	.0%			
PSBDUMMY		1	1	1.00	0.000	0.086	.0	.0	.0	0.086	10.010	640%	.0%	.0%			
Rgn	1 *TOTALS*	12	26	2.17	6845.365	6.001.736	.2	24.1	.1	2.770.032	2.310	.1%	2.3%	.0%			
**Group	BMP	2	2	1.00	215.890	3.573.395	.0	155.0	.0	3.573.395	10.010	.3%	.1%	.0%			
**Group	TFP	2	2	1.00	7796.713	5.183.596	.0	91.5	.0	5.183.596	10.010	.2%	.0%	.0%			
**Group	PSB	1	1	1.00	0.000	0.086	.0	.0	.0	0.086	10.010	640%	.0%	.0%			
**Group	DDL	9	23	2.56	9079.178	7.208.217	.2	13.7	.1	2.820.607	1.306	.0%	2.5%	.0%			
		----- Message Queue Calls -----															
PSBname	TranCode	Calls /Tran	IWTs /Tran	IWTs /Call	CPY Elp Mil.Mic	DLA Elp Mil.Mic	Elp/IWT Mil.Mic	Calls /Tran	IWTs /Tran	IWTs /Call	CPY Elp Mil.Mic	DLA Elp Mil.Mic	Elp/IWT Mil.Mic	Pct DB	Call	Elap	
BMPFPE05		2.0	.0	.00	0.007	0.140	0.000	13.0	.0	.00	0.014	0.019	0.000	41.7%	58.3%	.0%	
BMP255		18.0	.0	.00	0.010	0.164	0.000	13.0	.0	.00	0.014	0.017	0.000	45.7%	54.3%	.0%	
DDLTDS01	TXCDDS01	.3	.0	.00	0.020	0.062	0.000	2.3	.0	.00	0.020	42.514	0.000	.0%	.0%	.0%	
DDLTPE3	TXCTFPE3	21.0	.0	.00	0.008	0.133	0.000	.0									
DDLTPE4	TXCTFPE4	1.0	.0	.00	0.001	0.047	0.000	.0									
DDLTLM20	TXCDLM20	2.8	.3	.09	0.014	0.598	0.055	5.5	.3	.05	0.017	22.280	14.541	.1%	99.9%	3.0%	
DDLTRN14	TXCDRN14	.4	.0	.00	0.029	0.077	0.000	2.6	.0	.00	0.011	0.015	0.000	42.7%	57.3%	.0%	
PSBDUMMY		.0						.0									
Rgn	1 *TOTALS*	2.3	.0	.02	0.011	0.221	0.055	3.4	.0	.01	0.016	18.622	14.541	.1%	99.9%	.9%	
**Group	BMP	10.0	.0	.00	0.009	0.162	0.000	13.0	.0	.00	0.014	0.018	0.000	43.7%	56.3%	.0%	
**Group	TFP	11.0	.0	.00	0.008	0.129	0.000	.0									
**Group	PSB	.0						.0									
**Group	DDL	1.7	.0	.03	0.012	0.252	0.055	2.7	.0	.02	0.017	26.423	14.541	.1%	99.9%	.9%	
		----- E M H C a l l s -----															
PSBname	TranCode	Calls /Tran	IWTs /Call	Elap/Call Sc.Mil.Mic	Pct of IWAIT												
BMPFPE05		0.0															
BMP255		0.0															
DDLTDS01	TXCDDS01	1.8	0.00		1.309	.0%											
DDLTPE3	TXCTFPE3	0.0					1.1	1.00	852.937	.4%	0.3	0.00		1.454	.0%		
DDLTPE4	TXCTFPE4	0.0					161.0	0.45	63.809	1.3%	0.0						
DDLTLM20	TXCDLM20	0.0					0.0				0.0						
DDLTRN14	TXCDRN14	1.8	0.00		0.067	.0%	1.0	0.25	3.956	.8%	0.0						
PSBDUMMY		0.0					0.6	1.00	237.539	1.8%	0.0						
Rgn	1 *TOTALS*	1.2	0.00		0.949	.0%	17.1	0.26	53.698	1.2%	0.1	0.00		1.454	.0%		
**Group	BMP	0.0					132.0	0.10	6.841	5.7%	0.0						
**Group	TFP	0.0					80.5	0.45	63.809	1.3%	0.0						
**Group	PSB	0.0					0.0				0.0						
**Group	DDL	1.3	0.00		0.949	.0%	7.9	0.49	122.043	.9%	0.1	0.00		1.454	.0%		

Figure 198. Region Analysis report: Program Summary - programs, calls, FP calls

PROGRAM SUMMARY

Region No.	1	From 08Jun2018 13.06.21.86 To 08Jun2018 13.09.52.04 Elapsed= 0 Hrs 3 Mins 30.174.694 Secs													
** PSB Comparison **	*** All values are percents of total ***														
PSBname	TranCode	Schds	Trans	Sc-Dl	Dl-Tm	CPUtm	Calls	CPYE1	DLAE1	IWTs	IWE1p	Calls	CIE1p	IWTs	IWE1p
BMPFPE05		8.33%	3.85%	.13%	7.23%	16.67%	14.77%	12.42%	.02%	.00%	.00%	3.39%	2.14%	.00%	.00%
BMP255		8.33%	3.85%	.40%	2.69%	16.67%	14.77%	13.20%	.01%	.00%	.00%	30.51%	22.79%	.00%	.00%
DDLTD01	TXCDD01	33.33%	46.15%	49.52%	31.92%	.00%	30.68%	37.83%	70.05%	.00%	.00%	6.78%	2.39%	.00%	.00%
DDLTFPE3	TXCTFPE3	8.33%	3.85%	.52%	14.39%	16.67%	.00%	.00%	.00%	.00%	.00%	35.59%	21.65%	.00%	.00%
DDLTFPE4	TXCTFPE4	8.33%	3.85%	18.46%	.00%	16.67%	.00%	.00%	.00%	.00%	.00%	1.69%	.35%	.00%	.00%
DDLTL20	TXCDLM20	8.33%	15.38%	6.39%	7.86%	16.67%	25.00%	26.61%	29.91%	100.00%	100.00%	18.64%	49.14%	100.00%	100.00%
DDLTRN14	TXCDRN14	16.67%	19.23%	24.58%	35.90%	.00%	14.77%	9.95%	.01%	.00%	.00%	3.39%	1.55%	.00%	.00%
PSBDUMMY		8.33%	3.85%	.00%	.00%	16.67%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%
Rgn	1 *TOTALS*	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
**Group	BMP	16.67%	7.69%	.53%	9.92%	33.33%	29.55%	25.62%	.03%	.00%	.00%	33.90%	24.93%	.00%	.00%
**Group	TFP	16.67%	7.69%	18.98%	14.39%	33.33%	.00%	.00%	.00%	.00%	.00%	37.29%	22.00%	.00%	.00%
**Group	PSB	8.33%	3.85%	.00%	.00%	16.67%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%
**Group	DDL	75.00%	88.46%	99.47%	90.08%	50.00%	70.45%	74.38%	99.97%	100.00%	100.00%	66.10%	75.07%	100.00%	100.00%
** PSB Comparison (FP) ***** All values are percents of total ***															
PSBname	TranCode	----- E M H C a l l s -----				----- D E D B C a l l s -----				----- M S D B C a l l s -----					
		Calls	CIE1p	IWTs	IWE1p	Calls	CIE1p	IWTs	IWE1p	Calls	CIE1p	IWTs	IWE1p		
BMPFPE05		.00%	.00%	.00%	.00%	.67%	.06%	2.61%	.48%	.00%	.00%	.00%	.00%		
BMP255		.00%	.00%	.00%	.00%	58.65%	7.50%	20.00%	34.53%	.00%	.00%	.00%	.00%		
DDLTD01	TXCDD01	70.97%	97.94%	.00%	.00%	2.92%	46.40%	11.30%	16.00%	100.00%	100.00%	.00%	.00%		
DDLTFPE3	TXCTFPE3	.00%	.00%	.00%	.00%	36.18%	42.99%	62.61%	44.52%	.00%	.00%	.00%	.00%		
DDLTFPE4	TXCTFPE4	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%		
DDLTL20	TXCDLM20	.00%	.00%	.00%	.00%	.90%	.07%	.87%	.04%	.00%	.00%	.00%	.00%		
DDLTRN14	TXCDRN14	29.03%	2.06%	.00%	.00%	.67%	2.98%	2.61%	4.43%	.00%	.00%	.00%	.00%		
PSBDUMMY		.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%		
Rgn	1 *TOTALS*	100.00%	100.00%	.00%	.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	.00%	.00%		
**Group	BMP	.00%	.00%	.00%	.00%	59.33%	7.56%	22.61%	35.01%	.00%	.00%	.00%	.00%		
**Group	TFP	.00%	.00%	.00%	.00%	36.18%	42.99%	62.61%	44.52%	.00%	.00%	.00%	.00%		
**Group	PSB	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%	.00%		
**Group	DDL	100.00%	100.00%	.00%	.00%	40.67%	92.44%	77.39%	64.99%	100.00%	100.00%	.00%	.00%		

Figure 199. Region Analysis report: Program Summary - PSB comparisons

Report from 08Jun2018 13.06.12.71			IMS 15.1.0		IMS Performance Analyzer 4.4				Report to 08Jun2018 13.10.39.26					
Database IWAIT Summary														
Region No.		1	From 08Jun2018 13.06.21.86 To 08Jun2018 13.09.52.04		Elapsed= 0 Hrs 3 Mins 30.174.694 Secs									
DDname	Type	IWAITs	Elap/IWAIT	StdDev	Max IWAIT	Calls	IWAITs	Pct Tot	Pct Rgn	Pct Rgn	Pct Rgn	Pct Tot	Pct Tot	Pct Tot
			Sc.Mil.Mic	X Avg	Sc.Mil.Mic	Waiting	/Call				DLAElp	IWAITs	IWTElp	DLAElp
DB23AR0	DEDB	5	3.517	.787	5.827	5	1.00	.68%	4.27%	5.719%	.069%	3.82%	4.955%	.059%
DB23AR1	DEDB	10	5.098	1.200	12.751	8	1.25	1.09%	8.55%	16.579%	.199%	7.63%	14.365%	.171%
DB23AR2	DEDB	34	0.631	3.471	9.402	34	1.00	4.64%	29.06%	6.974%	.084%	25.95%	6.042%	.072%
DB23AR3	DEDB	15	0.914	3.388	12.500	15	1.00	2.05%	12.82%	4.459%	.054%	11.45%	3.863%	.046%
DB23AR4	DEDB	2	15.523	.285	19.950	2	1.00	.27%	1.71%	10.096%	.121%	1.53%	8.748%	.104%
DB23AR5	DEDB	21	2.252	1.920	11.386	14	1.50	1.91%	17.95%	15.382%	.185%	16.03%	13.328%	.159%
DD01AR0	DEDB	28	3.958	1.230	14.039	21	1.33	2.87%	23.93%	36.045%	.433%	21.37%	31.231%	.373%
DIMS01D1	VSAM	1	14.541	.000	14.541	1	1.00	.14%	.85%	4.729%	.057%	.76%	4.097%	.049%
SHMSG	QUE	1	0.055	.000	0.055	1	1.00	.14%	.85%	.018%	.000%	.76%	.015%	.000%
Rgn	1 *Tot	117	2.628	1.791	19.950	101	1.16	13.80%	100.00%	100.00%	1.202%	89.31%	86.645%	1.034%
DEDB	*Grp	115	2.547	1.810	19.950	99	1.16	13.52%	98.29%	95.253%	1.145%	87.79%	82.532%	.985%
VSAM	*Grp	1	14.541	.000	14.541	1	1.00	.14%	.85%	4.729%	.057%	.76%	4.097%	.049%

Figure 200. Region Analysis report: Database IWAIT Summary

Report from 25Jun2018 14.45.00.04				IMS 15.1.0		IMS Performance Analyzer 4.4				Report to 25Jun2018 14.54.59.99							
R E G I O N D E T A I L																	
Region No. 23		From 25Jun2018 14.45.00.04 To 25Jun2018 14.54.59.96 Elapsed= 0 Hrs 9 Mins 59.921.048 Secs															
** Transaction data **																	
Rgn No.	Elapsed Secs.Mil	Scheds	Trans	Trans /Schd	Elap/Sched Sc.Mil.Mic	%ages of Regn elapsed Sc-DLI Active Idle			Sch-DLI Mil.Mic	Elap/Tran Sc.Mil.Mic	CPU/Trn Mil.Mic	%ages of Tran Elapsed CPU Call IWAIT					
23	599.921	667	1,310	1.96	364.519	1.75%	38.78%	59.47%	15.747	177.580	12.889	7.26%	35.89%	27.09%			
** Schedule data **																	
Rgn No.	Trans /sec	Call /sec	IWTs /sec	Schd On Q	Percents of Region Idle Time NoMsg Bldr I/CK DBAS NtIW					No Messages No. Avg Elap		Blk Ldr Busy No. Avg Elap		Sched NotIWT No. Avg Elap		Synch DB IWTs No. Avg Elap	
23	2.18	59.50	7.38	0.00	99.9%	.0%	.0%	.0%	.1%	662	538.498	0	666	452	0		
** Call data **																	
Rgn No.	Calls /Tran	IWTs /Tran	IWTs /Call	Calls /Tran	IWTs /Tran	IWTs /Call	Elap/Call Sc.Mil.Mic	Pct of Call CPY	Elap DLA IWT	Calls /Tran	IWTs /Tran	IWTs /Call	Elap/Call Sc.Mil.Mic	Pct of Call CPY	Elap DLA IWT		
23	27.2	3.4	0.12	8.5	1.2	0.14	1.575	1.0%	99.0% 4.4%	18.7	2.2	0.12	2.687	.1%	99.9% 94.5%		
** Call data (ESAF) **																	
Rgn No.	Calls /Tran	ESAF SSID	IWTs /Tran	Initialization - Calls Elap/Call Sc.Mil.Mic	Normal Call - Calls /Tran	Elap/Call Sc.Mil.Mic	Commit Ph1 - Calls /Tran	Elap/Call Sc.Mil.Mic	Commit Ph2 - Calls /Tran	Elap/Call Sc.Mil.Mic	Termination - Calls /Tran	Elap/Call Sc.Mil.Mic					
23	3.2	P2I1	1.2	0.304	0.8	25.469	0.8	0.207	0.4	1.109	0.0	0.000					
Elapsed/Schedule																	
Average				Std-Dev/Avg				Max Value									
364.519				.590				1.851.209									

Elapsed/Call				Elapsed/IWAIT				IWAITs/Call									
Average		Std-Dev/Avg		Max Value		Average		Std-Dev/Avg		Max Value		Average		Std-Dev/Avg		Max Value	
2.895		3.274		207.898		12.848		1.218		207.898		0.18		2.340		3	

Report from 25Jun2018 14.45.00.04				IMS 15.1.0				IMS Performance Analyzer 4.4				Report to 25Jun2018 14.54.59.99				
P R O G R A M S U M M A R Y																
Region No. 23		From 25Jun2018 14.45.00.04 To 25Jun2018 14.54.59.96				Elapsed= 0 Hrs 9 Mins 59.921.048 Secs										
** Program Analysis **		(Sorted by Total Call Elapsed time; LIMIT 25%)														
		----- Per Schedule -----						----- P e r T r a n s a c t i o n -----								
PSBname	TranCode	Schds	Trans	/Schd	Scd-DLI	DLI-Term	Schd	Elapsed	CPUtime	Pct of Tran	Elap					
RMZIOIS1	RMZITIS1	409	973	2.38	4.288	410.362	.0	32.8	6.1	5.1%	41.2%	45.9%				
RMZIOIR1	RMZITIR1	124	171	1.38	4.040	300.147	.0	35.2	6.3	4.4%	31.3%	32.8%				
Rgn	23 *LIMIT *	533	1,144	2.15	4.230	384.721	.0	33.2	6.1	5.0%	39.4%	43.5%				
Rgn	23 *TOTALS*	667	1,310	1.96	15.747	348.771	.0	30.4	5.4	7.3%	35.9%	38.9%				
** Call Analysis **		(Sorted by Total Call Elapsed time; LIMIT 25%)														
		----- Message Queue Calls -----						----- D a t a b a s e C a l l s -----								
		Calls	IWTs	IWTs	CPY Elp	DLA Elp	Elp/IWT	Calls	IWTs	IWTs	CPY Elp	DLA Elp	Elp/IWT	Pct DB Call	Elap	
PSBname	TranCode	/Tran	/Tran	/Call	Mil.Mic	Mil.Mic	Mil.Mic	/Tran	/Tran	/Call	Mil.Mic	Mil.Mic	Mil.Mic	CPY	DLA	IWT
RMZIOIS1	RMZITIS1	8.3	1.3	.16	0.017	1.704	0.458	21.0	2.5	.12	0.004	2.703	21.557	.1%	99.9%	94.7%
RMZIOIR1	RMZITIR1	9.2	1.6	.17	0.015	1.495	0.673	22.0	2.3	.10	0.004	2.464	22.589	.1%	99.9%	93.7%
Rgn	23 *LIMIT *	8.4	1.4	.16	0.017	1.670	0.495	21.1	2.5	.12	0.004	2.665	21.698	.1%	99.9%	94.6%
Rgn	23 *TOTALS*	8.5	1.2	.14	0.016	1.558	0.495	18.7	2.2	.12	0.004	2.683	21.683	.1%	99.9%	94.5%
** Call Analysis (ESAF) **		(Sorted by Total Call Elapsed time; LIMIT 25%)														
		- Initialization -				-- Normal Call --		--- Commit Ph1 ---		--- Commit Ph2 ---		--- Termination --				
		ESAF	Elap/Call	Sc.Mil.Mic	Elap/Call	Sc.Mil.Mic	Elap/Call	Calls	Elap/Call	Calls	Elap/Call	Calls	Elap/Call	Calls	Elap/Call	
PSBname	TranCode	SSID	/Tran	Sc.Mil.Mic	/Tran	Sc.Mil.Mic	/Tran	Sc.Mil.Mic	/Tran	Sc.Mil.Mic	/Tran	Sc.Mil.Mic	/Tran	Sc.Mil.Mic		
RMZIOIS1	RMZITIS1	P211	1.3	0.316	0.9	26.181	0.9	0.207	0.4	1.050						
RMZIOIR1	RMZITIR1	P211	1.6	0.249	0.9	21.287	0.9	0.204	0.7	1.313						
Rgn	23 *LIMIT *	P211	1.4	0.304	0.9	25.469	0.9	0.207	0.4	1.109						
Rgn	23 *TOTALS*	P211	1.2	0.304	0.8	25.469	0.8	0.207	0.4	1.109						
** PSB Comparison **		*** All values are percents of total *** (Sorted by Total Call Elapsed time; LIMIT 25%)														
		----- Data Base Calls -----						----- Msg Que Calls -----								
PSBname	TranCode	Schds	Trans	Sc-DI	DI-Tm	CPUtm	Calls	CPYE1	DLAE1	IWTs	IWE1p	Calls	CIE1p	IWTs	IWE1p	
RMZIOIS1	RMZITIS1	61.32%	74.27%	16.70%	72.15%	50.37%	83.24%	84.71%	83.85%	84.57%	84.08%	71.95%	78.64%	82.84%	76.66%	
RMZIOIR1	RMZITIR1	18.59%	13.05%	4.77%	16.00%	9.77%	15.34%	14.60%	14.09%	13.41%	13.97%	14.05%	13.47%	17.16%	23.34%	
Rgn	23 *LIMIT *	79.91%	87.33%	21.47%	88.15%	60.14%	98.58%	99.31%	97.94%	97.98%	98.05%	86.00%	92.11%	100.00%	100.00%	
Rgn	23 *TOTALS*	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	
** PSB Comparison (ESAF) **		*** All values are percents of total *** (Sorted by Total Call Elapsed time; LIMIT 25%)														
		Total		---- Init ----		--- Normal ---		-- Commit 1 --		-- Commit 2 --		---- Term ----				
		SSID	Calls	Calls	Elaps	Calls	Elaps	Calls	Elaps	Calls	Elaps	Calls	Elaps	Calls	Elaps	
RMZIOIS1	RMZITIS1	P211	83.49%	82.82%	85.93%	85.44%	87.83%	85.46%	85.67%	77.26%	73.09%	.00%	.00%			
RMZIOIR1	RMZITIR1	P211	16.51%	17.18%	14.07%	14.56%	12.17%	14.54%	14.33%	22.74%	26.91%	.00%	.00%			
Rgn	23 *LIMIT *	P211	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	.00%	.00%			
Rgn	23 *TOTALS*	P211	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	.00%	.00%			

Figure 202. Region Analysis report: Program Summary with ESAF Integration and Sequenced by Calls (with Limit)

Application Detail report

A separate Application Detail report is produced for each specified application (PSB) group.

A number of report options are available:

- An analysis of program activity for each program group, including details for each PSB name that comprises the group, in the same format as the Program Summary report.

- Distribution graphs for the elapsed time per schedule, elapsed time per call, elapsed time per IWAIT, and number of IWAITs per call for each group and for each PSB within the group.
- The number or percent of transactions occurring, and overall transaction rate for specified time periods, in the same format as the Transactions by Time Period report.

The Application Detail report cannot be produced from DB Monitor traces.

Monitor records: This report is derived from monitor records 02–29, 38–39, 47–49, 56–65.

Uses

The application grouping feature provides a separate report for each group of PSBs having similar characteristics. The definition of *similar* is whatever is meaningful to you. Groups might be established by department (cash, sales, orders, and so on), by vendor, or by application development group (as in the sample report); or groups might be IMS-oriented, such as by transaction class.

Once the groups have been defined, comparative evaluations can be made. For example, the report might show that one application group has a better design technique that could be shared with other groups. Maybe one application group can share a dependent region with another group. The need to redistribute application workload during the workday or transaction class assignment might be inferred.

Report options

To request the Application Detail report, activate the **Application Detail** report in a Monitor Report Set and select **Program Summary** (the default) or **Transactions by Time Period** or both. Also, specify the application groups to include in the report by activating the **Application Grouping** global option, and specifying an Object List of **Application Groups** or **Programs**.

The Application Detail report cannot be produced by region. However, other options include:

- To produce the Transactions by Time Period report, also activate the Transactions by Time Period global option and specify the time periods in which to report transaction activity.
- Optionally, activate the **ESAF Integration** global option to include external subsystem calls in total call and IWAIT counts.
- Optionally, distribution graphs may be added to the report. From the Monitor Global Options panel, select **Include Distributions in Reports** and specify one or more of the following Distributions to produce the corresponding Application Detail graph:
 - **Elapsed Time per Schedule**
 - **Elapsed Time per Call**
 - **Elapsed Time per IWAIT**
 - **IWAITs per Call**

The report output is identified by the Detail Report Output DDname global option.

Report content

This is an example of the Application Detail report. For each application group, a report identical in format to the Program Summary report is presented, showing a summary of program activity for each PSB that is part of the application group.

For each application group, the report carries the heading “Application Detail – xxxxxxxx” where xxxxxxxx is a specified application group name.

The Transactions by Time Period report for the application group is presented if the **Transactions by Time Period** Option in the Monitor Report Set is activated and appropriate options specified.

If ESAF Integration is requested, the Program Summary report includes **Call Analysis (ESAF)** and **PSB Comparison (ESAF)** sections.

If distributions are requested, the report also contains the following information for each PSB in each application group, and for the totals of each application group:

- **Program Analysis** line of the Program Summary report
- **Call Analysis** line of the Program Summary report
- **Call Analysis (ESAF)** line of the Program Summary report
- **Distributions.** Elapsed time per schedule, elapsed time per call, elapsed time per IWAIT, and number of IWAITs per call statistical summary line, with graphical output corresponding to the specified Distributions.

Date=14May2018 Time=09.23.41.31

IMS 15.1.0 IMS Performance Analyzer

Report from 14May2018 09.23.41.31

Application Detail - ZRC**** Program Analysis ****

		Per Schedule				Per Transaction							
PSBname	TranCode	Schds	Trans	Trans /Schd	Scd-DLI	DLI-Term	Schd	Q	Calls	IWTs	Elapsed	CPUtime	Pct of Tran Elap
ZRCMCC	ZRCMCC	14	30	2.14	107.966	995.281	3.1	20.3	.8	464.464	30.229	6.5%	62.4%
ZRCMCXR	ZRCMCXRA	1	1	1.00	161.421	2.040.835	.0	22.0	.0	2.040.835	0.000	.0%	80.2%
ZRCMMSG	ZRCMMSGGA	2	10	5.00	205.719	9.547.227	.0	38.4	7.2	1.909.445	0.000	.0%	87.8%
ZRCMMSG	ZRCMMSGD	1	5	5.00	77.799	1.024.439	.0	37.4	2.0	204.888	0.000	.0%	29.3%
ZRCMMSG	ZRCMMSGGR	1	5	5.00	152.307	1.593.330	.0	52.4	2.0	318.666	0.000	.0%	19.5%
ZRCMSPC	ZRCMSPCA	2	2	1.00	123.230	3.110.981	.0	191.5	19.5	3.110.981	0.000	.0%	15.0%
ZRCMTWC	ZRCMTACL	20	20	1.00	62.204	227.334	1.2	7.0	1.0	227.334	15.868	7.0%	51.9%
ZRCOWHO	ZRCOWHO	20	21	1.05	92.145	1.147	.0	2.5	.0	1.092	0.000	.0%	66.6%
ZRCPCD	ZRCPCD	13	13	1.00	39.176	188.510	.0	16.6	1.7	188.510	5.940	3.2%	83.1%
ZRCPCFD	ZRCPCFD	2	2	1.00	258.731	3.404.673	.0	44.5	194.5	3.404.673	135.382	4.0%	56.3%
ZRCPCFS	ZRCPCFS	2	2	1.00	48.039	1.162.620	.0	12.0	2.5	1.162.620	14.170	1.2%	36.5%
ZRCPDD	ZRCPDD	14	14	1.00	40.672	144.510	.0	22.4	2.9	144.510	0.000	.0%	35.4%
ZRC1PTC	ZRC1PTC	5	5	1.00	44.371	15.083	.0	5.2	.8	15.083	0.000	.0%	67.0%
**Group *TOTALS*		97	130	1.34	77.959	640.849	.7	20.8	4.9	478.172	12.312	2.6%	62.0%

		Message Queue Calls				Database Calls							
PSBname	TranCode	CPY Elp	DLA Elp	Elp/IWT	CPY Elp	DLA Elp	Elp/IWT	CPY Elp	DLA Elp	Elp/IWT	Pct DB Call Elap	CPY	DLA
ZRCMCC	ZRCMCC	3.7	.7	.18	0.027	7.223	21.563	16.6	.2	.01	0.103	15.771	21.440
ZRCMCXR	ZRCMCXRA	5.0	.0	.00	0.027	1.025	0.000	17.0	.0	.00	0.173	95.763	0.000
ZRCMMSG	ZRCMMSGGA	1.8	1.4	.78	0.033	5.487	3.335	36.6	5.8	.16	0.093	45.459	42.963
**Group *TOTALS*		3.3	.8	.25	0.030	4.774	10.454	17.5	4.1	.23	0.108	15.912	10.106

**** PSB Comparison **** *** All values are percents of total ***

		Data Base Calls				Msg Que Calls							
PSBname	TranCode	Schds	Trans	Sc-DL	DL-Tm	CPUtm	CPYE1	DLAE1	IWTs	IWE1p	CPYE1	DLAE1	IWTs
ZRCMCC	ZRCMCC	14.43%	23.08%	19.99%	22.42%	56.66%	21.86%	20.78%	21.66%	.95%	2.01%	25.81%	38.94%
ZRCMCXR	ZRCMCXRA	1.03%	.77%	2.13%	3.28%	.00%	.75%	1.20%	4.50%	.00%	.00%	1.15%	.25%
ZRCMMSG	ZRCMMSGGA	2.06%	7.69%	5.44%	30.72%	.00%	16.09%	13.80%	45.98%	10.96%	46.61%	4.15%	4.77%
**Group *TOTALS*		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Figure 203. Application Detail report: programs, calls, PSB comparison

Date=14May2018 Time=09.23.41.31

IMS 15.1.0 IMS Performance Analyzer

Report from 14May2018 09.23.41.31

Application Detail - ZRC

		Midnite	07.00	08.00	09.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00	18.00	19.00
PSBNAME	TranCode	-07.00	-08.00	-09.00	-10.00	-11.00	-12.00	-13.00	-14.00	-15.00	-16.00	-17.00	-18.00	-19.00	-24.00
ZRCMCC	ZRCMCC	0	0	0	20	10	0	0	0	0	0	0	0	0	0
ZRCMCXR	ZRCMCXRA	0	0	0	1	0	0	0	0	0	0	0	0	0	0
ZRCMMSG	ZRCMMSGGA	0	0	0	5	5	0	0	0	0	0	0	0	0	0
ZRCMMSG	ZRCMMSGD	0	0	0	5	0	0	0	0	0	0	0	0	0	0
ZRCMMSG	ZRCMMSGGR	0	0	0	5	0	0	0	0	0	0	0	0	0	0
ZRCMSPC	ZRCMSPCA	0	0	0	0	2	0	0	0	0	0	0	0	0	0
ZRCMTWC	ZRCMTACL	0	0	0	15	5	0	0	0	0	0	0	0	0	0
ZRCOWHO	ZRCOWHO	0	0	0	8	9	4	0	0	0	0	0	0	0	0
ZRCPCD	ZRCPCD	0	0	0	13	0	0	0	0	0	0	0	0	0	0
ZRCPCFD	ZRCPCFD	0	0	0	0	1	1	0	0	0	0	0	0	0	0
ZRCPCFS	ZRCPCFS	0	0	0	0	1	1	0	0	0	0	0	0	0	0
ZRCPDD	ZRCPDD	0	0	0	0	14	0	0	0	0	0	0	0	0	0
ZRC1PTC	ZRC1PTC	0	0	0	0	5	0	0	0	0	0	0	0	0	0
**Group* *TOTALS*		0	0	0	72	50	8	0	0	0	0	0	0	0	0
**Group* *TOTALS*/Sec		.00	.00	.00	.02	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00

Figure 204. Application Detail report: Transactions by Time Period

** Program Analysis ** ----- Per Schedule ----- |----- Per Transaction -----
 PSBName TranCode Scheds Trans Trans Scd-DLI DLI-Term Schd Elapsed CPUtime Pct of Tran Elap
 /Schd Mil.Mic Sc.Mil.Mic on Q Calls IWTs Sc.Mil.Mic Mil.Mic CPU Call IWT
 **Group *TOTALS* 97 130 1.34 77.959 640.849 .7 20.8 4.9 478.172 12.312 2.6% 62.0% 10.4%

ELAPSED/SCHEDULE		
Average	Std-Dev/Avg	Max Value
718.808	2.890	18.450.534
Range	Count in	
Sc Mil Mic Range		
To Maximum	16	*****
1.000.000	9	****
500.000	5	**
300.000	18	*****
100.000	14	*****
50.000	7	***
30.000	17	*****
10.000	2	*
5.000	9	****
1.000	0	
Total=	97	10 20 30 40 50%

** Call Analysis **----- Message Queue Calls ----- Database Calls -----
 Calls IWTs IWTs CPY Elp DLA Elp Elp/IWT Calls IWTs IWTs CPY Elp DLA Elp Elp/IWT Pct DB Call Elap
 PSBName TranCode /Tran /Tran /Call Mil.Mic Mil.Mic Mil.Mic /Tran /Tran /Call Mil.Mic Mil.Mic Mil.Mic CPY DLA IWT
 **Group *TOTALS* 3.3 .8 .25 0.030 4.774 10.454 17.5 4.1 .23 0.108 15.912 10.106 .7% 99.3% 14.7%

ELAPSED PER CALL			ELAPSED PER IWAIT			IWAITS PER CALL		
Average	Std-Dev/Avg	Max Value	Average	Std-Dev/Avg	Max Value	Average	Std-Dev/Avg	Max Value
14.223	18.671	11.218.609	10.165	5.874	1.478.907	0.000	30.086	0.366
Range	Count in		Range	Count in		Range	Count in	
Sc Mil Mic Range			Sc Mil Mic Range			Sc Mil Mic Range		
To Maximum	8		To Maximum	1		To Maximum	0	
1.000.000	2		1.000.000	0		1.000.000	0	
500.000	0		500.000	0		500.000	0	
300.000	13		300.000	1		300.000	0	
100.000	9		100.000	4		100.000	0	
50.000	30		50.000	24	**	50.000	0	
30.000	81	*	30.000	120	*****	30.000	0	
10.000	43	*	10.000	50	***	10.000	0	
5.000	111	**	5.000	436	*****	5.000	0	
1.000	2411	*****	1.000	0		1.000	2708	*****
Total=	2,708	10 20 30 40 50%	Total=	636	10 20 30 40 50%	Total=	2,708	10 20 30 40 50%

Figure 205. Application Detail report: distributions

Report from 31May2018		13.06.10.91		IMS 15.1.0		IMS Performance Analyzer 4.4				Report to 31May2018		13.11.23.46					
Application Detail - APGRP1																	
** Program Analysis **																	
				----- Per Schedule -----				----- P e r T r a n s a c t i o n -----									
PSBname	TranCode	Schds	Trans	Trans /Schd	Scd-DLI Mil.Mic	DLI-Term Sc.Mil.Mic	Schd on Q	Calls	IWTs	Sc.	Elapsed Mil.Mic	CPUtime Mil.Mic	Pct of Tran CPU	Call	Elap IWT		
AI340	AI340T01	2	2	1.00	1.768	127.793	.0	14.0	8.0		127.793	6.916	5.4%	13.6%	98.2%		
AI342	AI342T01	2	2	1.00	2.041	139.958	.0	15.0	9.0		139.958	6.968	5.0%	41.3%	117%		
. . . .																	
PU100	PU100T01	6	6	1.00	2.032	757.796	.0	178.3	162.0		757.796	88.608	11.7%	25.4%	109%		
PU102	PU102T01	30	30	1.00	2.655	302.904	.0	51.7	47.2		302.904	44.332	14.6%	21.0%	90.9%		
**Group	*TOTALS*	628	635	1.01	4.584	120.956	.0	18.4	5.5		119.622	17.223	14.4%	32.0%	58.7%		
** Call Analysis **																	
				----- Message Queue Calls -----				----- D a t a b a s e C a l l s -----									
		Calls	IWTs	IWTs	CPY Elp	DLA Elp	Elp/IWT	Calls	IWTs	IWTs	CPY Elp	DLA Elp	Elp/IWT	Pct DB Call	Elap		
PSBname	TranCode	/Tran	/Tran	/Call	Mil.Mic	Mil.Mic	Mil.Mic	/Tran	/Tran	/Call	Mil.Mic	Mil.Mic	Mil.Mic	CPY	DLA	IWT	
AI340	AI340T01	5.0	3.0	.60	0.011	3.413	29.787	1.0	.0	.00	0.034	0.178	0.000	15.8%	84.2%	.0%	
AI342	AI342T01	5.0	3.0	.60	0.010	8.622	48.217	2.0	1.0	.50	0.036	7.262	13.822	.5%	99.5%	94.7%	
. . . .																	
PU100	PU100T01	7.2	9.3	1.30	0.010	15.504	47.724	12.0	2.8	.24	0.042	6.703	26.428	.6%	99.4%	92.5%	
PU102	PU102T01	3.0	2.0	.67	0.005	9.814	44.061	3.0	1.5	.51	0.043	11.187	20.980	.4%	99.6%	94.4%	
**Group	*TOTALS*	8.0	.6	.07	0.017	1.817	27.207	5.7	.7	.13	0.039	4.107	22.268	.9%	99.1%	70.4%	
** Call Analysis (ESAF) **																	
		- Initialization -				-- Normal Call ---			--- Commit Ph1 ---			--- Commit Ph2 ---			--- Termination --		
PSBname	TranCode	ESAF SSID	Calls /Tran	Elap/Call Sc.Mil.Mic	Calls /Tran	Elap/Call Sc.Mil.Mic	Calls /Tran	Elap/Call Sc.Mil.Mic	Calls /Tran	Elap/Call Sc.Mil.Mic	Calls /Tran	Elap/Call Sc.Mil.Mic	Calls /Tran	Elap/Call Sc.Mil.Mic			
AI340	AI340T01	DBP2	2.0	0.178	3.0	11.933			3.0	26.580							
AI342	AI342T01	DBP2	2.0	0.204	3.0	1.479			3.0	46.427							
. . . .																	
PU100	PU100T01	DBP2	5.2	0.311	144.7	2.095			9.3	43.697							
PU102	PU102T01	DBP2	2.0	0.250	41.7	3.710			2.0	46.714							
**Group	*TOTALS*	DBP2	0.3	0.254	3.8	9.996			0.0	0.715			0.4	34.053			
**Group	*TOTALS*	Q3P2	0.0	0.178	0.1	2.586							0.0	5.218			
** PSB Comparison ** *** All values are percents of total ***																	
				----- Data Base Calls -----				----- Msg Que Calls -----									
PSBname	TranCode	Schds	Trans	Sc-DLI	DL-Tm	CPUtm	Calls	CPYE1	DLAE1	IWTs	IWE1p	Calls	CIElp	IWTs	IWE1p		
AI340	AI340T01	.32%	.31%	.12%	.34%	.13%	.06%	.05%	.00%	.00%	.00%	.20%	.37%	1.65%	1.81%		
AI342	AI342T01	.32%	.31%	.14%	.37%	.13%	.11%	.10%	.20%	.42%	.26%	.20%	.92%	1.65%	2.93%		
. . . .																	
PU100	PU100T01	.96%	.94%	.42%	5.99%	4.86%	2.00%	2.18%	3.26%	3.60%	4.27%	.84%	7.13%	15.43%	27.06%		
PU102	PU102T01	4.78%	4.72%	2.77%	11.96%	12.16%	2.53%	2.83%	6.88%	9.75%	9.18%	1.76%	9.45%	16.53%	26.77%		
**Group	*TOTALS*	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	
** PSB Comparison (ESAF) ** *** All values are percents of total ***																	
		Total				--- Init ---		--- Normal ---		-- Commit 1 --		-- Commit 2 --		---- Term ----			
PSBname	TranCode	SSID	Calls	Calls	Elaps	Calls	Elaps	Calls	Elaps	Calls	Elaps	Calls	Elaps	Calls	Elaps		
AI340	AI340T01	DBP2	.54%	1.73%	1.24%	.24%	.30%	.00%	.00%	2.21%	1.85%	.00%	.00%				
AI342	AI342T01	DBP2	.54%	1.73%	1.42%	.24%	.04%	.00%	.00%	2.21%	3.23%	.00%	.00%				
. . . .																	
PU100	PU100T01	DBP2	32.08%	13.42%	16.74%	35.44%	7.53%	.00%	.00%	20.66%	28.38%	.00%	.00%				
PU102	PU102T01	DBP2	46.05%	25.97%	26.05%	51.08%	19.21%	.00%	.00%	22.14%	32.50%	.00%	.00%				
**Group	*TOTALS*	DBP2	97.31%	93.07%	95.05%	98.24%	99.54%	100.00%	100.00%	92.25%	98.73%	.00%	.00%				
**Group	*TOTALS*	Q3P2	2.69%	6.93%	4.95%	1.76%	.46%	.00%	.00%	7.75%	1.27%	.00%	.00%				

Figure 206. Application Detail report with ESAF Integration

Database IWAIT Analysis report

The Database IWAIT Analysis report produces IWAIT distribution graphs and IWAIT activity analysis by DDname and DDname Group for each dependent region.

See "Report content" on page 394 for further details.

The report can be obtained from both IMS Monitor and DB Monitor data.

Monitor records: This report is derived from monitor records 20–29, 56–61.

Uses

The Database IWAIT Analysis report expands the detail already available in the Database IWAIT Summary report by graphically portraying the distribution of IWAIT time for each DDname and DDgroup. Widely dispersed times and long elapsed times, which would be accompanied by a large standard deviation, may indicate inefficient seek patterns. By using DDgroups based on a direct-access device, you can determine if this is the problem. This grouping, in conjunction with the Database IWAIT Analysis distribution graphs, may also help you isolate problems in database organization, data set contention, or shared direct-access device interference.

Report options

To obtain the Database IWAIT Analysis report, activate the **Database IWAIT Analysis** report in a Monitor Report Set.

In addition:

- To obtain distribution graphs, specify the following on the Database IWAIT Analysis report panel:
 - Select **Print Distributions**.
 - Specify a Distribution for **Elapsed Time per IWAIT**. If not specified, the sample Distribution DDIWELAP is used.
- To present IWAIT activity by groups of DDnames, activate the **DDname Grouping** Option in the Monitor Report Set, and specify a **DDname** or **DDname Groups** Object List which defines the groups to appear in the report.
- To present IWAIT activity by region, select **Report Breaks by Region** on the Monitor Global Options panel.

Report output is sent to the DDname specified in Detail Report Output DDname on the Monitor Global Options panel.

The **Alternate Sequencing** Option is applicable to this report.

Report content

The Database IWAIT Analysis report has two parts: the Database IWAIT Summary and the distribution graphs.

The Database IWAIT Summary (which appears in this report under the heading “Database IWAIT Analysis”) is repeated in the output for convenience; this summary presents IWAIT activity for each DDname and, if specified, each DDgroup. The Database IWAIT Summary is followed by elapsed time per IWAIT distribution graphs, 12 per page, one for each DDname (in the monitor records; there is no filter on DDname) and each specified DDgroup.

See “Database IWAIT Summary report” on page 374 for a description of the report.

If Alternate Sequencing is requested:

- The report header is suffixed by **Sorted by Total IWAIT Elapsed time**. Only Delay is applicable to this report.
- If a number or percentage (less than 100%) Limit is specified:

- The report header is also suffixed by **LIMIT nn** or **LIMIT nn%**
- A ****Limit*** line is printed for the total of the reported (limited) data only.
- A ***Tot** line is printed for the total of all (100%) of the data.

Report from 08Jun2018 13.06.12.71		IMS 15.1.0		IMS Performance Analyzer 4.4		Report to 08Jun2018 13.10.39.26					
Database IWAIT Analysis											
Region Totals		From 08Jun2018 13.06.21.86 To 08Jun2018 13.09.52.04		Elapsed= 0 Hrs 4 Mins 26.545.110 Secs							
DDname	Type	IWAITs	Elap/IWAIT Sc.Mil.Mic X Avg	Max IWAIT Sc.Mil.Mic	Calls Waiting /Call	IWAITs /Call	Pct Tot Calls	Pct Tot IWAITs	Pct Tot IWTelp	Pct Tot DLAEIelp	
DB23AR0	DEDB	5	3.517 .787	5.827	5	1.00	.68%	3.82%	4.955%	.059%	
DB23AR1	DEDB	12	4.263 1.382	12.751	9	1.33	1.23%	9.16%	14.414%	.172%	
DB23AR2	DEDB	34	0.631 3.471	9.402	34	1.00	4.64%	25.95%	6.042%	.072%	
DB23AR3	DEDB	16	1.652 2.507	12.726	16	1.00	2.19%	12.21%	7.449%	.089%	
DB23AR4	DEDB	3	10.386 .781	19.950	3	1.00	.41%	2.29%	8.779%	.105%	
DB23AR5	DEDB	31	2.635 1.754	11.386	21	1.48	2.87%	23.66%	23.016%	.275%	
DD01AR0	DEDB	28	3.958 1.230	14.039	21	1.33	2.87%	21.37%	31.231%	.373%	
DIMS01D1	VSAM	1	14.541 .000	14.541	1	1.00	.14%	.76%	4.097%	.049%	
SHMSG	QUE	1	0.055 .000	0.055	1	1.00	.14%	.76%	.015%	.000%	
**Grand* *Tot		131	2.709 1.761	19.950	111	1.18	15.16%	100.00%	100.00%	1.194%	
DEDB	*Grp	129	2.638 1.776	19.950	109	1.18	14.89%	98.47%	95.887%	1.144%	
VSAM	*Grp	1	14.541 .000	14.541	1	1.00	.14%	.76%	4.097%	.049%	
		Average SD/Avg Max-Value		Average SD/Avg Max-Value		Average SD/Avg Max-Value		Average SD/Avg Max-Value			
		10.386 .786 19.950		2.635 1.758 11.386		3.958 1.234 14.039		14.541 .005 14.541			
Range		Count in	DDnm=DB23AR4 DEDB	Count in	DDnm=DB23AR5 DEDB	Count in	DDnm=DD01AR0 DEDB	Count in	DDnm=DIMS01D1 VSAM		
Sc Mil Mic		Range	Totals all Regions	Range	Totals all Regions	Range	Totals all Regions	Range	Totals all Regions		
To Maximum		0		0		0		0			
100.000		0		0		0		0			
50.000		0		0		0		0			
25.000		0		0		0		0			
20.000		1	*****	0		0		0			
15.000		1	*****	7	*****	1 *		1	*****		
10.000		0		0		10	*****	0			
5.000		0		0		0		0			
2.000		0		0		0		0			
1.000		1	*****	24	*****	17	*****	0			
Total=		3		31		28		1			
		----- 10 20 30 40 50%		----- 10 20 30 40 50%		----- 10 20 30 40 50%		----- 10 20 30 40 50%			
		Average SD/Avg Max-Value		Average SD/Avg Max-Value		Average SD/Avg Max-Value		Average SD/Avg Max-Value			
		0.055 .005 0.055		2.709 1.765 19.950		2.638 1.781 19.950		14.541 .005 14.541			
Range		Count in	DDnm=SHMSG QUE	Count in	DDnm=**Grand* *Tot	Count in	DDnm=DEDB *Grp	Count in	DDnm=VSAM *Grp		
Sc Mil Mic		Range	Totals all Regions	Range	Totals all Regions	Range	Totals all Regions	Range	Totals all Regions		
To Maximum		0		0		0		0			
100.000		0		0		0		0			
50.000		0		0		0		0			
25.000		0		0		0		0			
20.000		0		1		1		1			
15.000		0		16	*****	15	*****	0	*****		
10.000		0		15	*****	15	*****	0			
5.000		0		0		0		0			
2.000		0		0		0		0			
1.000		1	*****	99	*****	98	*****	0			
Total=		1		131		129		1			
		----- 10 20 30 40 50%		----- 10 20 30 40 50%		----- 10 20 30 40 50%		----- 10 20 30 40 50%			

Figure 207. Database IWAIT Analysis report

Report from 28May2018		15.17.36.27		IMS 15.1.0		IMS Performance Analyzer 4.4				Report to 28May2018		15.40.48.33	
Database IWAIT Analysis (Sorted by Total IWAIT Elapsed time; LIMIT 10%)													
Region Totals		From 28May2018 15.25.59.45 To 28May2018 15.37.24.84		Elapsed=		0 Hrs 23 Mins		12.057.507 Secs					
DDname	Type	IWAITs	Elap/IWAIT StdDev	Max IWAIT	Calls	IWAITs	Pct Tot	Pct Rgn	Pct Rgn	Pct Rgn	Pct Tot	Pct Tot	Pct Tot
HJOHSG10	VSAM	111	35.394 1.756	591.093	71	1.56	6.62%				33.23%	45.037%	.593%
**Limit*		111	35.394 1.756	591.093	71	1.56	6.62%				33.23%	45.037%	.593%
**Grand* *Tot		334	26.118 1.736	591.093	239	1.40	22.27%				100.00%	100.00%	1.316%
Database IWAIT Analysis (Sorted by Total IWAIT Elapsed time; LIMIT 10%)													
Region No. 1		From 28May2018 15.25.59.45 To 28May2018 15.37.24.84		Elapsed=		0 Hrs 11 Mins		25.393.819 Secs					
DDname	Type	IWAITs	Elap/IWAIT StdDev	Max IWAIT	Calls	IWAITs	Pct Tot	Pct Rgn	Pct Rgn	Pct Rgn	Pct Tot	Pct Tot	Pct Tot
HJOHSG10	VSAM	63	35.505 2.071	591.093	41	1.54	3.82%	35.59%	45.663%	26.418%	18.86%	25.641%	.337%
**Limit*		63	35.505 2.071	591.093	41	1.54	3.82%	35.59%	45.663%	26.418%	18.86%	25.641%	.337%
Rgn	1 *Tot	177	27.675 1.722	591.093	131	1.35	12.21%	100.00%	100.00%	57.854%	52.99%	56.153%	.739%
Database IWAIT Analysis (Sorted by Total IWAIT Elapsed time; LIMIT 10%)													
Region No. 2		From 28May2018 15.26.02.27 To 28May2018 15.37.17.06		Elapsed=		0 Hrs 11 Mins		14.792.118 Secs					
DDname	Type	IWAITs	Elap/IWAIT StdDev	Max IWAIT	Calls	IWAITs	Pct Tot	Pct Rgn	Pct Rgn	Pct Rgn	Pct Tot	Pct Tot	Pct Tot
HJOHSG10	VSAM	21	36.189 1.264	217.650	11	1.91	1.03%	25.93%	46.570%	.243%	6.29%	8.712%	.115%
**Limit*		21	36.189 1.264	217.650	11	1.91	1.03%	25.93%	46.570%	.243%	6.29%	8.712%	.115%
Rgn	2 *Tot	81	20.147 1.555	217.650	56	1.45	5.22%	100.00%	100.00%	.521%	24.25%	18.707%	.246%
Database IWAIT Analysis (Sorted by Total IWAIT Elapsed time; LIMIT 10%)													
Region No. 3		From 28May2018 15.26.04.12 To 28May2018 15.37.17.20		Elapsed=		0 Hrs 11 Mins		13.084.772 Secs					
DDname	Type	IWAITs	Elap/IWAIT StdDev	Max IWAIT	Calls	IWAITs	Pct Tot	Pct Rgn	Pct Rgn	Pct Rgn	Pct Tot	Pct Tot	Pct Tot
HJOHSG10	VSAM	26	34.669 1.187	198.331	18	1.44	1.68%	36.62%	44.178%	.323%	7.78%	10.333%	.136%
**Limit*		26	34.669 1.187	198.331	18	1.44	1.68%	36.62%	44.178%	.323%	7.78%	10.333%	.136%
Rgn	3 *Tot	71	28.738 1.849	390.802	47	1.51	4.38%	100.00%	100.00%	.731%	21.26%	23.390%	.308%
Database IWAIT Analysis (Sorted by Total IWAIT Elapsed time; LIMIT 10%)													
Region No. 4		From 28May2018 15.26.04.45 To 28May2018 15.28.03.74		Elapsed=		0 Hrs 1 Mins		59.288.831 Secs					
DDname	Type	IWAITs	Elap/IWAIT StdDev	Max IWAIT	Calls	IWAITs	Pct Tot	Pct Rgn	Pct Rgn	Pct Rgn	Pct Tot	Pct Tot	Pct Tot
HJVHS2XJ	VSAM	2	35.944 .044	37.514	2	1.00	.19%	40.00%	47.091%	.115%	.60%	.824%	.011%
**Limit*		2	35.944 .044	37.514	2	1.00	.19%	40.00%	47.091%	.115%	.60%	.824%	.011%
Rgn	4 *Tot	5	30.532 .384	41.861	5	1.00	.47%	100.00%	100.00%	.245%	1.50%	1.750%	.023%

Figure 208. Database IWAIT Analysis report by Region, Sequenced by Delay (with Limit)

DDgroup report

The DDgroup report presents for each specified DDgroup, an analysis of database IWAIT activity for the group and for each data set in the DDgroup. The DDgroup report is available from DB Monitor traces.

Uses

The DDgroup report provides information to analyze database IWAIT activity, and is an excellent way to analyze data set placement or database access method. For example, DDgroups could be established for each volume serial number, each IMS access method, the data set type, and so on. Figure 209 on page 398 shows a DDgroup based on access method type (VSAM). If it is known that access to VSAM databases should be random (GU calls), the expected IWAITs/Call ratio is approximately 1.0. In the sample however, one database (CKTLDSDI) has a ratio of 4.53. Either access is not through GU calls, or possibly synonym chains have

developed. You can verify this by referring to the PSB Details (Program Activity Detail reports) for the PCB names associated with the DDname.

Grouping in this way also makes it convenient to monitor guideline IWAIT times for different access methods. See the *IMS Performance Guide* for these guideline values.

Report options

To request the DDgroup report, activate the **DDname Grouping** global option in a Monitor Report Set and specify an Object List of **DDnames** or **DDname Groups**. Also activate the **Database IWAIT Summary** report or the **Database IWAIT Analysis** report.

Request the **Database IWAIT Summary** report to obtain the DDgroup report showing total statistics for each DDgroup (no details for DDnames).

Request the **Database IWAIT Analysis** report to obtain the DDgroup report showing statistics for each DDname within each DDgroup. Optionally, select **Print Distributions** and specify a Distribution for **Elapsed Time per IWAIT**. If a distribution is not specified, the sample Distribution DDIWELAP is used.

Report content

For each DDname group requested in the DDgroup report, a report identical in format to the Database IWAIT Summary report is presented. The report contains a summary of IWAIT activity for each DDname that is part of the group.

Elapsed time per IWAIT distribution graphs for each DDname, identical in format to the Database IWAIT Analysis distribution graphs, are always produced when DDname groups are specified.

For each DDname group, the report carries the heading "IWAIT Analysis DDgrp=xxxxxxx" where xxxxxxxx is a DDname group specified using the DDname Grouping Options panel.

IWAIT Analysis DDgrp=DEDB

DDname	Type	IWAITs	Elap/IWAIT	StdDev	Max IWAIT	Calls	IWAITs	Pct Tot	Pct Grp	Pct Grp	Pct Tot	Pct Tot	Pct Tot
			Sc.Mil.Mic	X Avg	Sc.Mil.Mic	Waiting	/Call	Calls	IWAITs	IWTElp	IWAITs	IWTElp	DLAEIp
DB23AR0	DEDB	5	3.517	.787	5.827	5	1.00	.68%	3.88%	5.167%	3.82%	4.955%	.059%
DB23AR1	DEDB	12	4.263	1.382	12.751	9	1.33	1.23%	9.30%	15.033%	9.16%	14.414%	.172%
DB23AR2	DEDB	34	0.631	3.471	9.402	34	1.00	4.64%	26.36%	6.301%	25.95%	6.042%	.072%
DB23AR3	DEDB	16	1.652	2.507	12.726	16	1.00	2.19%	12.40%	7.769%	12.21%	7.449%	.089%
DB23AR4	DEDB	3	10.386	.781	19.950	3	1.00	.41%	2.33%	9.156%	2.29%	8.779%	.105%
DB23AR5	DEDB	31	2.635	1.754	11.386	21	1.48	2.87%	24.03%	24.003%	23.66%	23.016%	.275%
DD01AR0	DEDB	28	3.958	1.230	14.039	21	1.33	2.87%	21.71%	32.571%	21.37%	31.231%	.373%
DEDB	*Grp	129	2.638	1.776	19.950	109	1.18	14.89%	100.00%	100.00%	98.47%	95.887%	1.144%

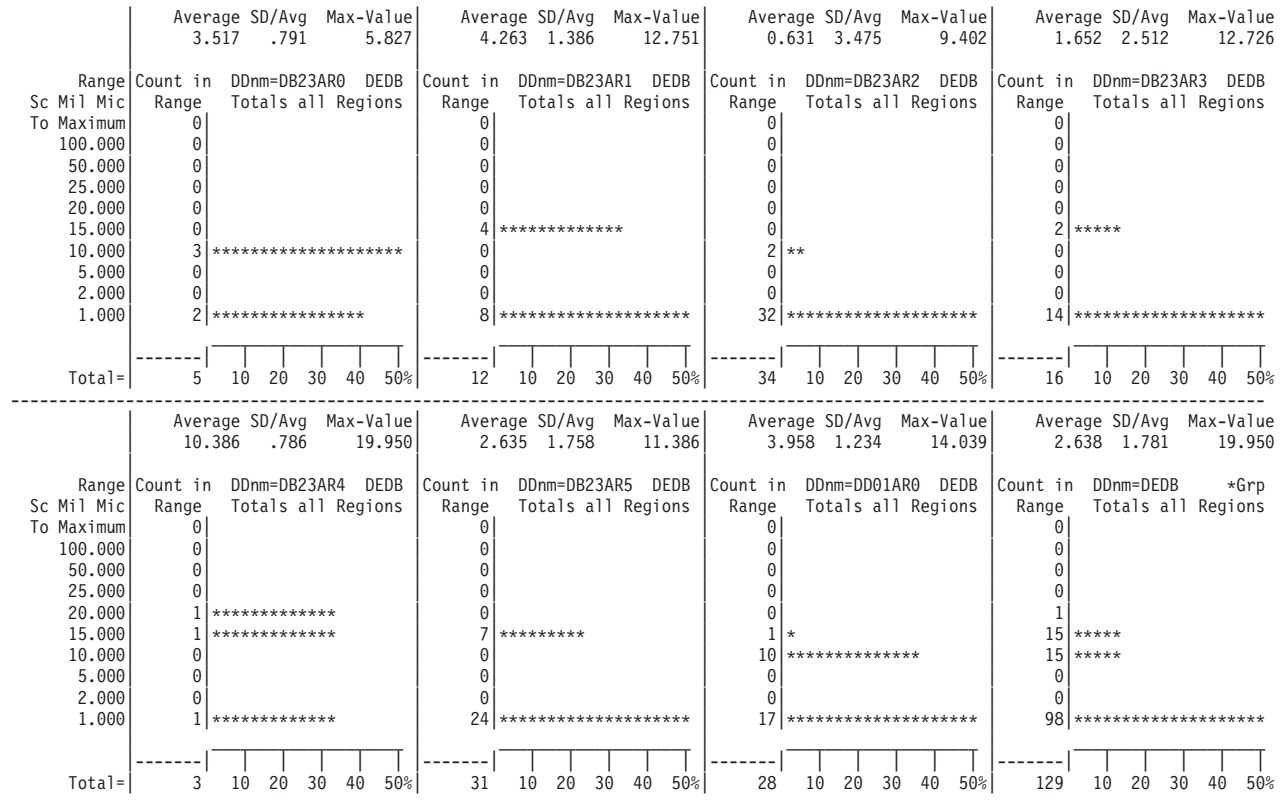


Figure 209. DDgroup report: DEDB group

IWAIT Analysis DDgrp=VSAM

DDname	Type	IWAITs	Elap/IWAIT	StdDev	Max IWAIT	Calls	IWAITs	Pct Tot	Pct Grp	Pct Grp	Pct Tot	Pct Tot	Pct Tot
DIMS01D1	VSAM	1	Sc.Mil.Mic	X Avg	Sc.Mil.Mic	Waiting	/Call	Calls	IWAITs	IWTElp	IWAITs	IWTElp	DLAE1p
CKTLDSOI	VSAM	154	17.323	.638	34.784	34	4.53	12.34%	36.23%	43.32%	13.54%	15.323%	.049%

VSAM	*Grp	376	15.874	.487	46.324	67	1.32	15.63%	100.00%	100.00%	16.43%	18.324%	.049%
------	------	-----	--------	------	--------	----	------	--------	---------	---------	--------	---------	-------

			Average	SD/Avg	Max-Value				Average	SD/Avg	Max-Value				Average	SD/Avg	Max-Value
			14.541	.000	14.541				17.323	.638	34.784				15.874	.487	46.324
Range			Count in	DDnm=DIMS01D1 VSAM		Count in			DDnm=CKTLDSOI VSAM		Count in			DDnm=VSAM		*Grp	
Sc	Mil	Mic	Range	Totals all Regions		Range	Totals all Regions		Range	Totals all Regions		Range	Totals all Regions				
To			0			0			0			0					
	100.000		0			0			0			0					
	50.000		0			1	*		1	*		1	*				
	25.000		0			31	*****		15	***		15	***				
	20.000		0			44	*****		0			0					
	15.000		1	*****		78	*****		174	*****		174	*****				
	10.000		0			0			0			186	*****				
	5.000		0			0			0			0					
	2.000		0			0			0			0					
	1.000		0			0			0			0					
Total=			1	----- 10 20 30 40 50%		154	----- 10 20 30 40 50%		376	----- 10 20 30 40 50%							

Figure 210. DDgroup report: VSAM group

Performance Exception reports

The Performance Exception reports provide a list report of performance exceptions, and summary reports of intent failures, pool space failures, or deadlock events.

- **Exception Listing.** A chronological listing of several types of exceptional occurrences including violations of performance thresholds for call elapsed time, IWAIT elapsed time, and number of IWAITs per call; and unusual occurrences such as BMP schedule failures, pseudo-schedules (schedules in progress), transaction backouts inferred, and terminations (incomplete schedules).
- **Intent Failure Summary.** Summary information on schedule failures due to PSB/DMB intent conflict.
- **Pool Space Failure Summary.** Summary information on failures of requests to reserve storage for pool space.
- **Deadlock Event Summary.** Summary information on deadlocks occurring in DMB segments.

Only the Exception Listing is available from DB Monitor data.

Monitor records: The Performance Exception reports are derived from the following monitor records:

- Exception Listing: 02–29, 38–39, 47–49, 56–65
- Intent Failure Summary: 80
- Pool Space Failure Summary: 82
- Deadlock Event Summary: 83, 86

Report options

To obtain the reports, activate **Performance Exceptions** in a Monitor Report Set, specify a DDname for the output data set, and select any number of the four reports: Exception Listing, Intent Failure Summary, Pool Space Failure Summary, Deadlock Event Summary.

For the Exception Listing, also specify the following options:

- **Ignore Schedules** to suppress printing of Created Schedule and Forced Schedule End lines in the Exception Listing report. See “Type 2 Event Entries” on page 403 for further details.
- The threshold values for call elapsed time, IWAIT elapsed time and IWAITs per call. Any performance exceeding these values causes a corresponding exception entry to be generated.

Alternatively, the threshold values can be specified using Distributions. Select **Include Distributions in Reports** from the Monitor Global Options panel and specify one or more of the following Distributions. The upper limit of the Distribution defines the threshold value for the corresponding exception entry in the report:

Exception Entry

Distribution

Call Elapsed

Elapsed Time per Call

IWAIT Elapsed

Elapsed Time per IWAIT

IWAITs per Call

IWAITs per Call

The threshold value specified on the Performance Exceptions panel takes precedence. If these are not specified, and the Distributions also are not specified, this type of exception item cannot be produced.

- Maximum number of pages to be printed.

The **ESAF Integration** option is applicable to the Exception Listing.

Report content and uses: Exception Listing

The Exception Listing report is a detailed record of two types of exception events.

The reported events are:

1. Each occurrence of a DL/I call in which either the call elapsed time, a single IWAIT elapsed time, or the number of IWAITs experienced by the call exceeded the specified exception value.
2. Each occurrence of an unusual scheduling or termination event, for example:
 - Schedules created by IMS PA for transactions in process at trace start time
 - Terminations forced by IMS PA for transactions in process at trace end time
 - BMP schedule failures
 - Transaction backouts inferred by IMS PA

This example report shows some of the exceptions that might occur.

Report from 31Jul2014 14:24:55:85

IMS 14.1.0

IMS Performance Analyzer 4.4
Exception Listing

Page	1	PSBname	Trancode	Scheduled at	in	Rgn	PCBname	Func	Sc	Seg	Fdbk	Call #	Call/IWT St	Call/IWT El	IWTs
Excd Call Elapsed		ZRGCS01	-ZRGCS01	14Jun 09.25.10.24		13	ZRGC01DD	GU		GC01SEG	01	3 +	1.599.988	1.196.821	3
Excd Call Elapsed		ZRGCS01	-ZRGCS01	14Jun 09.25.10.24		13	COCRR01	GU		COCRR01	01	4 +	2.797.145	4.088.958	2
Excd Call Elapsed		ZRGCS01	-ZRGCS01	14Jun 09.25.10.24		13	ZRGC02DD	GU		GC01SEG	01	8 +	7.647.012	1.188.937	4
Excd Call Elapsed		ZRGC002	-ZRGC002	14Jun 09.25.29.05		13	ZRGCINSP	GU		ZRGCIN01	01	1202 +	4.873.007	1.914.730	3
Excd Call Elapsed		ZRGC002	-ZRGC002	14Jun 09.25.29.05		13	COCXRFDD	ISRT		COCXRF02	02	1205 +	6.901.035	1.237.629	1
Excd Call Elapsed		ZRSCXDR	-RSCXDR	14Jun 09.25.36.52		14	LOCREFDD	GU		LOCREF02	02	5 +	1.326.465	12.409.464	6
DD=LOCINDDI VSAM		ZRSCXDR	-RSCXDR	14Jun 09.25.36.52		14	LOCREFDD	GU		LOCREF02	02	5 +	8.305.755	3.302.570	6
DD=LOCINDDI VSAM		ZRSCXDR	-RSCXDR	14Jun 09.25.36.52		14	LOCREFDD	GU		LOCREF02	02	5 +	11.629.014	1.535.824	6
Excd Call Elapsed		ZRGC002	-ZRGC002	14Jun 09.25.29.05		13	CKTTGMDD	GU		CKTTGM05	02	1215 +	9.623.361	11.636.848	6
Excd Call Elapsed		ZRGC002	-ZRGC002	14Jun 09.25.29.05		13	CKTTGMDD	GU		CKTTGM03	02	1223 +	21.432.949	6.075.017	2
Excd Call Elapsed		ZRSCXDR	-RSCXDR	14Jun 09.25.36.52		14	FEPUTLDI	GU		FEPUTL01	01	15 +	13.942.526	6.464.565	5
Excd Call Elapsed		ZRSCXDR	-RSCXDR	14Jun 09.25.36.52		14	F1SUBPDP	GU		@SUBP1	01	18 +	20.556.658	12.092.247	4
DD=F1SUBPDI VSAM		ZRSCXDR	-RSCXDR	14Jun 09.25.36.52		14	F1SUBPDP	GU		@SUBP1	01	18 +	30.551.609	1.505.862	4
Excd Call Elapsed		ZRSCXDR	-RSCXDR	14Jun 09.25.36.52		14	CKTXRFDD	GU	GE		00	30 +	32.854.123	14.860.144	15
DD=CKTXRFDI VSAM		ZRSCXDR	-RSCXDR	14Jun 09.25.36.52		14	CKTXRFDD	GU	GE		00	30 +	37.512.582	1.527.260	15
DD=ZRC1LZDI VSAM		ZRSCXDR	-RSCXDR	14Jun 09.25.36.52		14	CKTXRFDD	GU	GE		00	30 +	41.419.089	1.671.658	15
:															
Created Schedule		VKTBLDDP-		14Jun 12.15.41.40		22	to 12.15.46.79			1 Trans		Term Ct=	0		
Excd Call Elapsed		VKSIBLD -		14Jun 12.16.13.42		22	VKS1XXDD	GU		S1XXDD01	01	1 +	2.778.156	7.623.341	14
Excd Call Elapsed		VKSIBLD -		14Jun 12.16.13.42		22	VKS1XXDD	ISRT		S1XXDD01	01	118 +	14.899.879	2.908.061	2
Created Schedule		VKSIBLD -		14Jun 12.16.13.42		22	to 12.16.49.03			1 Trans		Term Ct=	0		
Created Schedule		%PSB0001-%Tran		14Jun 14.37.03.86		1	to 15.07.01.37			1 Trans		Term Ct=	76		

Figure 211. Performance Exceptions report: Exception Listing

The sample report in Figure 212 includes External Subsystem calls that exceed the Call or IWAIT thresholds.

Report from 25Jun2018 14.45.00.04

IMS 15.1.0

IMS Performance Analyzer 4.4
Exception Listing

Report to 25Jun2018 14.45.00.04

Page	23	PSBname	Trancode	Scheduled at	in	Rgn	PCBname	Func	Sc	Seg	Fdbk	Call #	Call/IWT St	Call/IWT El	IWTs
Too many IWAITS		RMZIOIS1-RMZITIS1		25Jun 14.54.52.47		22	I/O PCB	ASRT				78 +	0.391.646	1.158	1
Too many IWAITS		RMZIOLOG-RMZITLOG		25Jun 14.54.52.82		35	RMZILGDP	ISRT		RMZILG01	01	2 +	0.033.020	39.331	2
DD=RMZILGDP VSAM		RMZIOLOG-RMZITLOG		25Jun 14.54.52.82		35	RMZILGDP	ISRT		RMZILG01	01	2 +	0.036.992	16.905	2
DD=RMZILGDP VSAM		RMZIOLOG-RMZITLOG		25Jun 14.54.52.82		35	RMZILGDP	ISRT		RMZILG01	01	2 +	0.054.012	17.819	2
Too many IWAITS		RMZIOIS1-RMZITIS1		25Jun 14.54.52.97		23	RMCS00DE	GU		RMMSCS05	02	3 +	0.052.023	42.284	1
DD=RMCS275 VSAM		RMZIOIS1-RMZITIS1		25Jun 14.54.52.97		23	RMCS00DE	GU		RMMSCS05	02	3 +	0.052.098	42.135	1
Too many IWAITS		RMZIOIS1-RMZITIS1		25Jun 14.54.52.97		23	P211 (E) Signon			S00	00	6 +	0.226.807	0.084	1
Too many IWAITS		RMZIOIS1-RMZITIS1		25Jun 14.54.52.97		23	P211 (E) Create Thrd			CT0	00	6 +	0.226.954	0.591	1
Too many IWAITS		RMZIOIS1-RMZITIS1		25Jun 14.54.52.97		23	P211 (E) Normal Call			PR0	00	6 +	0.227.609	17.180	1
DD=P211 (E)		RMZIOIS1-RMZITIS1		25Jun 14.54.52.97		23	P211 (E) Normal Call			PR0	00	6 +	0.227.609	17.180	1
Too many IWAITS		RMZIOIS1-RMZITIS1		25Jun 14.54.52.97		23	RMMSSNDX	GU	GE		00	10 +	0.245.062	23.999	1
DD=RMMSSNDX VSAM		RMZIOIS1-RMZITIS1		25Jun 14.54.52.97		23	RMMSSNDX	GU	GE		00	10 +	0.246.898	22.050	1
Excd Call Elapsed		RMZIOIS1-RMZITIS1		25Jun 14.54.52.97		23	I/O PCB	CHNG				17 +	0.269.417	2.612	0
Excd Call Elapsed		RMZIOLOG-RMZITLOG		25Jun 14.54.53.23		35	I/O PCB	GU				1 +	0.000.000	13.554	0
Too many IWAITS		RMZIOIS1-RMZITIS1		25Jun 14.54.52.97		23	I/O PCB	GU				23 +	0.272.889	10.079	1
Too many IWAITS		RMZIOIS1-RMZITIS1		25Jun 14.54.52.97		23	RMCS00DE	GU		RMMSCS05	02	24 +	0.283.104	14.977	1
DD=RMCS052 VSAM		RMZIOIS1-RMZITIS1		25Jun 14.54.52.97		23	RMCS00DE	GU		RMMSCS05	02	24 +	0.283.164	14.846	1
Too many IWAITS		RMZIOIS1-RMZITIS1		25Jun 14.54.52.97		23	P211 (E) Signon			S00	00	28 +	0.298.470	0.613	1
Too many IWAITS		RMZIOLOG-RMZITLOG		25Jun 14.54.53.23		35	RMZILGDP	ISRT		RMZILG01	01	2 +	0.013.606	47.051	2
DD=RMZILGDI VSAM		RMZIOLOG-RMZITLOG		25Jun 14.54.53.23		35	RMZILGDP	ISRT		RMZILG01	01	2 +	0.016.202	21.073	2
DD=RMZILGDP VSAM		RMZIOLOG-RMZITLOG		25Jun 14.54.53.23		35	RMZILGDP	ISRT		RMZILG01	01	2 +	0.037.414	20.525	2
Too many IWAITS		RMZIOIS1-RMZITIS1		25Jun 14.54.52.97		23	P211 (E) Normal Call			PR0	00	28 +	0.299.148	37.702	1
DD=P211 (E)		RMZIOIS1-RMZITIS1		25Jun 14.54.52.97		23	P211 (E) Normal Call			PR0	00	28 +	0.299.148	37.702	1
Excd Call Elapsed		RMZIOIS1-RMZITIS1		25Jun 14.54.52.97		23	RMMSSNDX	GU	GE		00	32 +	0.337.138	5.264	0
Excd Call Elapsed		RMZIOIS1-RMZITIS1		25Jun 14.54.52.97		23	I/O PCB	CHNG				39 +	0.342.747	2.562	0
Excd Call Elapsed		RMZIOLOG-RMZITLOG		25Jun 14.54.53.30		35	I/O PCB	GU				1 +	0.000.000	14.277	0
Too many IWAITS		RMZIOIS1-RMZITIS1		25Jun 14.54.52.97		23	I/O PCB	GU				45 +	0.346.839	10.313	1

Figure 212. Performance Exceptions report: Exception Listing with ESAF Integration

The heading line is applicable to type 1 events:

Page Page number of the Exception Listing report.

PSBname Trancode

PSB-transaction code that issued the associated call.

Scheduled at

Date and time at which the application program that issued the call was scheduled. This information makes it possible to request a Program Trace of this specific schedule at a later time.

In Rgn

Number of the region into which the application program was scheduled.

PCBname

PCB name associated with this call. If ESAF Integration is activated, this can be the External Subsystem name, suffixed with (E) to distinguish it from a DL/I PCB name.

Func Sc Seg Fdbk

Call function, Status code, Segment name and Database level associated with this call. If ESAF Integration is activated, the Function Code field is the ESAF call type, followed by its associated module ID, and then the return code.

Call # Sequence number of the associated call in the schedule.

Call/IWT St

Offset time (seconds.milliseconds.microseconds) of the start of the associated call or IWAIT from the beginning of the schedule.

Call/IWT El

Elapsed time of the call or IWAIT (seconds.milliseconds.microseconds).

IWTs Number of IWAITs experienced by this call.

Each entry in the Exception Listing report presents additional information which depends on the type and nature of the event:

Type 1 Event Entries:

This is an explanation of the type 1 exception events reported by IMS PA.

The nature of the type 1 events is indicated to the far-left of each entry:

Excd Call Elapsed

DL/I call whose elapsed time exceeded the specified **Elapsed Time per Call** threshold value.

Excessive DL/I call elapsed times can be associated with other problem indicators for which a tuning change could be effective. Consistently long call times could be an extension of consistently long database IWAIT times, multiple IWAITs per call, or a general lack of CPU resources. Long call times logically result from program isolation enqueues (this can be correlated with the IMS PA Enqueue/Dequeue Trace reports).

DD=DDname meth

I/O IWAIT that had an elapsed time greater than the specified **Elapsed Time per IWAIT** threshold value. The four character field *meth* to the right of the *DDname* is the data set type (access method) for which the IWAIT occurred, and is either OSAM, VSAM, HSAM, DEDB, or QMGR. Additional data is as described for the heading line for type 1 events with the exception that the offset and elapsed time values refer to this IWAIT, rather than the associated DL/I call.

Unusually long I/O IWAITs can indicate a variety of problems. If average IWAITs are exceeding the expected IWAIT, which will vary by data set type (OSAM, VSAM) or purpose (INDEX, DATA), data set contention or placement may be the problem. High IWAIT times can indicate shared DASD interference. A GTF or RMF analysis report tool may be needed to identify the specific problem. The DDgroup facility of IMS PA can help localize the problem. Long IWAIT elapsed times can also be caused by an insufficient DMB pool causing frequent open activity. Other possible causes also exist, such as the OSAM write check option.

DD=nnnn pool

IWAIT for storage that had an elapsed time greater than the specified **Elapsed Time per IWAIT** threshold value. The number *nnnn* is the number of bytes requested from the storage pool designated by *pool*. Additional data is as described for the heading line for type 1 events with the exception that the offset and elapsed time values refer to this IWAIT, rather than the associated DL/I call.

Too Many IWAITs

DL/I call that experienced more IWAITs than the number specified as the **IWAITs per Call** threshold value.

The number of I/O IWAITs resulting from a database call is an important indication of database design and organization efficiency. An exceptional number of IWAITs per call against a database can indicate the development of long physical twin chains or a deteriorating organization, especially when this number increases over time. Excessive IWAITs per call can also indicate ineffectively designed logical relationships or secondary indexes. DBT can help you analyze twin chains or reorganization requirements. The IMS PA PSB Details reports and Program Trace report can help you determine the I/O profile for the application. Further analysis should help you determine whether the I/O profile can be improved through a more efficient DL/I call pattern.

Type 2 Event Entries:

This is an explanation of the type 2 exception events reported by IMS PA.

The type 2 exception event entries have no heading line and the additional information depends on the nature of the event as indicated to the far-left of the entry:

Created Schedule

Schedule created by IMS PA to account for a transaction that was in progress at trace start time or a BMP that does not access the IMS message queues.

For this entry, the additional data displayed is:

- Assigned (unknown) PSB name and transaction code, in the format %PSB00*nn-trancode*
- Date and time at which this schedule began
- Region number
- Time at which this schedule ended
- Number of transactions dequeued since trace start time (including those in progress at trace start), in the format *nn* Trans
- Number of transactions processed in the actual complete IMS schedule, including those not seen before trace start, in the format Term Ct=*nn*

A pseudo-schedule or transaction is created by IMS PA for either of two reasons:

- The schedule was in progress at the beginning of the reporting interval.
- No transactions were dequeued, that is, a GU to the IOPCB with blank status code was not the first call recorded in the dependent region (this situation is typical of BMPs).

An Exception Listing report appears for each schedule/transaction created by IMS PA. The entries can be used to identify occurrences of BMP activity in an IMS system.

To suppress printing of Created Schedule lines, see “Report options” on page 400.

Forced Schedule End

Termination created by IMS PA to account for application programs in execution at trace end time.

The additional data displayed for this entry is:

- PSB name and transaction code
- Date and time at which this schedule began
- Region number
- Time at which this schedule ended (pseudo end)
- Number of transactions dequeued up to the point of forced termination, in the format *nn* Trans

If the IMS PA reporting interval ends before receiving a monitor record indicating the end of a schedule in the dependent region, IMS PA forces the end of the schedule.

To suppress printing of Forced Schedule End lines, see “Report options” on page 400.

***BMP Failed in Schd**

Failure to schedule a BMP. The additional data displayed for this entry is:

- PSB name and transaction code
- Date and time at which the attempted schedule began
- Region number

Even though a BMP has entered the system, the IMS control region may refuse to schedule it. For example, the master terminal operator may have stopped the PSB or databases required by the BMP.

Transaction Backout

Execution of an application program for which the IMS PA count of transactions dequeued does not agree with the count given by the IMS monitor termination record. Transaction backout is inferred. The additional data displayed for this entry is the same as that given for **Created Schedule**.

The IMS Monitor does not record IMS transaction backouts. However, IMS PA assumes a backout has occurred if the number of transactions dequeued is less than the number of transactions processed.

IMS PA counts the number of GU calls to the IOPCB that result in a blank status code. This number is compared to the number of messages dequeued as reported in the following IMS monitor records:

- BMP termination start (code 04)
- Message scheduling start (code 10)

If the number of messages dequeued is smaller than the number of transactions counted, IMS PA assumes that one or more transaction backouts have occurred and makes an entry in the Exception Listing report.

The transaction backout determination logic is ignored if any of the following conditions exist at schedule end:

- A pseudo-schedule end was forced by IMS PA because there was no BMP termination start or message scheduling start record.
- There is processing in a WFI region.
- A pseudo-schedule or transaction was created by IMS PA.

Report content: Intent Failure Summary

This is an example of the Performance Exceptions Intent Failure Summary report. It provides the summary information on schedule failures due to intent conflict for the combination of PSBs and DMBs.

If there are no intent conflicts during the reporting period, the report is not produced.

Report from 22Jun2018 14.03.21.55		IMS 15.1.0	IMS Performance Analyzer 4.4	Report to 22Jun2018 14.04.57.18	
Intent Failure Summary					
From 22Jun2018 14.03.34.15 To 22Jun2018 14.04.36.34		Elapsed=		0 Hrs	1 Mins 2.185.734 Secs
PSB Name	DMB Name	Count			
BMP255	DH41SK01	2			
DDLTRN15	DH41ST01	5			
DDLTRN16	DH41ST01	7			
MPP01	DMB52FIN	3			
Total for	DH41SK01	2			
Total for	DH41ST01	12			
Total for	DMB52FIN	3			
*** Total ***		17			

Figure 213. Performance Exceptions report: Intent Failure Summary

The report contains the following data items:

PSB Name

The name of the PSB being reported.

DMB Name

The name of the DMB being reported.

Count The number of schedule failures.

Report content: Pool Space Failure Summary

The Performance Exceptions Pool Space Failure Summary report presents, by Pool ID, the number of attempts that failed to reserve pool space due to unavailable storage. During the reporting period, if no attempts failed to reserve storage for pool space, the report is not produced.

Report from 22Jun2018 14.03.21.55	IMS 15.1.0	IMS Performance Analyzer 4.4	Report to 22Jun2018 14.14.57.18
Pool Space Failure Summary			
From 22Jun2018 14.03.34.15	To 22Jun2018 14.14.36.34	Elapsed=	0 Hrs 10 Mins 2.185.734 Secs
Pool ID	Bytes req.	Count	
DLDP	12561	1	
DLHP	4325	2	
DLMP	95697	1	
*** Total ***		4	

Figure 214. Performance Exceptions report: Pool Space Failure Summary

The report contains the following data columns:

Pool ID

The ID of the pool being reported.

Bytes req.

The number of bytes requested as pool space.

Count The number of failed attempts for pool space.

Report content: Deadlock Event Summary

This is an example of the Performance Exceptions Deadlock Event Summary report. It presents information on the number of deadlocks which occurred in DMB segments.

If no deadlocks occurred during the reporting period, the report is not produced.

Deadlocks occurring in the IRLM environment are not included in this report.

Report from 08Jun2018 13.06.12.71	IMS 15.1.0	IMS Performance Analyzer 4.4	Report to 08Jun2018 13.10.39.26
Deadlock Event Summary			
From 08Jun2018 13.07.20.93	To 08Jun2018 13.09.52.00	Elapsed=	0 Hrs 2 Mins 31.070.446 Secs
Winning PSB	Losing PSB	DMB Name	Area Name Count
BMPFPE05	BMPFPE06	DEDBJN23	DB23AR5 1
BMPFPE06	DDLTD01	DEDBJN23	DB23AR5 3
BMPFPE06	DDLTD01	DIMSRN01	1
BMPFPE06	DDLTLN20	DEDBJN23	DB23AR5 1
DDLTRN24	DDLTRN14	DEDBJN23	DB23AR3 1
*** Total ***			7

Figure 215. Performance Exceptions report: Deadlock Event Summary

The report contains the following data columns:

Winning PSB

The program that requested and won access.

Losing PSB

The program that was backed out.

DMB Name

The DMB name related to the deadlock.

Area Name

The name of the area related to the deadlock (FP only).

Count The number of deadlocks.

Enqueue/Dequeue Trace report

The Enqueue/Dequeue Trace report is a detailed trace of the database enqueue conflicts occurring during the reporting interval. A detail line is printed for each enqueue IWAIT interval recorded on the monitor data set. The PSB names active in the IMS region during the interval are displayed.

This report is not available from DB Monitor data.

Monitor records: This report is derived from monitor records 66, 67.

Report options

To obtain the Enqueue/Dequeue Trace report, activate the **Enqueue/Dequeue Trace** report from the Monitor Report Set panel, and specify a DDname for the output data set for this report.

You can request any combination of the following reports:

- Detailed Trace
- Summary by Database
- Summary by Transaction Code

If none are selected, the two Summary reports are produced by default.

The **Alternate Sequencing** Option is applicable to the Summary reports.

Report content: Detailed Trace

This is an example of the Enqueue/Dequeue detailed trace report.

Report from 17Feb2018 10.15.00.14		IMS 15.1.0		IMS Performance Analyzer 4.4				Report to 17Feb2018 10.15.00.14	
<u>Enqueue-Dequeue Trace</u>									
Date = 17Feb2018		-- Waiting --		----- Active Transactions and Regions -----					
Time	Database Seg	Tran*****Rgn	ENQ	elapsed	Tran*****Rgn	Tran*****Rgn	Tran*****Rgn	Tran*****Rgn	Tran*****Rgn
10.15.01.547	CKTTGMDD 1	TRAN0001 12		4.006	TRAN0001 1	TRAN0002 2	TRAN0003 3	TRAN0004 4	TRAN0005 5
					TRAN0011 11	TRAN0012 12	TRAN0013 13	TRAN0014 14	TRAN0015 15
10.15.02.574	CKTTGMDD 5	TRAN0099 99		12.324	TRAN0001 1	TRAN0002 2	TRAN0003 3	TRAN0004 4	TRAN0005 5
					TRAN0011 11	TRAN0012 12	TRAN0013 13	TRAN0014 14	TRAN0015 15

Figure 216. Enqueue/Dequeue Trace report

The Enqueue/Dequeue Trace report contains the following information:

Time	Time (with millisecond precision) at which the enqueue IWAIT began or ended.
-------------	--

Database

DMB name for which the contention occurred.

Seg

Physical segment code in the database to which access was requested. If one or more enqueue IWAITS start before a previous one is finished, this field contains END when the IWAIT is complete.

Waiting

The Transaction Code and Region ID that is waiting.

ENQ elapsed

Elapsed time (seconds.milliseconds.microseconds) of the IWAIT. If one or more enqueue IWAITs start before a previous one is finished, this field is blank on the start enqueue trace entry; the elapsed time appears on the END entry.

Active Transactions and Regions

An array of transactions that were active at the time of the enqueue IWAIT in IMS dependent regions. The Transaction Codes are reported with their Region IDs. Up to five transactions are reported across the page. If required, the reporting continues onto extra lines to ensure that all active transactions are shown. A Transaction Code that begins with a percent sign (%) indicates an unknown Transaction Code (the transaction was already active when the reporting period began).

Report content: Summary by Database

This is an example of the Enqueue/Dequeue Summary by Database trace report.

The Summary by Database is collated by:

- Database/Segment
- Waiting Transaction Code

```
Report from 17Feb2018 10.15.00.14      IMS 15.1.0  IMS Performance Analyzer 4.4      Report to 17Feb2018 10.15.00.14
                                     Enqueue-Dequeue Summary by Database

Database Seg  Waiting
              Trancode   Count   Average   Std Dev   Maximum
CKTTGMDD    1  TRAN0001    127    12.431    0.123    16.121
              2  TRAN0002    233    13.344    0.225    18.676
** Total **                360    12.876    0.234    18.676
```

Figure 217. Enqueue/Dequeue Trace report: Summary by Database

A **** Total **** line is printed for the total of all (100%) of the data.

If Alternate Sequencing is requested:

- The report header is suffixed by **Sorted by Total IWAIT Elapsed time** as Delay is the only sequence applicable to this report
- If a number or percentage (less than 100%) Limit is specified:
 - The report header is also suffixed by **LIMIT nn** or **LIMIT nn%**
 - A **** Limit **** line is printed for the total of the reported (limited) data only.

```
Report from 25Jun2018 14.45.00.04      IMS 15.1.0  IMS Performance Analyzer 4.4      Report to 25Jun2018 14.54.59.99
                                     Enqueue-Dequeue Summary by Database (Sorted by Total IWAIT Elapsed time; LIMIT 90%)

Database Seg  Waiting
              Trancode   Count   Average   Std Dev   Maximum
RMZILGDP    1  RMZIOLOG      6    39.486    0.392    57.069
              0  RMZIOLOG     12     7.524    3.200    87.380
** Limit **                18    18.178    1.448    87.380
** Total **                18    18.178    1.448    87.380
```

Figure 218. Enqueue/Dequeue Trace report: Summary by Database, Sequenced by Delay (with Limit)

Report content: Summary by Transaction Code

This is an example of the Enqueue/Dequeue Summary by Transaction Code trace report.

The Summary by Transaction Code is collated by:

- Waiting Transaction Code
- Database/Segment

A **** Total **** line is printed for the total of all (100%) of the data.

Report from 17Feb2018 10.15.00.14				IMS 15.1.0	IMS Performance Analyzer 4.4	Report to 17Feb2018 10.15.00.14	
<u>Enqueue-Dequeue Summary by Trancode</u>							
Waiting				-- Enqueue IWAIT Elapsed Time --			
Trancode	Database Seg	Count		Average	Std Dev	Maximum	
TRAN0001	CKTTGMDD 1	127		12.431	0.123	16.121	
	CKTTGMDD 2	233		13.344	0.225	18.676	
** Total **		360		12.876	0.234	18.676	

Figure 219. Enqueue/Dequeue Trace report: Summary by Transaction Code

If Alternate Sequencing is requested:

- The report header is suffixed by **Sorted by Total IWAIT Elapsed time** as Delay is the only sequence applicable to this report
- If a number or percentage (less than 100%) Limit is specified:
 - The report header is also suffixed by **LIMIT nn** or **LIMIT nn%**
 - A **** Limit **** line is printed for the total of the reported (limited) data only.

Report from 25Jun2018 14.45.00.04			IMS 15.1.0	IMS Performance Analyzer 4.4	Report to 25Jun2018 14.54.59.99	
<u>Enqueue-Dequeue Summary by Trancode (Sorted by Total IWAIT Elapsed time; LIMIT 90%)</u>						
Waiting			-- Enqueue IWAIT Elapsed Time --			
Trancode	Database Seg	Count	Average	Std Dev	Maximum	
RMZIOLOG	RMZILGDP 1	6	39.486	0.392	57.069	
	RMZILGDP 0	12	7.524	3.200	87.380	
** Limit **		18	18.178	1.448	87.380	
** Total **		18	18.178	1.448	87.380	

Figure 220. Enqueue/Dequeue Trace report: Summary by Transaction Code, Sequenced by Delay (with Limit)

Region Histogram report

The Region Histogram report traces region activity by time interval. Activity for up to 13 regions is presented graphically in side-by-side format. Periods of region activity and inactivity can be seen at a glance from the visual presentation.

The Region Histogram cannot be produced from DB Monitor traces.

Monitor records: This report is derived from monitor records 02–05, 10–17, 20–29, 60–65.

Uses

The Region Histogram is a valuable aid in analyzing interrelationships of program activity in the IMS system. You might refer to this report for a variety of reasons. For example, effects of insufficient resources determined from the Region Summary or Total System IWAIT Summary reports may be reflected as periods of region inactivity in the histogram. Insight into spontaneous response time problems may be gained by selecting a histogram during the associated time period. Excessively long scheduling periods may reflect program isolation interference.

Note: Schedules in progress at the start of the reporting interval do not appear on the histogram.

Report options

To request the Region Histogram report, select **Region Histogram** in a Monitor Report Set. Due to the detailed nature of this report, substantial output can result. Select the report options carefully to control the volume of output.

The report options are:

- Time interval for the histogram
- DDname of the report output
- Time interval between output lines
- Flag this schedule if the average CPU time per transaction exceeds the specified value
- The number of duplicate lines to print before condensing duplicates
- Region ID by PST Object List specifying the regions to be graphed

Report content

The Region Histogram report produced from IMS Monitor data provides at least one detail line for each time interval and up to 13 columns for up to 13 regions.

REGION HISTOGRAM

Schedule Start shows Trancode. Termination shows Msgs DEQd, Msgs on Q at start(*=exceeded CPUtime limit per Msg)

[illegible]

Figure 221. Region Histogram (Monitor) report

The histogram column headings are:

Time Time interval.

 $1, 2, 3, \dots, nnn$

IMS region number, up to a maximum of 13 regions.

CKPT START and STOP in this column mean the beginning and end of an IMS checkpoint.

For each time interval, the activity (or inactivity) of each region is shown. If multiple events for a region occur in the time interval, a detail line is printed for each event. Checkpoints are noted in the far right-hand column of the report.

Activity (or inactivity) in each region for each time interval is shown as follows:

Region inactive

A row of dashes (-----) is shown.

Schedule start

The transaction code of the transaction for which the region is scheduled is shown. Example:

DRC@TR04

Region active

Blank rows represent time intervals in which the region is active.

Schedule end

The number of messages enqueued at the time of schedule end (MPR schedule start) time is shown on the left; this value excludes primed messages and, therefore, may be zero. The number on the right is CPU time. If the average CPU time per transaction for the transactions processed during this schedule exceeds the value specified on the **CPU/Transaction Limit** option on the Region Histogram panel, an asterisk * is appended. Example:

2 3*

Deadlock event

A deadlocked pair of enqueue requests detected by IMS and recorded by the IMS monitor is indicated for each region involved by DDLCKW (requestor) or DDLCKL (loser).

If all activity is identical to previous time intervals, Same to next line is shown, as controlled by the **Duplicate Line Limit** option specified on the Region Histogram panel.

System Analysis reports

The System Analysis reports provide a summary and detailed account of the IWAIT activity of the entire IMS system. The reports in this category are the Total System IWAIT Summary and Total System IWAIT Detail.

Reported IWAIT events include:

- System data sets
- Databases (Full Function and Fast Path)
- ACBLIB Block loading
- Message Format services
- Scheduler
- Checkpoints
- Line/VTAM node
- Storage Pools
- MSC

Total System IWAIT Summary report

The Total System IWAIT Summary report describes the IWAIT activity for the entire IMS system including system data sets, databases (full function and Fast Path), block loading, format services, scheduler, checkpoints, line/node IWAITs, pools, multiple system transfers.

Elapsed time per IWAIT distribution graphs for each category can be requested.

Note that other IMS PA reports only present IWAITs directly associated with application program activity in the dependent regions.

Uses:

The Total System IWAIT Summary report is compact and informative. A brief time spent with the report may provide a number of areas in which corrective action is required. SHMSG/LGMSG queue data set balance or imbalance can be deduced.

Database IWAIT counts may be higher than those shown in the dependent region Database IWAIT Summary because of sync point processing or use of the VSAM Background Write facility.

A high number of block loading IWAITs should be investigated using the Total System IWAIT Detail report for the appropriate type of block.

A high number of Message Format directory IWAITs may suggest that you should use the \$IMSDIR facility to force resident indexes. A high number of MFS block I/Os may suggest that you should review MFS pool allocations, the number of FREs, or both. If the average IWAIT elapsed time for queue data sets versus MFS times are significantly different, then a data set placement problem may be responsible. All of these are OSAM direct data sets and should require approximately the same access time.

A large number of scheduler IWAITs probably indicates a serious bottleneck resulting from insufficient scheduling of pool resources.

The Line/Node IWAITs section is generally not useful for communications analysis. The IWAIT count could be a rough indication of line loading, but other more accurate sources of communications data should be referenced.

Monitor records: This report is derived from monitor records 14–19, 22–33, 36–37, 40–41, 44–45, 50–51, 54–57, 66–73.

Report options

To obtain the Total System IWAIT Summary report, select **Total System IWAIT** on the Monitor Report Set panel then select **Total System IWAIT Summary** and specify a DDname for the report output.

To add distribution graphs to the report, specify a Distribution for **Elapsed Time per IWAIT**. The sample Distribution **IWTSUMMY** is provided.

Report content

This is an example of the Total System IWAIT Summary report.

The Total System IWAIT Summary report is presented in two sections printed side by side. **I/O IWAITs**, the left-hand section, presents the types of IWAITs for which specific I/O activity can be identified. **NON I/O IWAITs**, the right-hand section,

presents the types of IWAITS for which no specific I/O activity can be identified (such as line/node interrupts). VSAM IWAITS greater than the **Min VSAM IWAIT** value specified on the Monitor Global Options panel, are reported in the **NON I/O IWAITS** section. The same column headings are provided for both sections.

Report from 10Jun2018 16.45.54.75	IMS 15.1.0	IMS Performance Analyzer 4.4					Report to 10Jun2018 17.17.14.75									
Total System IWAIT Summary																
	I / O			I W A I T S				N O N			I / O			I W A I T S		
	Count	Elap/IWAIT Sc.Mil.Mic	StdDv X Avg	Max value Sc.Mil.Mic	Pct of IWAITS	Pct of IWT Elp		Count	Elap/IWAIT Sc.Mil.Mic	StdDv X Avg	Max value Sc.Mil.Mic	Pct of IWAITS	Pct of IWT Elp			
System Data Sets																
SNAP QUEUE	1	5.185.411	.000	5.185.411	1.18%	82.55%										
LGMSG	67	13.368	2.289	190.376	78.82%	14.26%										
QBLKS	2	2.187	.949	4.263	2.35%	.07%										
SHMSG	2	3.501	.967	6.887	2.35%	.11%										
Database IWAITS																
OSAM	55	3.000	1.572	24.225	25.35%	21.17%										
HSAM							577	2.774	.544		15.835	28.35%	1.26%			
VSAM	6	12.720	.189	14.638	3.64%	10.45%										
VSAM							52	0.941	1.087		3.762	2.49%	.04%			
DEDB(Read)	54	8.022	.906	20.823	52.94%	55.86%										
DEDB(Write)	22	4.959	.449	10.023	21.57%	14.07%										
DEDB(Lock)							17	231.816	.229		348.690	6.16%	41.62%			
MSDB(Write)	3	49.182	.199	57.404	2.94%	19.03%										
Block Loading																
INTENT LIST	7	2.180	.279	3.458	3.45%	2.56%										
PSBS	14	4.618	1.303	25.711	6.90%	10.86%										
DMBS	8	2.706	.212	3.683	3.94%	3.63%										
PGM ISOLATN							8	7.965.021	1.775		39.670.415	.39%	50.05%			
Message Formats																
FORMAT DIR	4	3.688	.394	5.370	17.39%	12.61%										
BLOCK DIR	6	6.341	.975	19.936	26.09%	32.52%										
FORMAT I/O	6	4.255	.463	7.890	26.09%	21.82%										
BLOCK I/O	6	5.359	.289	7.759	26.09%	27.48%										
PA2 HITS							1	0.001	.000		0.001	2.04%	.00			
POOL IWAIT							1	0.254	.000		0.254	.81%	.00%			
Scheduler IWAITS																
MPP RGN WORK							4	12.599.685	1.040		32.673.237	.19%	39.57%			
M/B/J INPUT							13	232.546	.391		440.643	.47%	16.44%			
Checkpoints																
CHECKPOINTS							3	350.862	.385		509.520	1.09%	11.12%			
Line/Node IWAITS																
LINE INTERPT							248	17.762	9.659		2.637.874	89.86%	46.52%			
VTAM TRANSFR							8	8.707	1.030		22.701	2.90%	.74%			
Pool IWAITS																
POOL							4	0.060	1.655		0.232	1.53%	.04%			
POOL SZE							4	4.096	.000		4.096	1.53%	2.72%			
*** Totals ***	263	7.602					936	34.305								

Figure 222. Total System IWAIT Summary report

Total System IWAIT Summary

Average SD/Avg Max-Value				Average SD/Avg Max-Value				Average SD/Avg Max-Value				Average SD/Avg Max-Value			
5.185.411 .005 5.185.411				13.368 2.294 190.376				2.187 .954 4.263				3.501 .972 6.887			
Range	Count in	System Data Sets		Range	Count in	System Data Sets		Range	Count in	System Data Sets		Range	Count in	System Data Sets	
Sc Mil Mic	Range	SNAP QUEUE		Range	Range	LGMSG		Range	Range	QBLKS		Range	Range	SHMSG	
To Maximum	1	*****		0	0			0	0			0	0		
1.000.000	0			0	0			0	0			0	0		
500.000	0			0	0			0	0			0	0		
300.000	0			1 *				0	0			0	0		
100.000	0			7 ****				0	0			0	0		
50.000	0			1 *				0	0			0	0		
30.000	0			7 ****				0	0			0	0		
10.000	0			2 *				0	0			1 *****			
5.000	0			11 *****				1 *****				0			
1.000	0			38 *****				1 *****				1 *****			
Total=	1			67				2				2			
Average SD/Avg Max-Value				Average SD/Avg Max-Value				Average SD/Avg Max-Value				Average SD/Avg Max-Value			
3.000 1.576 24.225				2.774 .549 15.835				12.720 .194 14.638				0.941 1.091 3.762			
Range	Count in	Database IWAITS		Range	Count in	Database IWAITS		Range	Count in	Database IWAITS		Range	Count in	Database IWAITS	
Sc Mil Mic	Range	OSAM		Range	Range	HSAM		Range	Range	VSAM I/O		Range	Range	VSAM Non-I/O	
To Maximum	0			0	0			0	0			0	0		
1.000.000	0			0	0			0	0			0	0		
500.000	0			0	0			0	0			0	0		
300.000	0			0	0			0	0			0	0		
100.000	0			0	0			0	0			0	0		
50.000	0			0	0			0	0			0	0		
30.000	5 ****			4				4 *****				0			
10.000	3 **			18 *				2 *****				0			
5.000	22 *****			508 *****				0				23 *****			
1.000	25 *****			47 ***				0				29 *****			
Total=	55			577				6				52			
Average SD/Avg Max-Value				Average SD/Avg Max-Value				Average SD/Avg Max-Value				Average SD/Avg Max-Value			
8.022 .910 20.823				4.959 .454 10.023				231.816 .234 348.690				49.182 .204 57.404			
Range	Count in	Database IWAITS		Range	Count in	Database IWAITS		Range	Count in	Database IWAITS		Range	Count in	Database IWAITS	
Sc Mil Mic	Range	DEDB(Read)		Range	Range	DEDB(Write)		Range	Range	DEDB(Lock)		Range	Range	MSDB(Write)	
To Maximum	0			0	0			0	0			0	0		
1.000.000	0			0	0			3 *****				0	0		
500.000	0			0	0			14 *****				0	0		
300.000	0			0	0			0				2 *****			
100.000	0			0	0			0				1 *****			
50.000	0			0	0			0				0	0		
30.000	25 *****			1 **				0				0	0		
10.000	7 *****			9 *****				0				0	0		
5.000	0			12 *****				0				0	0		
1.000	22 *****			0				0				0	0		
Total=	54			22				17				3			
Average SD/Avg Max-Value				Average SD/Avg Max-Value				Average SD/Avg Max-Value				Average SD/Avg Max-Value			
2.180 .283 3.458				4.618 1.307 25.711				2.706 .216 3.683				7.965.021 1.779 39.670.415			
Range	Count in	Block Loading		Range	Count in	Block Loading		Range	Count in	Block Loading		Range	Count in	Block Loading	
Sc Mil Mic	Range	INTENT LIST		Range	Range	PSBS		Range	Range	DMBS		Range	Range	PGM ISOLATN	
To Maximum	0			0	0			0	0			2 *****			
1.000.000	0			0	0			0	0			1 *****			
500.000	0			0	0			0	0			1 *****			
300.000	0			0	0			0	0			0	0		
100.000	0			0	0			0	0			0	0		
50.000	0			0	0			0	0			0	0		
30.000	0			1 ***				0	0			0	0		
10.000	0			2 *****				0	0			0	0		
5.000	7 *****			11 *****				8 *****				1 *****			
1.000	0			0				0				3 *****			
Total=	7			14				8				8			

Figure 223. Total System IWAIT Summary report: distributions

Types reported

IWAITs are classified and reported in the following groups:

System Data Sets

IWAITs on the queue data sets **LGMSG**, **SHMSG**, and **QBLKS**.

Database IWAITs

All database IWAITs, whether or not they are associated with region activity, for **OSAM**, **HSAM**, and **VSAM** data sets. Also reported are VSAM background write IWAITs, and IWAITs for Fast Path databases which include DEDB reads, writes, and locks, and MSDB writes. Non-I/O IWAITs for VSAM data sets are a function of the **Min VSAM IWAITs** setting (specified on the Monitor Global Options panel).

Block Loading

All block loading IWAITs encountered by the control region scheduler grouped by:

PSBS Loading PSBs

INT LIST
Loading the PSB intent list

DMBS
Loading DMBs (DBDs)

PGM ISOLATN
Block loading IWAITs associated with program isolation

Message Formats

All IWAITs associated with message format services grouped by:

FORMAT DIR (I/O)
Directory I/O for format blocks (MID-MOD)

FORMAT DIR (NON I/O)
Directory IWAITs (busy DCB) while fetching MID-MOD formats

BLOCK DIR (I/O)
Directory I/O for MFS blocks (DIF-DOF)

BLOCK DIR (NON I/O)
Directory IWAITs (busy DCB) while fetching DIF-DOF blocks

FORMAT I/O
IWAITs to read MID-MOD formats

BLOCK I/O
IWAITs to read DIF-DOF blocks

MFS PREF
MFS prefetch IWAITs

PA2 HITS
IWAITs resulting from PA2 key service

Scheduler IWAITs

IWAITs occurring during region scheduling grouped by:

JMP RGN WORK
JMP region waiting for work

MPP RGN WORK
MPP region waiting for work

MPP/J INTENT

MPP/JMP region waiting for intent

BMP/J INTENT

BMP/JBP region waiting for intent

M/B/J INPUT

MPP/BMP/JMP region waiting for input

Checkpoints

A count of all IMS control region checkpoints

Line/Node IWAITs

IWAITs in the IMS communication facility grouped by:

LINE INT

Count of interrupts on BTAM lines

VTAM TRANSFR

IWAITs on VTAM transfers

POOL IWAITs

IWAITs for each storage pool are separately identified. Average size of the space waited for is summarized in the **NON I/O IWAITs** section of the report.

MULT SYS XFRS

The number of transmissions occurring in the multiple systems coupling (MSC) feature of IMS.

Report detail

The data presented for each detail line is as follows:

Count Number of IWAITs. Maximum value: 10 million

Elap/IWAIT Sc.Mil.Mic

Average elapsed time per IWAIT. Maximum value: 1000 seconds

StdDv X Avg

The standard deviation of IWAIT elapsed time expressed as a multiple of the average.

Max value Sc.Mil.Mic

Maximum IWAIT elapsed time. Maximum value: 1000 seconds

Pct of IWAITs

The number of IWAITs as a percentage of the total number of IWAITs presented in this report section. (Total of this column should be 100 percent; any difference results from rounding.)

Pct of IWT Elp

IWAIT elapsed time as a percentage of the total IWAIT elapsed time for the IWAITs presented in this report section.

Distributions

The report includes elapsed time per IWAIT distribution graphs for each IWAIT type if you specify a Distribution for **Elapsed Time per IWAIT**.

Total System IWAIT Detail report

The Total System IWAIT Detail report is a detailed breakdown of IWAIT activity for the entire IMS system. IWAIT activity is reported for Databases (full function and Fast Path), Block loading, Format services, Line/Node IWAITs. Elapsed time per IWAIT distributions for each detail line are optionally reported.

These details are summarized in the Total System IWAIT Summary report described on page “Total System IWAIT Summary report” on page 413

The Total System IWAIT Detail report can be produced from DB Monitor data.

Note that this report presents IWAIT activity for the entire IMS system, whereas other IMS PA reports only present IWAITs directly associated with application program activity in the dependent regions.

Uses: The uses of the Total System IWAIT Detail report naturally follow from information obtained from the Total System IWAIT Summary report. Specific scheduling and MFS block activity can be specifically identified. This may lead either to redefinition of block allocations or to the use of residency options. Particularly active blocks (DMBs, PSBs, MFS) can often be made resident, which can result in overall performance improvements without significant storage impact. A listing of program isolation enqueue IWAITs is provided. This listing can be cross-referenced with the Enqueue/Dequeue Trace report.

Monitor records: This report is derived from monitor records 14–19, 22–33, 36–37, 40–41, 44–45, 50–51, 54–57, 66–73.

Report options

To obtain the Total System IWAIT Detail report, select **Total System IWAIT** in a Monitor Report Set and specify a DDname for the report output.

To add distribution graphs to the report, specify a Distribution for **Elapsed Time per IWAIT**. The sample Distribution IWTSUMMY is provided.

The **Alternate Sequencing** option is applicable to all sections of this report (except the distributions).

Report content

The Total System IWAIT Detail report contains six sections. Each section is a detailed breakdown of part of the summary data presented in the Total System IWAIT Summary report. Each section has the same data format as the Total System IWAIT Summary report.

The report section headings and the content of the sections are as follows:

Data Base IWAITs

Detail line for each DDname, and OSAM, VSAM, HSAM, and QUE data sets, and Fast Path data sets for DEDB reads, writes, and locks, and MSDB writes.

ACBLIB block loading IWAITs

Detail line for each PSB and intent list loaded.

ACBLIB miscellaneous IWAITs

Detail line for each DMB loaded, and for each DMB involved in an enqueue IWAIT.

Format services directory I/O

Detail line for each format directory (MID-MOD) name and each block directory (DIF-DOF) name. Block names are eight bytes. The first two bytes are device flags used by IMS to associate a block with the type of device using this format. For the meaning of these flags, see *IMS Application Programming: Data Communication*. The last six bytes are the user-defined name.

Format services block read I/O

Detail line for each MFS format read (MID-MOD) and for each MFS block read (DIF-DOF).

Line/Node Interrupts

Detail line for each BTAM line number and for each VTAM node.

Each section has a **** Total** line for the total of all (100%) of the data in the report period.

If Alternate Sequencing is requested:

- The report section headings are suffixed by **Sorted by Total IWAIT Elapsed time** as Delay is the only sequence applicable to this report
- If a number or percentage (less than 100%) Limit is specified:
 - The report section headings are also suffixed by **LIMIT nn** or **LIMIT nn%**
 - A **** Limit** line is printed for the total of the reported (limited) data only.

Data Base IWAITS

----- I / O I W A I T S -----							----- I / O I W A I T S -----						
	Elap/IWAIT	StdDv	Max value	Pct Tot	Pct Tot			Elap/IWAIT	StdDv	Max value	Pct Tot	Pct Tot	
OSAM DDn	IWAITS	Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS	IWT Elp	VSAM DDn	IWAITS	Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS	IWT Elp
DJOHDG10	14	3.811	1.314	14.788	25.45%	32.33%	DBHVSAM1	6	0.029	.314	0.048	10.34%	.14%
DJOHDG20	2	1.484	.305	1.937	3.64%	1.80%	DBHVSAM2	3	0.030	.250	0.040	5.17%	.07%
DKOHDG10	28	3.190	1.647	24.225	50.91%	54.13%	GSHISAM1	13	0.757	1.219	2.253	22.41%	7.85%
DKOHDG20	8	1.768	1.607	8.408	14.55%	8.57%	HIDAM	21	2.724	1.435	14.638	36.21%	45.66%
DKOHDG30	3	1.744	.454	2.834	5.45%	3.17%	XDLBT04I	15	3.865	1.314	14.598	25.86%	46.27%
** Total	55	3.000	1.572	24.225	100.00%	100.00%	** Total	58	2.160	1.757	14.638	100.00%	100.00%

Data Base IWAITS

----- R e a d I / O I W A I T S -----							----- W r i t e I / O I W A I T S -----						
DEDB Ads	IWAITS	Elap/IWAIT	StdDv	Max value	Pct Tot	Pct Tot	DEDB Ads	IWAITS	Elap/IWAIT	StdDv	Max value	Pct Tot	Pct Tot
		Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS	IWT Elp			Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS	IWT Elp
DB23AN1	17	8.652	.913	17.245	31.48%	33.95%	DB23AN1	4	6.780	.263	9.741	18.18%	24.85%
DB23AN2	17	9.368	.922	20.823	31.48%	36.76%	DB23AN2	4	7.073	.286	10.023	18.18%	25.93%
DB23AR0	7	6.392	.044	7.006	12.96%	10.33%	DB23AR0	6	3.576	.333	5.785	27.27%	19.67%
DB23AR1	10	6.523	.769	11.791	18.52%	15.06%	DB23AR1	6	3.873	.394	6.592	27.27%	21.30%
DB23AR7	3	5.623	1.348	16.340	5.56%	3.89%	DB23AR7	2	4.503	.434	6.455	9.09%	8.25%
** Total	54	8.022	.906	20.823	100.00%	100.00%	** Total	22	4.959	.449	10.023	100.00%	100.00%

Data Base IWAITS

----- L o c k I W A I T S -----							----- W r i t e I / O I W A I T S -----							
	Elap/IWAIT	StdDv	Max value	Pct Tot	Pct Tot			Elap/IWAIT	StdDv	Max value	Pct Tot	Pct Tot		
DEDB ArN	IWAITS	Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS	IWT Elp	MSDB DDn	IWAITS	Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS	IWT Elp	
DB23AN1	4	241.462	.175	314.316	23.53%	24.51%	MSDBCP1	2	46.416	.237	57.404	66.67%	62.92%	
DB23AN2	4	217.011	.337	333.704	23.53%	22.03%	MSDBCP2	1	54.714	.000	54.714	33.33%	37.08%	
DB23AR0	4	259.047	.203	348.690	23.53%	26.29%								
DB23AR1	4	225.462	.031	236.651	23.53%	22.88%	** Total	3	49.182	.199	57.404	100.00%	100.00%	
DB23AR7	1	168.939	.000	168.939	5.88%	4.29%								
** Total	17	231.816	.229	348.690	100.00%	100.00%								

Figure 224. Total System IWAIT Detail report: Data Base IWAITS

Report from 10Jun2018 16.45.54.75

IMS 15.1.0

IMS Performance Analyzer 4.4

Report to 10Jun2018 17.17.14.75

ACBLIB block loading IWAITS

----- I / O I W A I T S -----								----- I / O I W A I T S -----							
Int List	IWAITS	Elap/IWAIT	StdDv	Max value	Pct Tot	Pct Tot		PSBname	IWAITS	Elap/IWAIT	StdDv	Max value	Pct Tot	Pct To	
		Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS	IWT Elp				Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS	IWT El	
DDLTFPE4	6	1.941	.070	2.088	85.71%	73.24%		BMP255	5	3.228	.273	4.803	35.71%	40.87	
DDLTLM20	1	4.256	.000	4.256	14.29%	26.76%		DDLTFPE4	6	3.230	.354	5.396	7.14%	4.29	
								HSBASK41	2	2.402	.261	3.029	14.29%	12.17	
** Total	7	2.272	.361	4.256	100.00%	100.00%		PLAPJK24	3	2.459	.140	2.867	21.43%	18.68	
								PMVAPZ12	2	2.883	.038	2.992	14.29%	14.60	
								PSVAZZ30	1	3.704	.000	3.704	7.14%	9.38	
								** Total	19	2.820	.279	5.396	100.00%	100.00	

ACBLIB miscellaneous IWAITS

----- I / O I W A I T S -----								----- N O N I / O I W A I T S -----							
DMBname	IWAITS	Elap/IWAIT	StdDv	Max value	Pct Tot	Pct Tot		PI/Unknown	IWAITS	Elap/IWAIT	StdDv	Max value	Pct Tot	Pct To	
		Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS	IWT Elp				Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS	IWT El	
DBHDOJ01	1	2.056	.000	2.056	6.67%	5.64%		DHVNTZ02	1	3.786.595	.000	3.786.595	33.33%	.73	
DBHDOK01	1	2.429	.000	2.429	6.67%	6.66%		DIVNTZ02	1	2.819.352	.000	2.819.352	33.33%	99.27	
DBOVLFP0	1	2.270	.000	2.270	6.67%	6.23%		DXVNTZ02	1	12.093.126	.000	12.093.126	33.33%	100.00	
DHVNTZ02	1	2.579	.000	2.579	6.67%	7.08%									
DH4ISK01	1	2.895	.000	2.895	6.67%	7.94%		** Total	3	6.233.024	.668	12.093.126	100.00%		
:															
DXVNTZ02	1	2.568	.000	2.568	6.67%	7.05%									
DX4ISK01	1	2.750	.000	2.750	6.67%	7.54%									
DX4ISK02	1	2.808	.000	2.808	6.67%	7.70%									
** Total	15	2.430	.138	2.895	100.00%	100.00%									

Figure 225. Total System IWAIT Detail report: ACBLIB Block Loading and Miscellaneous IWAITS

Report from 07May2018 13.55.20.21

IMS 15.1.0

IMS Performance Analyzer 4.4

Report to 07May2018 13.57.41.61

Format services directory I/O

----- I / O I W A I T S -----								----- I / O I W A I T S -----							
Formats	IWAITS	Elap/IWAIT	StdDv	Max value	Pct Tot	Pct Tot		Flgs-Block	IWAITS	Elap/IWAIT	StdDv	Max value	Pct Tot	Pct To	
		Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS	IWT Elp				Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS	IWT El	
DCTLP1I1	1	2.160	.000	2.160	25.00%	14.64%		027F-DCTL1A	2	3.696	.309	4.837	33.33%	19.43	
DCTLP1I0	1	2.334	.000	2.334	25.00%	15.82%		027F-DCTL1B	2	2.919	.365	3.983	33.33%	15.34	
DCTLPN1I	1	4.888	.000	4.888	25.00%	33.13%		027F-DFSDF2	2	12.410	.607	19.936	33.33%	65.23	
DCTLPN10	1	5.370	.000	5.370	25.00%	36.40%									
** Total	4	3.688	.394	5.370	100.00%	100.00%		** Total	6	6.341	.975	19.936	100.00%	100.00	

Format services block read I/O

----- I / O I W A I T S -----								----- I / O I W A I T S -----							
Formats	IWAITS	Elap/IWAIT	StdDv	Max value	Pct Tot	Pct Tot		Flgs-Block	IWAITS	Elap/IWAIT	StdDv	Max value	Pct Tot	Pct To	
		Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS	IWT Elp				Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS	IWT El	
DCTLP1I1	1	2.722	.000	2.722	16.67%	10.66%		027F-DCTL1A	2	5.895	.316	7.759	33.33%	36.67	
DCTLP1I0	1	2.823	.000	2.823	16.67%	11.06%		027F-DCTL1B	2	4.277	.325	5.668	33.33%	26.60	
DCTLPN1I	1	3.577	.000	3.577	16.67%	14.01%		027F-DFSDF2	2	5.906	.017	6.006	33.33%	36.73	
DCTLPN10	1	7.890	.000	7.890	16.67%	30.91%									
DFSMI2	1	5.865	.000	5.865	16.67%	22.97%		** Total	6	5.359	.289	7.759	100.00%	100.00	
DFSMD5	1	2.652	.000	2.652	16.67%	10.39%									
** Total	6	4.255	.463	7.890	100.00%	100.00%									

Figure 226. Total System IWAIT Detail report: Format Services

----- N O N I / O I W A I T S -----										----- N O N I / O I W A I T S -----										
Line No.	IWAITs	Elap/IWAIT	StdDv	Max value	Pct Tot	Pct Tot	Nodename	IWAITs	Elap/IWAIT	StdDv	Max value	Pct Tot	Pct Tot	IWAITs	Elap/IWAIT	StdDv	Max value	Pct Tot	Pct Tot	
1	1	139.093	.000	139.093	.05%	1.73%	ADLU2A	10	45.079	1.975	299.867	8.93								
2	195	20.591	2.240	249.137	9.04%	49.96%	ADLU2B	10	16.070	2.717	146.621	8.93								
4	1,240	1.099	12.801	394.797	57.46%	16.95%	ADLU2C	10	16.267	2.887	157.132	8.93								
18	67	15.996	2.676	189.000	3.10%	13.33%	LU376724	32	9.516	3.670	165.657	28.57								
26	655	2.211	5.652	121.887	30.35%	18.02%	NDSLU2A1	10	16.366	2.889	158.164	8.93								
							NDSLU2A2	10	16.631	2.893	160.961	8.93								
** Total	2,158	3.724	5.720	394.797	100.00%	100.00%	NDSLU2A3	10	15.614	2.880	150.478	8.93								
							NDSLU2A4	10	16.380	2.883	158.014	8.93								
							NDSLU2A5	10	16.634	2.884	160.512	8.93								
** Total								112	16.919	2.956	299.867	100.00								

Figure 227. Total System IWAIT Detail report: Line/Node IWAITs

		Average SD/Avg Max-Value 0.264 1.561 8.069			Average SD/Avg Max-Value 1.086 2.944 30.345			Average SD/Avg Max-Value 7.913 .207 20.180			Average SD/Avg Max-Value 8.741 .374 20.371			
Range		Count in OSAM DDn=PDHDOKAA			Count in OSAM DDn=PDHDOKCA			Count in VSAM DDn=PVHDJ5AA			Count in VSAM DDn=PVHDJ5DA			
Sc Mil Mic	Range													
To Maximum	0													
1.000.000	0													
500.000	0													
300.000	0													
100.000	0													
50.000	0													
30.000	0													
10.000	1													
5.000	54 **													
1.000	1110													
Total=		----- 1165 10 20 30 40 50%			----- 100 10 20 30 40 50%			----- 112 10 20 30 40 50%			----- 24 10 20 30 40 50%			
<hr/>														
		Average SD/Avg Max-Value 13.273 .587 20.916			Average SD/Avg Max-Value 11.549 1.397 88.639			Average SD/Avg Max-Value 19.359 1.097 92.091			Average SD/Avg Max-Value 85.002 .082 91.649			
Range		Count in DEDB ADs=DD01AR0			Count in DEDB ADs=DB22AR0			Count in DEDB ArN=DB22AR0			Count in MSDB DDn=MSDBCP2			
Sc Mil Mic	Range	Read I/O			Write I/O			Lock IWAIT			Write I/O			
To Maximum	0													
1.000.000	0													
500.000	0													
300.000	0													
100.000	0													
50.000	2 ****													
30.000	4 *****													
10.000	0													
5.000	1 **													
1.000	13													
Total=		----- 20 10 20 30 40 50%			----- 41 10 20 30 40 50%			----- 18 10 20 30 40 50%			----- 4 10 20 30 40 50%			

Figure 228. Total System IWAIT Detail report: Data Base IWAIT Distributions

Report from 25Jun2018 14.45.00.04				IMS 15.1.0				IMS Performance Analyzer 4.4				Report to 25Jun2018 14.54.59.99			
Data Base IWAITS (Sorted by Total IWAIT Elapsed time; LIMIT 5)															
----- I / O I W A I T S -----												----- I / O I W A I T S -----			
Elap/IWAIT StdDv Max value Pct Tot Pct Tot												Elap/IWAIT StdDv Max value Pct Tot Pct Tot			
OSAM DDn	IWAITS	Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS	IWT Elp		VSAM DDn	IWAITS	Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS	IWT Elp	
RMZIETDD	2	17.266	.030	17.782	100.00%	100.00%		RMZILGDP	6,942	19.799	.568	143.760	39.88%	38.11%	
								RMMSSNDX	3,392	20.925	.634	143.596	19.49%	19.68%	
** Limit	2	17.266	.030	17.782	100.00%	100.00%		RMZILGDI	2,612	20.098	.814	657.201	15.01%	14.56%	
** Total	2	17.266	.030	17.782	100.00%	100.00%		RMCS192	172	20.944	.335	44.861	.99%	1.00%	
								RMCS212	140	25.698	.429	60.893	.80%	1.00%	
								** Limit	13,258	20.223	.638	657.201	76.16%	74.34%	
								** Total	17,407	20.720	.599	657.201	100.00%	100.00%	

ACBLIB miscellaneous IWAITS (Sorted by Total IWAIT Elapsed time; LIMIT 5)															
----- I / O I W A I T S -----												----- N O N I / O I W A I T S -----			
Elap/IWAIT StdDv Max value Pct Tot Pct Tot												Elap/IWAIT StdDv Max value Pct Tot Pct Tot			
DMBname	IWAITS	Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS	IWT Elp		PI/Unknown	IWAITS	Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS	IWT Elp	
								RMZILGDP	18	18.178	1.448	87.380	100.00%	100.00%	
								** Limit	18	18.178	1.448	87.380	100.00%	100.00%	
								** Total	18	18.178	1.448	87.380	100.00%	100.00%	

Line Interrupts (Sorted by Total IWAIT Elapsed time; LIMIT 5)															
----- N O N I / O I W A I T S -----												----- N O N I / O I W A I T S -----			
Elap/IWAIT StdDv Max value Pct Tot Pct Tot												Elap/IWAIT StdDv Max value Pct Tot Pct Tot			
Line No.	IWAITS	Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS	IWT Elp		Nodename	IWAITS	Sc.Mil.Mic	X Avg	Sc.Mil.Mic	IWAITS	IWT Elp	
2	320	0.233	.770	1.306	100.00%	100.00%									
** Limit	320	0.233	.770	1.306	100.00%	100.00%									
** Total	320	0.233	.770	1.306	100.00%	100.00%									

Figure 229. Total System IWAIT Detail report: Sequenced by Delay (with Limit)

Program Analysis reports

The Program Analysis reports provide detailed information on all aspects of application processing.

Program Activity Detail reports

The Program Activity Detail reports provide a detailed breakdown of the database activity of each PSB name by PCB name, function code, DDname, and segment name feedback. Alternate report formats present the data organized by PCB name. No sorting of the input data is required to obtain the reports.

The Program Activity Detail reports are of three types:

- PSB Details (with optional PSB-Transaction Code details)
- PSB-Transaction Code Analysis
- DDname by PSB-Transaction Code

These reports can be produced from either IMS Monitor or DB Monitor data.

PSB Details reports

The PSB Details reports are a series of reports with identical formats that show program activity by PCB name, each report presenting different levels of further detail. Some of the reports show all calls, regardless of resulting IWAIT activity, while other reports show only the calls that result in IWAITS.

Monitor records: The reports are derived from monitor records 02–13, 20–29, 48–49, 56–65.

The following reports show all calls, regardless of resulting IWAIT activity:

Report	Level of detail	Example
PSB Details PCB Totals	PCB	Figure 230 on page 427
PSB Details by Function Code	PCB function	Figure 231 on page 428
PSB Details by Function Code-Segment Name	PCB function, segment status	Figure 232 on page 429
PSB Details by Segment Name Feedback	PCB, segment status	Figure 233 on page 430

The following reports show only the calls that result in IWAITs:

Report	Level of detail	Page
PSB Details PCB Totals (DD)	PCB	Figure 234 on page 431
PSB Details by DDname IWAITed On	PCB, DD	Figure 235 on page 431
PSB Details by Function Code (DD)	PCB function	Figure 236 on page 432
PSB Details by Function Code-DDname	PCB function, DD	Figure 237 on page 433

For each of these reports, PSB-transaction code details can optionally be shown at the lowest level. Figure 230 on page 427 through Figure 237 on page 433 show the eight reports, with all except Figure 235 on page 431 specified with the PSB-Transaction Code option.

Uses

The PSB Details reports are the primary presentations of IMS Monitor data needed for analysis of database use. These reports are of particular interest to DB Monitor users, since the DB Monitor only records database call and associated IWAIT activity. You can select one or more of the report detail options to provide an appropriate level of detail for your investigation. The reports can be used to help identify and analyze a variety of problems, such as database reorganization indications, data set placement problems, inefficient call patterns, and insufficient allocation of database buffer pools. These reports also serve as an excellent source of documentation, because they provide activity profiles for every PCB active during the reporting interval. Use of the PSB Details reports is most effective if based on an understanding of the database and applications involved.

The first report, PSB Details-PCB Totals, as shown in Figure 230 on page 427, is always produced. The most active databases should receive primary attention, and these are readily identified through the **Percent of System** column. A fine-grain

picture of the call patterns for very active (or any) PSBs can be obtained by requesting a Program Trace report. By referring to the PSB Details-PCB Totals (DD) report (Figure 234 on page 431), you can examine for these same PSBs the IWAIT/CALL ratios versus the number of calls; the ratio for this report includes only calls that result in IWAITs.

The PSB Details by DDname IWAITed On report can be examined if you suspect that database buffer pools are insufficient. IWAITs for DDnames not related to the PCB indicate database buffer pool related I/O. A different view of the same type of data is available with the DDname by PSB-Transaction Code report.

Report options:

To obtain the PSB Details reports, select **Program Activity Detail** in a Monitor Report Set.

Specify the following options:

- Select **1. PSB Details**, or to additionally show the PSBNAME and TranCode details, select **3. PSB Details with PSB-TranCode data added at the lowest level**.
- Select one or more of the report options from the list of **Reports Required** to produce the corresponding report types in addition to the PSB Details PCB Totals report which is always printed first:

all PSB Details PCB Totals

Function Code

PSB Details by Function Code

Segment Name

PSB Details by Segname Feedbk

Function-Segment Name

PSB Details by Functn-Segname

DDname

PSB Details PCB Totals(DD) PSB Details by DDname IWTd On

Function-DDname

PSB Details PCB Totals(DD) PSB Details by Function(DD) PSB Details by Functn-DDname

Report output is sent to the DDname specified in Detail Report Output DDname on the Monitor Global Options panel.

The **ESAF Integration** Option requests a breakdown of external subsystem call activity together with DL/I call activity. It applies to all the PSB Detail reports except those by DDname or Function-DDname.

Report content:

The column headings for all PSB Details reports are identical and are of two types: reported line items which represent the level of detail, and the report details themselves.

Reported line items

The level of detail that may be reported is as follows:

PCBNAME

Name of the PCB against which calls are made. If ESAF Integration is activated, this can be the External Subsystem name, suffixed with (E) to distinguish it from a DL/I PCB name.

Func Call function code. GET HOLD calls are combined with their corresponding GET call code, since IMS does not identify them to the IMS Monitor. For example, GHNP calls are included with GNP calls. If ESAF Integration is activated, the Function Code field contains the ESAF call type. For example, Signon, Normal Call, Commit Ph2.

Lvl Database segment level number of the named segment as returned in the segment feedback area.

DDname

The DDname associated with the data set against which an IWAIT is issued.

Segname

Segment name field from the segment feedback area.

Sc Status code returned on the call. If ESAF Integration is activated, the Status Code field contains the ESAF call return code.

PSBNAME

PSB name of the calling program.

TranCode

Transaction code of the transaction being processed by the calling program.

Report detail

The column headings for the details reported are as follows:

Calls Number of calls. Totals and subtotals of the number of calls are the sum of the detail lines. On several reports, this may be greater than the actual number of calls, since a call can result in IWAITs on more than one DDname. The reports affected are:

- PSB Details by DDname IWAITed On
- PSB Details by Function Code-DDname
- DDname by PSB-Transaction Code

IWAITs

Number of IWAITs.

IWAITs/Call

Average number of IWAITs per call.

Elap/IWAIT Sc.Mil.Mic

Average elapsed time per IWAIT.

IWTElap/CI Sc.Mil.Mic

Average IWAIT elapsed time per call.

Elap/Call(Max IWT)

Average elapsed time per call including IWAIT time. For reports providing detail by DDname, the maximum IWAIT elapsed time is reported.

Percent of System

The percentage of total system activity represented by this line item for the following:

Calls Number of calls

IWTs Number of IWAITs

CIElp Call elapsed time
IWTEI IWAIT elapsed time

Date=14Jun2018		Time=09.23.41.31		IMS 15.1.0		IMS Performance Analyzer				Report from 14Jun2018 09.23.41.31							
						PSB Details		PCB Totals									
PCBNAME	Func	Lvl	DDname or Segname	Sc	PSBNAME	TranCode	Calls	IWAITs	IWAITs /Call	Elap/IWAIT Sc.Mil.Mic	IWTElap/CI Sc.Mil.Mic	Elap/Call (Max IWT)	---Percent of System---	Calls	IWTs	CIElp	IWTEl
CKTTGMDD			RCLBDDS		CLBDDS		70					0.403	.1%	.0%	.0%	.0%	
			RCLBDDS		ZRCLBFDS		102					0.408	.2%	.0%	.0%	.0%	
			RCLBDEN		CLBDEN		230	19	.08	17.417	1.439	9.706	.4%	.2%	.4%	.2%	
			RCLBDEN		CLDC		141					0.363	.3%	.0%	.0%	.0%	
			RCLBDEN		ZRCLBFEN		323	4	.01	18.520	0.229	0.715	.6%	.1%	.0%	.0%	
			RCLBDFN		CLBDFN		120					0.344	.2%	.0%	.0%	.0%	
			RCLBDFN		ZRCLBFFN		104					0.361	.2%	.0%	.0%	.0%	
			RCLBDNX		CLBDNX		56					0.414	.1%	.0%	.0%	.0%	
			RCLBDPT		CLBDPT		460	3	.01	16.360	0.107	0.461	.8%	.0%	.0%	.0%	

Figure 230. PSB Details-PCB Totals report

Date=14Jun2018		Time=09.23.41.31		IMS 15.1.0		IMS Performance Analyzer				Report from 14Jun2018 09.23.41.31								
PSB Details by Function Code																		
PCBNAME	Func	Lvl	DDname or Segname	Sc	PSBNAME	TranCode	Calls	IWAITS	/Call	Elap/IWAIT	Sc.Mil.Mic	IWTElap/Cl	Elap/Call	---Percent of System---	Calls	IWTs	ClEIp	IWTEI
CKTTGMDD	DLET				RCLBDEN	ZRCLBFEN	24						1.190	.0%	.0%	.0%	.0%	
					ZRC1PTC	ZRC1PTC	5						1.128	.0%	.0%	.0%	.0%	
					ZRGCP03	ZRGCP03	20						1.670	.0%	.0%	.0%	.0%	
					ZRGCP61	CCPSTTY	10						1.698	.0%	.0%	.0%	.0%	
					ZRWAD	ZRWAD	16						1.264	.0%	.0%	.0%	.0%	
	GN				RCLBDEN	CLBDEN	10						0.245	.0%	.0%	.0%	.0%	
					RFEPBUMP	FEPBUMP	20						0.135	.0%	.0%	.0%	.0%	
					ZRCMMSG	ZRCMMSGD	5						0.111	.0%	.0%	.0%	.0%	
					ZRWAD	ZRWAD	7						0.211	.0%	.0%	.0%	.0%	
	GNP				RCLBDDS	CLBDDS	20						0.330	.0%	.0%	.0%	.0%	
: CKTTGMDD ** Total							4,165	82	.02	23.195	0.457	6.242	7.5%	1.0%	4.1%	1.1%		
CKTXRFDP GU																		
					RCLBDFN	CLBDFN	2						1.154	.0%	.0%	.0%	.0%	
					ZRGCA10	ZRGCA10	2	1	.50	20.877	10.489		12.050	.0%	.0%	.0%	.0%	
					ZRGCO02	ZRGCO02	3	3	1.00	25.860	25.860		409.328	.0%	.0%	.2%	.0%	
					ZRPRI01	ZRPRI02	3	1	.33	44.498	14.833		16.342	.0%	.0%	.0%	.0%	
					ZRSCXDR	RSCXDR	4	32	8.00	191.072	1.528.578		3.720.347	.0%	.4%	2.3%	3.7%	
					ZRSC2DR	ZRSC2DR	3						0.591	.0%	.0%	.0%	.0%	
					ZRWAD	ZRWAD	7	3	.43	17.218	7.379		8.401	.0%	.0%	.0%	.0%	
	ISRT				ZRGCA10	ZRGCA10	2	3	1.50	26.637	39.856		44.323	.0%	.0%	.0%	.0%	
					ZRGCO02	ZRGCO02	3	5	1.67	22.510	37.517		40.863	.0%	.1%	.0%	.1%	
					ZRSC2DR	ZRSC2DR	1	9	9.00	9.598	86.385		3.373.821	.0%	.1%	.5%	.1%	
CKTXRFDP ** Total							30	57	1.80	115.582	219.606		661.025	.1%	.7%	3.1%	4.0%	
: ZRVIEWDP GU																		
					RCLBDDS	ZRCLBFDS	2						0.786	.0%	.0%	.0%	.0%	
					RCLBDEN	CLBDEN	1						1.093	.0%	.0%	.0%	.0%	
					RCLBDFN	CLBDFN	1	9	9.00	17.159	154.434		1.844.606	.0%	.1%	.3%	.1%	
ZRVIEWDP ** Total							4	9	2.25	17.159	38.609		486.818	.0%	.1%	.3%	.1%	
** Total by Function Code							55,900	8,730	.16	20.227	3.159		11.386	101%	111%	100%	106%	

Figure 231. PSB Details by Function Code report

Date=14Jun2018		Time=09.23.41.31		IMS 15.1.0		IMS Performance Analyzer				Report from 14Jun2018 09.23.41.31											
						PSB Details by Functn-Segname															
PCBNAME	Func	Lvl	DDname or Segname	Sc	PSBNAME	TranCode	Calls	IWAITs	Elap/IWAIT	/Call	Sc.Mil.Mic	IWTElap/Cl	Elap/Call	(Max IWT)	---Percent of System---	Calls	IWTs	CIElp	IWTEl		
CKTTGMDD	DLET	01	CKTTGM01		ZRGCP61	CCPSTTY	5						2.523	.0%	.0%	.0%	.0%				
		02	CKTTGM04		ZRGCP61	CCPSTTY	5						0.872	.0%	.0%	.0%	.0%				
		02	CKTTGM05		RCLBDEN	ZRCLBFEN	24						1.190	.0%	.0%	.0%	.0%				
		02	CKTTGM05		ZRC1PTC	ZRC1PTC	5						1.128	.0%	.0%	.0%	.0%				
		02	CKTTGM05		ZRGCP03	ZRGCP03	20						1.670	.0%	.0%	.0%	.0%				
	GN	02	CKTTGM05		ZRWAD	ZRWAD	16						1.264	.0%	.0%	.0%	.0%				
		01	CKTTGM01	GE	RFEPBUMP	FEPBUMP	15						0.102	.0%	.0%	.0%	.0%				
		01	CKTTGM01	GE	ZRCMSG	ZRCMMSGD	5						0.111	.0%	.0%	.0%	.0%				
		01	CKTTGM01	GE	ZRWAD	ZRWAD	7						0.211	.0%	.0%	.0%	.0%				
		02	CKTTGM05		RCLBDEN	CLBDEN	10						0.245	.0%	.0%	.0%	.0%				
	GNP	02	CKTTGM05		RFEPBUMP	FEPBUMP	5						0.235	.0%	.0%	.0%	.0%				
		01	CKTTGM01	GE	RCLBDDS	CLBDDS	10						0.466	.0%	.0%	.0%	.0%				
								:													
			02	CKTTGM05		ZRGC003	ZRGC003	5						0.197	.0%	.0%	.0%	.0%			
			02	CKTTGM05		ZRSC2DR	ZRSC2DR	1		2	2.00		12.547	25.094	644.347	.0%	.0%	.1%	.0%		
CKTTGMDD ** Total							4,165	82	.02		23.195	0.457	6.242	7.5%	1.0%	4.1%	1.1%				
CKTXRFDP	GU	00		GE	ZRGCA10	ZRGCA10	2	1	.50		20.877	10.489	12.050	.0%	.0%	.0%	.0%				
		00		GE	ZRGCO02	ZRGCO02	3	3	1.00		25.860	25.860	409.328	.0%	.0%	.2%	.0%				
		00		GE	ZRSCXDR	ZRSCXDR	4	32	8.00		191.072	1.528.578	3.720.347	.0%	.4%	2.3%	3.7%				
		00		GE	ZRSC2DR	ZRSC2DR	3						0.591	.0%	.0%	.0%	.0%				
		01	CKTXRF01		RCLBDFN	CLBDFN	2						1.154	.0%	.0%	.0%	.0%				
	ISRT	01	CKTXRF01		ZRPRI01	ZRPRI02	3	1	.33		44.498	14.833	16.342	.0%	.0%	.0%	.0%				
		01	CKTXRF01		ZRWAD	ZRWAD	7	3	.43		17.218	7.379	8.401	.0%	.0%	.0%	.0%				
		01	CKTXRF01		ZRGCA10	ZRGCA10	2	3	1.50		26.637	39.856	44.323	.0%	.0%	.0%	.0%				
		01	CKTXRF01		ZRGCO02	ZRGCO02	3	5	1.67		22.510	37.517	40.863	.0%	.1%	.0%	.1%				
		01	CKTXRF01		ZRSC2DR	ZRSC2DR	1	9	9.00		9.598	86.385	3.373.821	.0%	.1%	.5%	.1%				
		CKTXRFDP ** Total						30	57	1.80		115.582	219.606	661.025	.1%	.7%	3.1%	4.0%			
		:																			
ZRVIEWDP	GU	01	ZRVIEW01		RCLBDDS	ZRCLBFDS	2						0.786	.0%	.0%	.0%	.0%				
		01	ZRVIEW01		RCLBDEN	CLBDEN	1						1.093	.0%	.0%	.0%	.0%				
		01	ZRVIEW01		RCLBDFN	CLBDFN	1		9	9.00		17.159	154.434	1.844.606	.0%	.1%	.3%	.1%			
ZRVIEWDP ** Total							4	9	2.25		17.159	38.609	486.818	.0%	.1%	.3%	.1%				
** Total by Functn-Segname							55,900	8,730	.16		20.227	3.159	11.386	101%	111%	100%	106%				

Figure 232. PSB Details by Function-Segment Name report

Date=14Jun2018		Time=09.23.41.31		IMS 15.1.0		IMS Performance Analyzer					Report from 14Jun2018 09.23.41.31						
PSB Details by Segname Feedbk																	
		DDname or						IWAITS		Elap/IWAIT		IWTElap/Cl		Elap/Call		---Percent of System---	
PCBNAME	Func	Lvl	Segname	Sc	PSBNAME	TranCode	Calls	IWAITS	/Call	Sc.Mil.Mic	Sc.Mil.Mic	(Max IWT)	Calls	IWTs	ClElp	IWTEl	
CKTTGMDD	00		GE	ZRGCA10	ZRGCA10		8	3	.38	32.506	12.190	12.823	.0%	.0%	.0%	.1%	
	00		GE	ZRGC002	ZRGC002		42	31	.74	22.177	16.369	17.156	.1%	.4%	.1%	.4%	
	00		GE	ZRGCP61	CCPSTTY		1					0.490	.0%	.0%	.0%	.0%	
	00		GE	ZRGTCDB	ZRGTCDB		5					0.569	.0%	.0%	.0%	.0%	
	00		GE	ZRSC2DR	ZRSC2DR		2	2	1.00	14.824	14.824	15.855	.0%	.0%	.0%	.0%	
	01	CKTTGM01		RCLBDEN	ZRCLBFEN		24					0.386	.0%	.0%	.0%	.0%	
	01	CKTTGM01		ZRC1PTC	ZRC1PTC		5					0.582	.0%	.0%	.0%	.0%	
	01	CKTTGM01		ZRGCA10	ZRGCA10		2					3.049	.0%	.0%	.0%	.0%	
	01	CKTTGM01		ZRGC002	ZRGC002		48	2	.04	6.720	0.280	17.104	.1%	.0%	.1%	.0%	
	01	CKTTGM01		ZRGC003	ZRGC003		5					0.227	.0%	.0%	.0%	.0%	
	01	CKTTGM01		ZRGCP03	ZRGCP03		18					0.318	.0%	.0%	.0%	.0%	
	:																
CKTTGMDD ** Total							4,165	82	.02	23.195	0.457	6.242	7.5%	1.0%	4.1%	1.1%	
:																	
CKTXRFDP	00		GE	ZRGCA10	ZRGCA10		2	1	.50	20.877	10.489	12.050	.0%	.0%	.0%	.0%	
	00		GE	ZRGC002	ZRGC002		3	3	1.00	25.860	25.860	409.328	.0%	.0%	.2%	.0%	
	00		GE	ZRSCXDR	ZRSCXDR		4	32	8.00	191.072	1.528.578	3.720.347	.0%	.4%	2.3%	3.7%	
	00		GE	ZRSC2DR	ZRSC2DR		3					0.591	.0%	.0%	.0%	.0%	
	01	CKTXRF01		RCLBDFN	CLBDFN		2					1.154	.0%	.0%	.0%	.0%	
	01	CKTXRF01		ZRGCA10	ZRGCA10		2	3	1.50	26.637	39.856	44.323	.0%	.0%	.0%	.0%	
	01	CKTXRF01		ZRGC002	ZRGC002		3	5	1.67	22.510	37.517	40.863	.0%	.1%	.0%	.1%	
	01	CKTXRF01		ZRPRI01	ZRPRI02		3	1	.33	44.498	14.833	16.342	.0%	.0%	.0%	.0%	
	01	CKTXRF01		ZRSC2DR	ZRSC2DR		1	9	9.00	9.598	86.385	3.373.821	.0%	.1%	.5%	.1%	
	01	CKTXRF01		ZRWAD	ZRWAD		7	3	.43	17.218	7.379	8.401	.0%	.0%	.0%	.0%	
	CKTXRFDP ** Total							30	57	1.80	115.582	219.606	661.025	.1%	.7%	3.1%	4.0%
	:																
ZRVIEWDP	01	ZRVIEW01		RCLBDDS	ZRCLBFDS		2					0.786	.0%	.0%	.0%	.0%	
	01	ZRVIEW01		RCLBDEN	CLBDEN		1					1.093	.0%	.0%	.0%	.0%	
	01	ZRVIEW01		RCLBDFN	CLBDFN		1	9	9.00	17.159	154.434	1.844.606	.0%	.1%	.3%	.1%	
ZRVIEWDP ** Total							4	9	2.25	17.159	38.609	486.818	.0%	.1%	.3%	.1%	
** Total by Segname Feedbk							55,900	8,730	.16	20.227	3.159	11.386	101%	111%	100%	106%	

Figure 233. PSB Details by Segment Name Feedback report

Date=14Jun2018 Time=09.23.41.31		IMS 15.1.0		IMS Performance Analyzer		Report from 14Jun2018 09.23.41.31				
				PSB Details		PCB Totals (DD)				
DDname or				IWAITS		Elap/IWAIT		IWTelap/Cl		
PCBNAME	Func Lvl Segname Sc	PSBNAME	TranCode	Calls	IWAITS	/Call	Sc.Mil.Mic	Sc.Mil.Mic	(Max IWT)	---Percent of System---
CKTTGMDD		RCLBDEN	CLBDEN	6	19	3.17	17.417	55.155	51.373	.0% .2% .2%
		RCLBDEN	ZRCLBFEN	3	4	1.33	18.520	24.693	29.848	.0% .1% .0%
		RCLBDPT	CLBDPT	1	3	3.00	16.360	49.081	25.016	.0% .0% .0%
		ZRCPCD	ZRCPCD	1	1	1.00	43.441	43.441	43.441	.0% .0% .0%
		ZRGCA10	ZRGCA10	2	3	1.50	32.506	48.760	42.190	.0% .0% .1%
		ZRGC002	ZRGC002	22	48	2.18	26.084	56.811	287.685	.0% .6% .8%
		ZRSC2DR	ZRSC2DR	2	4	2.00	13.735	27.471	27.810	.0% .1% .0%
	CKTTGMDD ** Total			37	82	2.22	23.195	51.406	287.685	.1% 1.0% 1.1%
CKTXRFDP		ZRGCA10	ZRGCA10	3	4	1.33	25.222	33.629	33.793	.0% .1% .1%
		ZRGC002	ZRGC002	3	8	2.67	23.804	63.477	47.560	.0% .1% .1%
		ZRPRI01	ZRPRI02	1	1	1.00	44.498	44.498	44.498	.0% .0% .0%
		ZRSCXDR	ZRSCXDR	2	32	16.00	191.072	3,057.157	1,671.658	.0% .4% 3.7%
		ZRSC2DR	ZRSC2DR	1	9	9.00	9.598	86.385	27.710	.0% .1% .1%
		ZRWAD	ZRWAD	2	3	1.50	17.218	25.827	31.124	.0% .0% .0%
CKTXRFDP ** Total				12	57	4.75	115.582	549.014	1,671.658	.0% .7% 4.0%
RTTBLDD		RCLBDDS	ZRCLBFDS	77	130	1.69	8.217	13.873	45.310	.1% 1.7% .6%
		RCLBDEN	CLBDEN	13	23	1.77	14.635	25.893	41.717	.0% .3% .2%
		RCLBDEN	ZRCLBFEN	2	2	1.00	11.378	11.378	14.866	.0% .0% .0%
ZRTTBLDD		ZRSC2DR	ZRSC2DR	8	18	2.25	7.806	17.788	23.215	.0% .2% .1%
		ZRWAD	ZRWAD	1	2	2.00	17.813	35.625	21.683	.0% .0% .0%
ZRTTBLDD ** Total				299	473	1.58	8.818	14.107	45.310	.5% 6.0% 2.5%
ZRVIEWDP		RCLBDFN	CLBDFN	1	9	9.00	17.159	154.434	28.024	.0% .1% .1%
** Total PCB Totals (DD)				3,528	7,852	2.23	21.118	47.000	3,302.570	6.3% 100% 100%

Figure 234. PSB Details-PCB Totals (DD) report

Date=14Jun2018 Time=09.23.41.31		IMS 15.1.0		IMS Performance Analyzer		Report from 14Jun2018 09.23.41.31				
				PSB Details by DDname		IWTd on				
DDname or				IWAITS		Elap/IWAIT		IWTelap/Cl		
PCBNAME	Func Lvl Segname Sc	PSBNAME	TranCode	Calls	IWAITS	/Call	Sc.Mil.Mic	Sc.Mil.Mic	(Max IWT)	---Percent of System---
CKTTGMDD		CKTFLSDI		1	6	6.00	14.871	89.828	41.346	.0% .1% .1%
		CKTPDCDI		6	15	2.50	34.331	85.827	287.685	.0% .2% .3%
		CKTTGMDD		32	61	1.81	21.266	40.539	66.821	.1% .8% .8%
	CKTTGMDD ** Total			39	82	2.10	23.195	48.770	287.685	.1% 1.0% 1.1%
CKTXRFDP		CKTXRFDI		6	18	3.00	123.079	369.236	1,527.260	.0% .2% 1.3%
		CKTXRFDP		6	9	1.50	18.168	27.252	44.498	.0% .1% .1%
		ZRC1LZDI		4	14	3.50	153.155	536.042	1,671.658	.0% .2% 1.3%
		ZRC1SSDI		6	16	2.67	129.067	344.179	1,569.590	.0% .2% 1.2%
CKTXRFDP ** Total				22	57	2.59	115.582	299.462	1,671.658	.0% .7% 4.0%
CLBDCPDD		CLBDCPDD		51	68	1.33	18.832	25.109	143.811	.1% .8% .8%
		CLBDCPG2		5	9	1.80	26.823	48.282	51.145	.0% .1% .1%
CLBDCPDD ** Total				56	77	1.38	19.766	27.178	143.811	.1% 1.0% .8%
ZRTTBLDD		ZRTTBLDD		299	473	1.58	8.818	14.107	45.310	.5% 6.0% 2.5%
		ZRVIEWDI		1	7	7.00	18.813	131.691	28.024	.0% .1% .1%
ZRVIEWDP		ZRVIEWDP		1	2	2.00	11.372	22.743	19.730	.0% .0% .0%
ZRVIEWDP ** Total				2	9	4.50	17.159	77.217	28.024	.0% .1% .1%
** Total by DDname IWTd on				4,774	7,852	1.64	21.118	34.733	3,302.570	8.6% 100% 100%

Figure 235. PSB Details by DDname IWAITed On report

Date=14Jun2018 Time=09.23.41.31				IMS 15.1.0		IMS Performance Analyzer				Report from 14Jun2018 09.23.41.31								
DDname or				PSB Details by Function(DD)														
PCBNAME	Func	Lvl	Segname	Sc	PSBNAME	TranCode	Calls	IWAITs	/Call	Elap/IWAIT	Sc.Mil.Mic	IWTElap/Cl	Elap/Call	(Max IWT)	Calls	IWTs	ClElp	IWTEl
CKTTGMDD	GU				RCLBDEN	CLBDEN	4	14	3.50	17.172	60.103	41.346	.0%	.2%	.1%			
					RCLBDEN	ZRCLBFEN	1	2	2.00	23.443	46.886	29.848	.0%	.0%	.0%			
					RCLBDPT	CLBDPT	1	3	3.00	16.360	49.081	25.016	.0%	.0%	.0%			
					ZRGCA10	ZRGCA10	2	3	1.50	32.506	48.760	42.190	.0%	.0%	.1%			
					ZRGC002	ZRGC002	21	46	2.19	26.826	58.881	287.685	.0%	.6%	.7%			
					ZRSC2DR	ZRSC2DR	1	2	2.00	14.824	29.847	27.810	.0%	.0%	.0%			
					ZRGC002	ZRGC002	1	2	2.00	6.720	13.440	11.549	.0%	.0%	.0%			
		ISRT			RCLBDEN	CLBDEN	2	5	2.50	18.103	45.259	51.373	.0%	.1%	.1%			
		REPL			RCLBDEN	ZRCLBFEN	2	2	1.00	13.597	13.597	23.128	.0%	.0%	.0%			
					ZRCPCD	ZRCPCD	1	1	1.00	43.441	43.441	43.441	.0%	.0%	.0%			
					ZRSC2DR	ZRSC2DR	1	2	2.00	12.547	25.094	23.269	.0%	.0%	.0%			
CKTTGMDD ** Total							37	82	2.22	23.195	51.406	287.685	.1%	1.0%	1.1%			
CKTXRFDP	GU				ZRGCA10	ZRGCA10	1	1	1.00	20.877	20.877	20.877	.0%	.0%	.0%			
					ZRGC002	ZRGC002	1	3	3.00	25.860	77.880	28.043	.0%	.0%	.0%			
					ZRPRI01	ZRPRI02	1	1	1.00	44.498	44.498	44.498	.0%	.0%	.0%			
					ZRSCXDR	RSCXDR	2	32	16.00	191.072	3,057.157	1,671.658	.0%	.4%	3.7%			
					ZRWAD	ZRWAD	2	3	1.50	17.218	25.827	31.124	.0%	.0%	.0%			
		ISRT			ZRGCA10	ZRGCA10	2	3	1.50	26.637	39.856	33.793	.0%	.0%	.0%			
					ZRGC002	ZRGC002	2	5	2.50	22.510	56.276	47.560	.0%	.1%	.1%			
					ZRSC2DR	ZRSC2DR	1	9	9.00	9.598	86.385	27.710	.0%	.1%	.1%			
CKTXRFDP ** Total							12	57	4.75	115.582	549.014	1,671.658	.0%	.7%	4.0%			
:																		
:																		
ZRTTBLDD	GNP				RCLBDDS	ZRCLBFDS	16	16	1.00	3.087	3.087	10.114	.0%	.2%	.0%			
:																		
	GU				ZRSCXDR	RSCXDR	14	38	2.71	12.297	33.378	31.853	.0%	.5%	.3%			
					ZRSC2DR	ZRSC2DR	8	18	2.25	7.806	17.788	23.215	.0%	.2%	.1%			
					ZRWAD	ZRWAD	1	2	2.00	17.813	35.625	21.683	.0%	.0%	.0%			
ZRTTBLDD ** Total							299	473	1.58	8.818	14.107	45.310	.5%	6.0%	2.5%			
ZRVIEWDP	GU				RCLBDFN	CLBDFN	1	9	9.00	17.159	154.434	28.024	.0%	.1%	.1%			
** Total by Function(DD)							3,528	7,852	2.23	21.118	47.000	3,302.570	6.3%	100%	100%			

Figure 236. PSB Details by Function Code (DD) report

Date=14Jun2018		Time=09.23.41.31		IMS 15.1.0		IMS Performance Analyzer				Report from 14Jun2018 09.23.41.31													
							PSB Details by Functn-DDname																
PCBNAME	Func	Lvl	DDname or Segname	Sc	PSBNAME	TranCode	Calls	IWAITs	/Call	Sc.Mil.Mic	IWTElap/Cl	Elap/Call	---Percent of System---										
CKTTGMDD	GU											(Max IWT)	Calls	IWTs	ClElp	IWTEl							
			CKTLDSDI		RCLBDEN	CLBDEN	1	6	6.00	14.871	89.828	41.346	.0%	.1%	.1%								
			CKTPDCDI		ZRGC002	ZRGC002	1	6	6.00	55.464	332.784	287.685	.0%	.1%	.2%								
			CKTTGMDD		RCLBDEN	CLBDEN	4	8	2.00	18.823	37.646	28.754	.0%	.1%	.1%								
			CKTTGMDD		RCLBDEN	ZRCLBFEN	1	2	2.00	23.443	46.886	29.848	.0%	.0%	.0%								
			CKTTGMDD		RCLBDPT	CLBDPT	1	3	3.00	16.360	49.081	25.016	.0%	.0%	.0%								
			CKTTGMDD		ZRGA10	ZRGA10	2	3	1.50	32.506	48.760	42.190	.0%	.0%	.1%								
			CKTTGMDD		ZRGC002	ZRGC002	21	40	1.80	22.645	43.134	66.821	.0%	.5%	.5%								
			CKTTGMDD		ZRSC2DR	ZRSC2DR	1	2	2.00	14.824	29.847	27.810	.0%	.0%	.0%								
	ISRT		CKTTGMDD		ZRGC002	ZRGC002	1	2	2.00	6.720	13.440	11.549	.0%	.0%	.0%								
	REPL		CKTPDCDI		RCLBDEN	CLBDEN	2	5	2.50	18.103	45.259	51.373	.0%	.1%	.1%								
			CKTPDCDI		RCLBDEN	ZRCLBFEN	1	1	1.00	23.128	23.128	23.128	.0%	.0%	.0%								
			CKTPDCDI		ZRCPD	ZRCPD	1	1	1.00	43.441	43.441	43.441	.0%	.0%	.0%								
			CKTPDCDI		ZRSC2DR	ZRSC2DR	1	2	2.00	12.547	25.094	23.269	.0%	.0%	.0%								
			CKTTGMDD		RCLBDEN	ZRCLBFEN	1	1	1.00	4.065	4.065	4.065	.0%	.0%	.0%								
CKTTGMDD ** Total							39	82	2.10	23.195	48.770	287.685	.1%	1.0%	1.1%								
CKTXRFDP GU																							
			CKTXRFDI		ZRGA10	ZRGA10	1	1	1.00	20.877	20.877	20.877	.0%	.0%	.0%								
			CKTXRFDI		ZRGC002	ZRGC002	1	2	2.00	27.368	54.735	28.043	.0%	.0%	.0%								
⋮																							
ZRTCXDP1		GU	ZRTCXDP1		RCLBDEN	CLBDEN	1	11	11.00	9.784	107.628	27.827	.0%	.1%	.1%								
ZRTTBLDD GNP																							
			ZRTTBLDD		RCLBDDS	ZRCLBFDS	16	16	1.00	3.087	3.087	10.114	.0%	.2%	.0%								
			ZRTTBLDD		RCLBDEN	CLBDEN	1	1	1.00	2.503	2.503	2.503	.0%	.0%	.0%								
			ZRTTBLDD		RCLBDFN	CLBDFN	3	3	1.00	2.116	2.116	2.129	.0%	.0%	.0%								
			ZRTTBLDD		ZRCMMMSG	ZRCMMSGA	1	1	1.00	4.723	4.723	4.723	.0%	.0%	.0%								
			ZRTTBLDD		ZRGC002	ZRGC002	51	51	1.00	5.082	5.082	32.859	.1%	.6%	.2%								
⋮																							
			ZRTTBLDD		ZRWAD	ZRWAD	1	2	2.00	17.813	35.625	21.683	.0%	.0%	.0%								
ZRTTBLDD ** Total							299	473	1.58	8.818	14.107	45.310	.5%	6.0%	2.5%								
ZRVIEWDP GU																							
			ZRVIEWDI		RCLBDFN	CLBDFN	1	7	7.00	18.813	131.691	28.024	.0%	.1%	.1%								
			ZRVIEWDP		RCLBDFN	CLBDFN	1	2	2.00	11.372	22.743	19.730	.0%	.0%	.0%								
ZRVIEWDP ** Total							2	9	4.50	17.159	77.217	28.024	.0%	.1%	.1%								

** Total by Functn-DDname							4,774	7,852	1.64	21.118	34.733	3,302.570	8.6%	100%	100%								

Figure 237. PSB Details by Function Code-DDname report

Report from 25Jun2018 14.45.00.04				IMS 15.1.0	IMS Performance Analyzer 4.4				Report to 25Jun2018 14.54.59.99							
						PSB Details		PCB	Totals							
		DDname or				IWAITS		Elap/IWAIT	IWTElap/Cl	Elap/Call	---Percent of System---					
PCBNAME	Func	Lvl	Segname	Sc	PSBNAME	TranCode	Callls	IWAITS	/Call	Sc.Mil.Mic	Sc.Mil.Mic	(Max IWT)	Callls	IWTs	ClElp	IWTEl
I/O PCB							39,624	6,114	.15	6.688	1.032	3.636	31.7%	21.7%	25.5%	9.5%
P2I1 (E)							6,757	6,757	1.00	10.157	10.157	10.157	5.4%	24.0%	12.1%	15.9%
RMCS00DE							65,367	4,251	.07	22.549	1.466	1.544	52.2%	15.1%	17.8%	22.2%
RMMSGCDD							30	29	.97	20.927	20.230	22.960	.0%	.1%	.1%	.1%
RMMSSNDP							20	70	3.50	21.700	75.949	79.256	.0%	.2%	.3%	.4%
RMMSSNDX							2,666	3,392	1.27	20.925	26.624	28.579	2.1%	12.1%	13.5%	16.5%
RMZIETDD							19	2	.11	17.266	1.817	1.960	.0%	.0%	.0%	.0%
RMZILGDP							3,761	7,429	1.98	20.399	40.293	44.848	3.0%	26.4%	29.8%	35.1%
RMZIUADP							2,960	82	.03	13.445	0.372	1.562	2.4%	.3%	.8%	.3%
-----							121,204	28,126	.23	15.330	3.557	4.665	96.8%	100%	100%	100%
** Total PCB Totals							121,204	28,126	.23	15.330	3.557	4.665	96.8%	100%	100%	100%
						PSB Details by		Function Code								
		DDname or				IWAITS		Elap/IWAIT	IWTElap/Cl	Elap/Call	---Percent of System---					
PCBNAME	Func	Lvl	Segname	Sc	PSBNAME	TranCode	Callls	IWAITS	/Call	Sc.Mil.Mic	Sc.Mil.Mic	(Max IWT)	Callls	IWTs	ClElp	IWTEl
I/O PCB	ASRT						2,879	1,293	.45	0.992	0.446	0.703	2.3%	4.6%	.4%	.3%
	BFPM						2,843					0.189	2.3%	.0%	.1%	.0%
	CHKP						43					8.531	.0%	.0%	.1%	.0%
	CHNG						7,524					1.563	6.0%	.0%	2.1%	.0%
	GU						10,363	4,821	.47	8.215	3.822	12.287	8.3%	17.1%	22.5%	9.2%
	ISRT						7,524					0.112	6.0%	.0%	.1%	.0%
	LOG						927					0.100	.7%	.0%	.0%	.0%
	PURG						7,521					0.150	6.0%	.0%	.2%	.0%
I/O PCB ** Total							39,624	6,114	.15	6.688	1.032	3.636	31.7%	21.7%	25.5%	9.5%
P2I1 (E) Normal Call							2,666	2,666	1.00	25.196	25.196	25.196	2.1%	9.5%	11.9%	15.6%
	Signon						2,685	2,685	1.00	0.282	0.282	0.282	2.1%	9.5%	.1%	.2%
	Create Thrd						1,349	1,349	1.00	0.518	0.518	0.518	1.1%	4.8%	.1%	.2%
	SNO						57	57	1.00	0.063	0.063	0.063	.0%	.2%	.0%	.0%
P2I1 (E) ** Total							6,757	6,757	1.00	10.157	10.157	10.157	5.4%	24.0%	12.1%	15.9%
. . .																
-----							121,204	28,126	.23	15.330	3.557	4.665	96.8%	100%	100%	100%
** Total by Function Code							121,204	28,126	.23	15.330	3.557	4.665	96.8%	100%	100%	100%

Figure 238. PSB Details report with ESAF Integration

PSB-Transaction Code Analysis report

The PSB-Transaction Code Analysis report is a detailed analysis of program activity.

The information presented for each PSB-transaction code includes the following analysis, with optional distributions, of schedule, transaction, and call activity:

- Elapsed time per schedule
- Elapsed time per call
- Elapsed time per IWAIT
- IWAITs per call
- Optionally, detailed analysis of PSB activity by PCB name, DDname, function code, segment name, and status code

Monitor records: This report is derived from monitor records 02–13, 20–29, 48–49, 56–65.

Uses

These PSB-Transaction Code Analysis reports present the same data as the PSB Details reports but in a collating sequence that highlights application program activity relative to databases. These reports are not as useful as the PSB Details reports in identifying general database-related problems, but if particular application problems are suspected, they are useful in more quickly isolating these problems.

These reports also serve as an excellent source of information to be filed with each program documentation package. In addition, the activity profiles reported provide an excellent means of monitoring application performance against installation design and performance standards. If you use the DB Monitor, this report is almost identical to the PSB Details reports because there is only one program reported on. The only difference is that the PSB Details reports are produced with each report on a new page, while the PSB-Transaction Code Analysis reports are concatenated.

Report options:

To obtain the PSB-Transaction Code Analysis report, select **Program Activity Detail** in a Monitor Report Set.

The options are:

- Select **2. PSB-TranCode Analysis**
- Select one or more of the report options from the list of **Reports Required** to produce the corresponding report types for the PSB Details section of the report:

Function Code

PCB Totals by Function Code

Segment Name

PCB Totals by Segname Feedbk

DDname

PCB Totals PCB Totals(DD) by DDname IWTd On

Function-Segment Name

PCB Totals by Functn-Segname

Function-DDname

PCB Totals PCB Totals(DD) by Function(DD) by Functn-DDname

Report output is sent to the DDname specified in Detail Report Output DDname on the Monitor Global Options panel.

The **ESAF Integration** option is applicable to this report.

The PSB Details section of the report combines information for all dependent regions. If the **Report Breaks by Region** option is selected on the Monitor Global Options panel, the report will also show program analysis, call analysis, and distributions for each region.

To produce the graphical distributions, select **Include Distributions in Reports** from the Monitor Global Options panel and specify one or more of the following Distributions to obtain the corresponding graph:

- **Elapsed Time per Schedule**
- **Elapsed Time per Call**
- **Elapsed Time per IWAIT**

- **IWAITs per Call**

If no Distributions are specified, only the Elapsed Time per Schedule distribution statistics are produced.

Report content:

The PSB-Transaction Code Analysis report contains Program Summary and PSB Details reports for each PSB-transaction code.

Each page of this report has the heading **Analysis of PSBname - Transaction Code**. In addition, the first page contains **Region Totals** and optionally **Region No. *nn*** where:

Region Totals

Shows all activity of this PSB-Transaction code

Region No. *nn*

Shows activity of this PSB-Transaction code for region *nn* when the **Report Breaks by Region** option is selected

Program Analysis

This section of the report is identical in format to the Program Analysis section of the Program Summary report. The program analysis is followed by the elapsed time per schedule distribution. The statistics line is always produced. The graph is also presented if a corresponding Distribution is specified.

Call Analysis

This section of the report is identical in format to the Call Analysis section of the Program Summary report. The call analysis is followed by the elapsed time per call, elapsed time per IWAIT, and IWAITs per call distribution graphs if the corresponding Distributions are specified.

PSB Details

This section of the report presents, in PSB Details report format, PSB details for this PSB-transaction code. Specific content is as requested by the report options selected from the list of **Reports Required**. See "PSB Details reports" on page 423 for a detailed description of the content.

Analysis of ZRPRW01 -ZRPRW02

Region Totals

** Program Analysis **

		----- Per Schedule -----						----- Per Transaction -----							
PSBname	TranCode	Scheds	Trans	/Sched	Scd-DLI	DLI-Term	Sched	on Q	Calls	IWTs	Sc.Mil.Mic	Elapsed	CPUtime	Pct of Tran	Elap
ZRPRW01	ZRPRW02	5	5	1.00	555.104	620.057	.0	38.0	7.2	620.057	104.666	16.9%	24.0%	18.1%	

		----- Message Queue Calls -----						----- Database Calls -----							
PSBname	TranCode	Calls	IWTs	IWTs	CPY Elp	DLA Elp	Elp/IWT	Calls	IWTs	IWTs	CPY Elp	DLA Elp	Elp/IWT	Pct DB	Call Elap
ZRPRW01	ZRPRW02	8.0	4.4	.55	0.033	8.173	11.934	30.0	2.8	.09	0.111	2.655	21.291	4.0%	96.0% 71.8%

Report Type	PCBNAME	Func	DDname or lvl Segname Sc	Calls	IWAITs	Elap/IWAIT /Call	Sc.Mil.Mic	IWTElap/Cl Sc.Mil.Mic	Elap/Call (Max IWT)	---age of PSB-Tran---	Call	IWTs	ClElp	IWTEl
PCB Totals	COCORDD	** Total		54	1	.02	29.908	0.554	1.373	28.4%	2.8%	10.0%	5.3%	
	COCRRODD	** Total		4					0.407	2.1%	.0%	.2%	.0%	
	I/O PCB	** Total		40	22	.55	11.934	6.564	8.206	21.1%	61.1%	44.2%	46.8%	
	ZRGCDADD	** Total		9					0.524	4.7%	.0%	.6%	.0%	
	ZRGCDIDD	** Total		15					0.557	7.9%	.0%	1.1%	.0%	
	ZRGCD2DD	** Total		9	11	1.22	22.126	27.042	28.709	4.7%	30.6%	34.8%	43.4%	
	ZRPRDTDD	** Total		2					0.524	1.1%	.0%	.1%	.0%	
	ZRPRTRDP	** Total		11	2	.18	12.392	2.253	3.317	5.8%	5.6%	4.9%	4.4%	
	ZRPRWLDP	** Total		34					0.719	17.9%	.0%	3.3%	.0%	
	ZRPRWLDP1	** Total		12					0.471	6.3%	.0%	.8%	.0%	
PCB Totals	** Total			190	36	.19	15.573	2.951	3.911	100%	100%	100%	100%	
PCB Totals(DD)	COCORDD	** Total		1	1	1.00	29.908	29.908	29.908	.5%	2.8%		5.3%	
	I/O PCB	** Total		5	22	4.40	11.934	52.509	98.928	2.6%	61.1%		46.8%	
	ZRGCD2DD	** Total		3	11	3.67	22.126	81.127	50.154	1.6%	30.6%		43.4%	
	ZRPRTRDP	** Total		2	2	1.00	12.392	12.392	23.096	1.1%	5.6%		4.4%	
PCB Totals(DD)	** Total			11	36	3.27	15.573	50.965	98.928	5.8%	100%		100%	

Figure 239. PSB-Transaction Code Analysis report: PCB Totals (DD)

Report from 31Jul2014 15:56:59:17			IMS 14.1.0		IMS Performance Analyzer 4.4				Report to 31Jul2014 16:15:52:57		
			<u>Analysis of ZRPRW01 -ZRPRW02</u>								
Report Type	PCBNAME	Func	DDname or lvl Segname Sc	Calls	IWAITs	/Call	Elap/IWAIT	IWTElap/Cl	Elap/Call	---%age of PSB-Tran---	
by DDname IWTd on	COCORDDD		COCORDDD	1	1	1.00	29.908	29.908	29.908	.5%	2.8%
	COCORDDD	** Total		1	1	1.00	29.908	29.908	29.908	.5%	2.8%
	I/O PCB		COCORDDD	2	2	1.00	19.124	19.124	22.483	1.1%	5.6%
			ZRGC01DD	5	5	1.00	4.643	4.643	6.828	2.6%	13.9%
			ZRPTRP1	5	5	1.00	15.929	15.929	66.207	2.6%	13.9%
			ZRPRWLDI	5	5	1.00	21.679	21.679	98.928	2.6%	13.9%
			ZRPRWLP1	5	5	1.00	2.608	2.608	5.760	2.6%	13.9%
	I/O PCB	** Total		22	22	1.00	11.934	11.934	98.928	11.6%	61.1%
	ZRGC02DD		ZRGC02DD	3	11	3.67	22.126	81.127	50.154	1.6%	30.6%
	ZRGC02DD	** Total		3	11	3.67	22.126	81.127	50.154	1.6%	30.6%
	ZRPTRDP		ZRPTRDI	1	1	1.00	1.687	1.687	1.687	.5%	2.8%
			ZRPTRP1	1	1	1.00	23.096	23.096	23.096	.5%	2.8%
	ZRPTRDP	** Total		2	2	1.00	12.392	12.392	23.096	1.1%	5.6%
-----				-----							
by DDname IWTd on	** Total			28	36	1.29	15.573	20.022	98.928	14.7%	100%

Figure 240. PSB-Transaction Code Analysis report: by DDname IWTd on

Report from 31May2018 13.06.10.91		IMS 15.1.0		IMS Performance Analyzer 4.4		Report to 31May2018 13.11.23.46											
		Analysis of AI342 -AI342T01															
Region Totals																	
** Program Analysis **																	
----- Per Schedule ----- ----- Per Transaction -----																	
PSBname	TranCode	Scheds	Trans	Trans /Sched	Scd-DLI Mil.Mic	DLI-Term Scd on Q Sc.Mil.Mic	Elapsed CPUtime Pct of Tran Elap										
AI342	AI342T01	2	2	1.00	2.041	139.958 .0	15.0 9.0 139.958 6.968 5.0% 41.3% 117%										
** Call Analysis **																	
----- Message Queue Calls ----- ----- Database Calls -----																	
		Calls	IWTs	IWTs	CPY Elp	DLA Elp	Elp/IWT	Calls	IWTs	IWTs	CPY Elp	DLA Elp	Elp/IWT	Pct	DB	Call	Elap
PSBname	TranCode	/Tran	/Tran	/Call	Mil.Mic	Mil.Mic	Mil.Mic	/Tran	/Tran	/Call	Mil.Mic	Mil.Mic	Mil.Mic	CPY	DLA	IWT	
AI342	AI342T01	5.0	3.0	.60	0.010	8.622	48.217	2.0	1.0	.50	0.036	7.262	13.822	.5%	99.5%	94.7%	
Report Type	PCBNAME	Func	lvl	DDname or Segname	Sc	Calls	IWAITs	IWAITs /Call	Elap/IWAIT Sc.Mil.Mic	IWTElap/Cl Sc.Mil.Mic	Elap/Call (Max IWT)	---%age of PSB-Tran---	Call	IWTs	ClElp	IWTEl	
PCB Totals	DBP2 (E)	** Total				12	14	1.17	21.208	24.742	7.724	40.0%	77.8%	74.0%	90.9%		
	DB2621	** Total				2					0.211	6.7%	.0%	.3%	.0%		
	DB4131	** Total				2	2	1.00	13.822	13.822	14.385	6.7%	11.1%	23.0%	8.5%		
	I/O PCB	** Total				8	2	.25	1.041	0.260	0.415	26.7%	11.1%	2.7%	.6%		
PCB Totals	** Total					24	18	.75	18.146	13.610	5.217	80.0%	100%	100%	100%		
by Segname	Feedbk	DBP2 (E)00				10	10	1.00	0.969	0.969	0.969	33.3%	55.6%	7.7%	3.0%		
		D8		QC		2	4	2.00	71.805	143.611	41.501	6.7%	22.2%	66.3%	87.9%		
	DBP2 (E)	** Total				12	14	1.17	21.208	24.742	7.724	40.0%	77.8%	74.0%	90.9%		
	DB2621	01 SG01002				2					0.211	6.7%	.0%	.3%	.0%		
	DB2621	** Total				2					0.211	6.7%	.0%	.3%	.0%		
	DB4131	01 SG52620				2	2	1.00	13.822	13.822	14.385	6.7%	11.1%	23.0%	8.5%		
	DB4131	** Total				2	2	1.00	13.822	13.822	14.385	6.7%	11.1%	23.0%	8.5%		
	I/O PCB					8	2	.25	1.041	0.260	0.415	26.7%	11.1%	2.7%	.6%		
	I/O PCB	** Total				8	2	.25	1.041	0.260	0.415	26.7%	11.1%	2.7%	.6%		
by Segname	Feedbk	** Total				24	18	.75	18.146	13.610	5.217	80.0%	100%	100%	100%		

Figure 241. PSB-Transaction Code Analysis report: by Segname Feedbk

DDname by PSB-Transaction Code report

The DDname by PSB-Transaction Code report is an analysis of call and IWAIT activity for each (major to minor) DDname, PSB name, transaction code, and PCB name combination. Call activity is only reported for those calls that result in IWAITs. Subtotals for each DDname and totals for all reported activity are presented.

Monitor records: This report is derived from monitor records 02–13, 20–29, 56–65.

Uses

The DDname by PSB-Transaction Code report presents another view of the same type of data presented in the PSB Details By DDname IWAITed On report. You can quickly spot which data set has the greatest IWAIT activity and, within the data set, which PCB and which PSB. In Figure 242 on page 440, DDname ZRTTBLDD has the highest number of IWAITs (473). Of this number, references made by RCLBDDS to the PCB named ZRTTBLDD account for 25.3% of the IWAIT elapsed time.

Report options:

To obtain the DDname by PSB-Transaction Code report, select **Program Activity Detail** in a Monitor Report Set then select the supplementary report **DDname by PSB-TranCode**.

The **Report Format** and **Reports Required** options do not apply to this report.

Report content:

This is an example of the DDname by PSB-Transaction Code report. The column headings in this report have the same meaning as those for the PSB Details reports.

See “PSB Details reports” on page 423.

Report from 18Jul2014 16:54:09:10				IMS 13.1.0 IMS Performance Analyzer 4.4				Report to 18Jul2014 16:56:09:69						
				DDname by PSB-Tran using										
DDname	PSBNAME	TranCode	PCBNAME	Calls	IWAITs	/Call	Sc.Mil.Mic	IWTElap/Cl	Max IWAIT	Percent	DDname	Total		
CKTPDCDI	RCLBDEN	CLBDEN	CKTTGMDD	2	5	2.50	18.103	45.259	51.373	7.1%	13.2%	13.2%		
		I/O PCB	7	7	1.00	5.784	5.784	27.552	25.0%	18.4%	5.9%			
		ZRCLBFEN	CKTTGMDD	1	1	1.00	23.128	23.128	23.128	3.6%	2.6%	3.4%		
	ZRCPD	I/O PCB	9	9	1.00	4.913	4.913	30.193	32.1%	23.7%	6.4%			
		ZRCPD	CKTTGMDD	1	1	1.00	43.441	43.441	43.441	3.6%	2.6%	6.3%		
		I/O PCB	1	1	1.00	2.894	2.894	2.894	3.6%	2.6%	.4%			
	ZRGC002	ZRGC002	CKTTGMDD	1	6	6.00	55.464	332.784	287.685	3.6%	15.8%	48.4%		
	ZRGCP03	ZRGCP03	I/O PCB	3	4	1.33	16.066	21.421	23.919	10.7%	10.5%	9.3%		
	ZRGCP61	CCPSTTY	I/O PCB	1	1	1.00	19.592	19.592	19.592	3.6%	2.6%	2.8%		
	ZRSC2DR	ZRSC2DR	CKTTGMDD	1	2	2.00	12.547	25.094	23.269	3.6%	5.3%	3.6%		
	I/O PCB	1	1	1.00	1.790	1.790	1.790	3.6%	2.6%	.3%				
	** Total				28	38	1.36	18.111	24.579	287.685	100%	100%	100%	
	CKTTGMDD	RCLBDEN	CLBDEN	CKTTGMDD	4	8	2.00	18.823	37.646	28.754	5.6%	5.7%	6.7%	
I/O PCB			7	7	1.00	4.693	4.693	18.824	9.7%	5.0%	1.5%			
ZRCLBFEN			CKTTGMDD	2	3	1.50	16.984	25.476	29.948	2.8%	2.1%	2.3%		
:														
	ZRGC002	ZRGC002	CKTTGMDD	22	42	1.91	21.887	41.784	66.821	30.6%	30.0%	41.2%		
			I/O PCB	8	31	3.88	8.832	34.224	38.543	11.1%	22.1%	12.3%		
			ZRGCP03	ZRGCP03	I/O PCB	3	5	1.67	33.159	55.266	46.588	4.2%	3.6%	7.4%
			ZRGCP61	CCPSTTY	I/O PCB	1	7	7.00	30.552	213.867	45.318	1.4%	5.0%	9.6%
			ZRSC2DR	ZRSC2DR	CKTTGMDD	1	2	2.00	14.924	29.847	27.910	1.4%	1.4%	1.3%
			I/O PCB	1	3	3.00	19.716	59.149	54.078	1.4%	2.1%	2.6%		
			ZRWAD	ZRWAD	I/O PCB	1	1	1.00	2.306	2.306	2.306	1.4%	.7%	.1%
			** Total				72	140	1.94	15.954	31.021	66.821	100%	100%
:														
ZRTTBLDD	RCLBDDS	ZRCLBFDS	ZRTTBLDD	77	130	1.69	8.217	13.873	45.310	25.8%	27.5%	25.3%		
		RCLBDEN	CLBDEN	ZRTTBLDD	13	23	1.77	14.635	25.893	41.717	4.3%	4.9%	8.0%	
		ZRCLBFEN	ZRTTBLDD	2	2	1.00	11.378	11.378	14.966	.7%	.4%	.5%		
:														
	ZRWAD	ZRWAD	ZRTTBLDD	1	2	2.00	17.813	35.625	21.683	.3%	.4%	.8%		
			** Total				299	473	1.58	8.918	14.107	45.310	100%	100%
ZRVIEWDI	RCLBDFN	CLBDFN	ZRVIEWDP	1	7	7.00	18.813	131.691	28.024	100%	100%	100%		
ZRVIEWDP	RCLBDFN	CLBDFN	ZRVIEWDP	1	2	2.00	11.372	22.743	19.730	100%	100%	100%		

Figure 242. DDname by PSB-Transaction Code report

Program Trace report

The Program Trace report is a detailed trace of the events associated with a program schedule. There is a detail line of information for each call and, optionally, each IWAIT occurring during the program schedule. There is also a summary of schedule activity.

Any number of traces can be specified as part of a single IMS PA execution as long as the DDname used for each report is unique.

The Program Trace report is produced from DB Monitor and IMS Monitor traces. It can be used for problem isolation, to determine database use, and for program documentation.

Monitor records: This report is derived from monitor records 02–29, 38–39, 47–49, 56–65.

Uses

The Program Trace report is one of the most useful IMS PA reports, but it is probably one of the least frequently referenced. It is a detailed trace of call and IWAIT activity for MPPs, BMPs or batch region programs.

The trace is an excellent tool for pinpointing the source of performance problems related to program and database design. For example, in the short trace (page Figure 243 on page 443) the inefficient call pattern suspected from the PSB Detail report is clearly shown as a repetitive, redundant sequence of an unproductive GU call followed by an ISRT call. The long trace identifies both calls and related IWAIT activity.

If you are using the DB Monitor, a trace of batch region activity can be excessively long if not controlled; this is because each trace is for a full scheduling of an application program. There is only one scheduling of a batch program. The best means of controlling the volume of output is with the From and To date and time options on the Program Trace panel.

Report options

To obtain the Program Trace report, select **Program Trace** in a Monitor Report Set. More than one trace can be requested by specifying different options and assigning a unique DDname for each.

The options are:

- Date and time range of the trace
- At least one of the following:
 - Program (PSB) name to be traced
 - Transaction code to be traced
 - Region to be traced
- Type of trace; either Short, Long or Summary
- Schedule limit; the maximum number of schedules to be traced
- DDname of the data set to receive the report output; must be unique for each trace

In addition, to produce graphical distributions with the report, select **Include Distributions in Reports** from the Monitor Global Options panel and specify one or more of the following Distributions to obtain the corresponding graph:

- **Elapsed Time per Call**
- **Elapsed Time per IWAIT**
- **IWAITs per Call**

Reporting of VSAM IWAITs is controlled by **Min VSAM IWAIT** specified on the Monitor Global Options panel.

The **ESAF Integration** Option is applicable to this report.

Report content

The Program Trace can be in one of three forms: Short, Long, or Summary.

The Short form of the trace has a single line for each call plus some scheduling data. The Long form, in addition to the data provided by the short trace, has a line for each IWAIT resulting from a call. Both the Short and Long form also produce the one page Summary with optional distributions.

The Summary form of the report provides, for the traced PSB-transaction code, the same data as the **Program Analysis**, **Call Analysis**, **Call Analysis (FP)**, and **Call Analysis (ESAF)** sections of the Program Summary report (see page “Report content” on page 365). The Call Analysis (FP) section is included only if there is Fast Path activity to report. The Call Analysis (ESAF) section is included only if there is External Subsystem activity to report and the ESAF Integration Option is activated. In addition, **ELAPSED PER CALL**, **ELAPSED PER IWAIT**, and **IWAITs PER CALL** distribution graphs are produced if the Monitor Global Option **Include Distributions in Reports** is selected and the corresponding Distributions specified. If selected, but a Distribution is not specified, the corresponding distribution statistics summary line is produced without the graph.

Any VSAM IWAIT whose elapsed time is less than the specified minimum VSAM IWAIT value is flagged with an asterisk (*) following the **IWT Elapsed** column. These IWAITs are not included in the count of the number of IWAITs for the call (**# IWAITs**), the total IWAIT elapsed time for the call (**Call Elap**), or the percent of call time spent in IWAITs (**Pct IWT**).

PROGRAM TRACE

14Jun2018	9.26.47.52	PSB=ZRPRI01	Tran=ZRPRI02	Scheduled in Region 15										Page 1
Relative Time	Pgm Time	Call	St	PCB	Feedbk	Mod	IWT	DDname	IWT Elapsed	Breakdown of Call Time				Call Elap
Secs.Mil.Mic	Sc.Mil.Mic	No.	Cd	Name	Ln	ule	(# IWAITs)		Sc.Mil.Mic	Pct CPY	Pct DLA	Pct IWT	Sc.Mil.Mic	
-	0.718	1	I/O PCB	BFPM						.00%	100.00%	.00%	0.697	
*** Schedule start ***														
+	759.026	2	I/O PCB	GU						100.00%	.00%	.00%	0.020	
+	761.418	3	ZRTTB added	GU	TTABLE03	02				1.05%	98.95%	.00%	45.065	
+	1.094.185	4	COCOR added	GU	COCORD02	02				.02%	99.98%	.00%	1.210.399	
+	2.789.234	5	ZRPRWLP1	GU	CLOINDEX	01	8	2.284.743	.00%	100.00%	35.86%	6.372.037		
+	9.773.795	6	ZRGCD added	GU	ZRGCDAA03	03				29.18%	70.82%	.00%	1.244	
+	9.778.295	7	ZRGCHODD	GU	GE	00				33.16%	66.84%	.00%	0.591	
+	9.778.974	8	ZRGCHODD	GU	ZRGCH001	01				29.06%	70.94%	.00%	0.203	
+	10.540.221	9	ZRPRD added	GU	GE	00	2	49.216	.05%	99.95%	2.74%	1.796.988		
+	12.338.390	10	ZRPRD added	GU	GOCDA01	01	1	53.288	.25%	99.75%	98.37%	54.170		
+	12.392.871	11	ZRPRD added	GNP	GE	GOCDA01	01			59.17%	40.83%	.00%	0.120	
+	12.393.394	12	ZRPRWLP1	GU	CLOINDEX	01				22.38%	77.62%	.00%	0.344	
+	12.393.871	13	ZRPRWLPD	GU	POSITEM	01	10	116.644	.01%	99.99%	3.37%	3.461.584		
+	15.855.829	14	ZRPRWLPD	GU	POSITEM	01				46.84%	53.16%	.00%	0.237	
+	15.856.324	15	ZRPRWLPD	GU	POSITEM	01				50.00%	50.00%	.00%	0.126	
+	16.180.453	16	ZRTTB added	GU	TTABLE02	02	3	75.974	.19%	99.81%	99.17%	76.607		
+	16.257.769	17	ZRTTB added	GU	TTABLE02	02	2	5.316	1.97%	98.03%	91.97%	5.780		
+	16.264.355	18	ZRPRTRDP	GU	GE	00	16	206.241	.00%	100.00%	5.03%	4.097.202		
+	20.361.867	19	ZRPRWLPD	ISRT	POSITEM	01	1	60.020	.01%	99.99%	2.33%	2.579.299		
+	22.993.992	20	ZRPRWLPD	REPL	POSITEM	01				23.70%	76.30%	.00%	0.443	
+	23.143.728	21	ZRPRTRDP	GU	GE	00				21.49%	78.51%	.00%	0.549	
+	23.144.451	22	ZRPRTRDP	ISRT	WORKITEM	01	2	36.119	.01%	99.99%	2.24%	1.613.100		
+	24.757.767	23	ZRPRTRDP	ISRT	EVENT	02	2	15.660	.02%	99.98%	2.46%	635.881		
+	25.395.238	Schedule end at 14Jun2018 09.27.45.02												

Figure 243. Program Trace report (Short)

PROGRAM TRACE

14Jun2018 10.54.34.92 PSB=ZRGCO02 Tran=ZRGCO02 Scheduled in Region 13										Page 63					
Relative Time	Pgm Time	Call	St	PCB	Feedbk	Mod	IWT	DDname	IWT Elapsed	Breakdown of Call Time					Call Elap
Secs.Mil.Mic	Sc.Mil.Mic	No.	PCBname	Func	Cd	Segname	Lvl	ule (# IWAITs)	Sc.Mil.Mic	Pct CPY	Pct DLA	Pct IWT	Sc.Mil.Mic		
- 6.388.380									6.386.636						
- 0.291		1	I/O PCB	BFPM						.00%	100.00%	.00%	0.279		
*** Schedule start ***															
+ 1.163.763	0.000	2	I/O PCB	GU						100.00%	.00%	.00%	0.099		
+ 1.192.658	28.796	3	ZRGCO1DD	GU		GC01SEG	01			16.23%	83.77%	.00%	0.733		
+ 1.193.576	0.185	4	ZRGCO1DD	GU		GC01SEG	01			25.19%	74.81%	.00%	0.528		
+ 1.220.520	26.416	5	COCORDD	GU		COCORD01	01	1	30.721	.45%	99.55%	98.44%	31.209		
+ 1.220.736								DBH OSAM COCORDD	30.721						
+ 1.251.905	0.176	6	COCORDD	GU	GE		00	1	65.709	.16%	99.84%	99.43%	66.084		
+ 1.252.085								DBH OSAM COCORDD	65.709						
+ 1.318.168	0.179	7	COCORDD	REPL		COCORD01	01			16.89%	83.11%	.00%	0.586		
+ 2.355.738	2.256	136	ZRGCO2DD	GU		GC01SEG	01			9.21%	90.79%	.00%	1.075		
+ 2.357.051	0.238	137	ZRGCO1DD	REPL		GC01SEG	01			19.13%	80.87%	.00%	0.392		
+ 2.358.021	0.578	138	I/O PCB	ISRT						18.57%	81.43%	.00%	0.210		
+ 2.358.850	0.619	139	I/O PCB	GU	QC			8	74.087	.03%	99.97%	70.20%	105.538		
+ 2.381.170								VSM VSAM ZRGCO1DD	27.292						
+ 2.408.822								VSM VSAM CKTTGMDD	2.183						
+ 2.411.242								VSM VSAM ZRC1IMDI	1.687						
+ 2.413.159								VSM VSAM ZRC1IODI	1.980						
+ 2.415.541								VSM VSAM ZRC1ICDI	8.362						
+ 2.424.357								VSM VSAM CKTTGMDD	9.618						
+ 2.434.326								VSM VSAM COCXRFDD	15.079						
+ 2.449.842								VSM VSAM COCXRFDD	7.886						
+ 2.479.510	15.122	140	I/O PCB	ASRT						12.50%	87.50%	.00%	0.096		
Schedule end at 14Jun2018 10.54.37.40															

Figure 244. Program Trace report (Long)

Date=14Jun2018 Time=09.23.41.31

IMS 15.1.0

IMS Performance Analyzer

Report from 14Jun2018 09.23.41.31

PROGRAM TRACE

14Jun2018 10.54.34.92

PSB=ZRGCO02

Tran=ZRGCO02

Scheduled in Region 13

Page 8

** Program Analysis **

----- Per Schedule -----

----- Per Transaction -----

Trans

Scd-DLI

DLI-Term

Schd

Elapsed

CPUtime

Pct of Tran

Elap

PSBname

TranCode

Scheds

Trans

/Schd

Mil.Mic

Sc.Mil.Mic

on Q

Calls

IWTs

Sc.Mil.Mic

Mil.Mic

CPU

Call

IWT

ZRGCO02

ZRGCO02

1

1

1.00

1163.763

1.316.335

.0

140.0

17.0

1.316.335

210.132

16.0%

28.3%

20.1%

** Call Analysis **

----- Message Queue Calls -----

----- Database Calls -----

Calls

IWTs

IWTs

CPY

Elp

DLA

Elp

Elp/IWT

Pct DB

Call

Elap

PSBname

TranCode

/Tran

/Tran

/Call

Mil.Mic

Mil.Mic

Mil.Mic

/Tran

/Tran

/Call

Mil.Mic

Mil.Mic

Mil.Mic

CPY

DLA

IWT

ZRGCO02

ZRGCO02

23.0

8.0

.35

0.029

4.997

9.261

117.0

9.0

.08

0.089

2.110

21.142

4.0%

96.0%

74.0%

ELAPSED PER CALL

Average

Std-Dev/Avg

Max Value

2.663

4.464

105.538

Range

Count in

Sc Mil Mic

Range

To Maximum

0

1.000.000

0

500.000

0

300.000

1

100.000

2 *

50.000

1

30.000

2 *

10.000

0

5.000

11 ***

1.000

123 *****

140

10

20

30

40

50%

Total=

ELAPSED PER IWAIT

Average

Std-Dev/Avg

Max Value

15.551

1.036

65.709

Range

Count in

Sc Mil Mic

Range

To Maximum

0

1.000.000

0

500.000

0

300.000

0

100.000

1 **

50.000

1 **

30.000

6 *****

10.000

3 *****

5.000

6 *****

1.000

0

17

10

20

30

40

50%

Total=

IWAITS PER CALL

Average

Std-Dev/Avg

Max Value

0.000

6.637

0.008

Range

Count in

Sc Mil Mic

Range

To Maximum

0

1.000.000

0

500.000

0

300.000

0

100.000

0

50.000

0

30.000

0

10.000

0

5.000

0

1.000

140 *****

140

10

20

30

40

50%

Total=

Figure 245. Program Trace report (Summary)

Report from 25Jun2018 14.45.00.04		IMS 15.1.0		IMS Performance Analyzer 4.4		Report to 25Jun2018 14.45.00.04													
PROGRAM TRACE																			
25Jun2018 14.45.00.04		PSB=RMZIOIS1 Tran=RMZITIS1		Scheduled in Region 23		Page 2													
Relative Time Pgm Time		Call		ST PCB Feedbck Mod IWT DDname		IWT Elapsed Breakdown of Call Time		Call Elap											
Secs.Mil.Mic Sc.Mil.Mic		No. PCBname Func Cd		Segname Lvl ULE (# IWAITS)		Sc.Mil.Mic Pct CPY Pct DLA Pct IWT		Sc.Mil.Mic											
+ 79.911 0.017		49 I/O PCB CHNG				3.91% 96.09% .00%		0.409											
+ 80.349 0.029		50 I/O PCB ISRT				20.69% 79.31% .00%		0.087											
+ 80.472 0.036		51 I/O PCB PURG				9.21% 90.79% .00%		0.152											
+ 80.643 0.019		53 I/O PCB GU				1 0.229 .16% 99.84% 1.54%		14.828											
+ 95.583 0.112		54 RMCS00DE GU		RMMSCS05 02		1 32.794 .01% 99.99% 99.57%		32.937											
+ 128.629 0.109		55 RMCS00DE GU		RMMSCS10 03		1.92% 98.08% .00%		0.052											
+ 128.715 0.034		56 RMCS00DE GNP		RMMSCS20 03		6.45% 93.55% .00%		0.031											
+ 128.758 0.012		57 RMCS00DE GNP		RMMSCS20 03		10.00% 90.00% .00%		0.020											
+ 128.789 0.011		58 RMCS00DE GNP		GE RMMSCS05 02		5.88% 94.12% .00%		0.017											
+ 128.921 0.115		59 P2I1 (E)		00 Signon S00		1 0.603 .00% 100.00% 100.00%		0.603											
+ 129.596 0.072		60 P2I1 (E)		00 Normal Call PR0		1 0.554 .00% 100.00% 100.00%		0.554											
+ 130.209 0.059		61 RMCS00DE GNP		RMMSCS30 03		1.03% 98.97% .00%		0.097											
+ 130.356 0.050		62 RMCS00DE GNP		GE RMMSCS05 02		3.64% 96.36% .00%		0.055											
...																			
PROGRAM TRACE																			
25Jun2018 14.45.00.04		PSB=RMZIOIS1 Tran=RMZITIS1		Scheduled in Region 23		Page 3													
** Program Analysis **																			
----- Per Schedule ----- ----- Per Transaction -----																			
PSBname TranCode		Scheds Trans		Trans /Sched		Scd-DLI Mil.Mic		DLI-Term Schd on Q		Calls IWTs		Elapsed Sc.Mil.Mic		CPUtime Mil.Mic		Pct of Tran Elap CPU Call IWT			
RMZIOIS1 RMZITIS1		1 2		2.00		9.996		155.663 2.0		40.5 5.5		77.832		26.728		34.3% 91.3% 49.8%			
** Call Analysis **																			
----- Message Queue Calls ----- ----- Database Calls -----																			
Calls IWTs		IWTs CPY Elp		DLA Elp Elp/IWT		Calls IWTs		IWTs CPY Elp		DLA Elp Elp/IWT		Pct DB Call Elap							
PSBname TranCode		/Tran /Tran		/Call Mil.Mic		Mil.Mic Mil.Mic		/Tran /Tran		/Call Mil.Mic		Mil.Mic Mil.Mic		CPY DLA IWT					
RMZIOIS1 RMZITIS1		11.0 2.0		.18 0.165		2.662 0.949		25.5 1.5		.06 0.003		1.565 21.564		.2% 99.8% 80.9%					
** Call Analysis (ESAF) **																			
- Initialization - -- Normal Call --- --- Commit Ph1 --- --- Commit Ph2 --- --- Termination --																			
PSBname TranCode		SSID		ESAF Calls		Elap/Call Sc.Mil.Mic		Calls Elap/Call		Sc.Mil.Mic		Calls Elap/Call		Sc.Mil.Mic		Calls Elap/Call			
RMZIOIS1 RMZITIS1		P2I1		1.0		0.535		1.0 3.971		1.5 0.226		0.5 3.119							
ELAPSED PER CALL												ELAPSED PER IWAIT				IWAITS PER CALL			
Average Std-Dev/Avg		Max Value		Average Std-Dev/Avg		Max Value		Average Std-Dev/Avg		Max Value		Average Std-Dev/Avg		Max Value					
1.964 2.742		32.937		7.045 1.516		32.794		0.14 2.449		1									

Figure 246. Program Trace report (Short and Summary) with ESAF Integration

The first line of the Program Trace report is the heading, which contains the following information:

Date, Time

The date and time of the start of the schedule (message scheduling end, type 11 record).

PSB=xxxxxxx

PSB name of the scheduled program.

Tran=xxxxxxx

Transaction code of the first transaction.

Scheduled in Region *nn*

IMS region number in which this PSB is scheduled.

Page

Page number of this trace.

The detail lines in the Program Trace report appear under the following column headings:

Relative Time Secs.Mil.Mic

Relative time of reported activity from schedule start. Scheduling activities are also reported. The relative times for these activities are negative.

Pgm Time Sc.Mil.Mic

The elapsed time from the end of the last reported activity until the beginning of this activity. This normally represents program activity between program calls. Maximum value: 10 seconds.

Call No.

The sequence number of the calls in this trace. The buffer prime call (if available) is call 1, and the I/O PCB GU retrieving the primed buffer is call 2.

PCBname

Name of the PCB against which the call is made. If the ESAF Integration Option is activated, this can be the External Subsystem name, suffixed with (E) to distinguish it from a DL/I PCB name.

Func Call function code. BFPM is the function code for the buffer prime call.

St Cd Status code returned on the call. For an External Subsystem, this is the ESAF call return code.

PCB Feedback

The PCB feedback area as returned to the calling program. See the *IMS Application Programming: Transaction Manager* for the meaning of these fields. This information normally identifies the segment returned in the I/O area. (See "Essential terminology for Monitor reporting" on page 502.)

Segname

Segment name field.

Lvl Database segment level number of the named segment.

For an External Subsystem, this is the ESAF call type. For example, Signon, Normal Call, Commit Ph2.

Module

The module identifier of the module issuing the IWAIT. DBH is the OSAM database buffer handler; VBH is the VSAM buffer handler.

IWT The type of IWAIT (VSAM, HSAM, OSAM, DEDB, MSDB, or QUE).

DDname or # IWAITs**DDname**

IWAIT line: the DDname of the data set against which the IWAIT is issued.

IWAITs

Call line: the number of IWAITs occurring during this call.

IWT Elapsed Sc.Mil.Mic

IWAIT line: The elapsed time of this IWAIT. An asterisk (*) indicates the IWAIT is ignored because it is less than the **Min VSAM IWAIT** threshold value specified on the Monitor Global Options panel.

Call line: The total elapsed time for the IWAITs occurring during this call.

Breakdown of Call Time

Pct CPY

Elapsed time spent in the IMS interregion CPY routines of DL/I as a percentage of total elapsed time for this call.

Pct DLA

Elapsed time spent in the DLA routines of DL/I as a percentage of total elapsed time for this call.

Pct IWT

Elapsed time spent in IWAITs as a percentage of total elapsed time for this call.

Call Elap Sc.Mil.Mic

Total elapsed time for this call.

The **CPU time** reported in the Program Analysis Summary at the end of the Program Trace sometimes reports CPU time as zero or is unreliable. The reason for this is because of the way IMS PA processes WFI transactions and when the IMS monitor records CPU time. The monitor does not record CPU time for each individual transaction. Instead, it only records CPU time at schedule end (SLOG 13 record). And this is an accumulation of all transactions that executed during this program schedule. For WFI, this can be for many transactions over a long period of time.

The Program Trace treats Wait-For-Input IWAITs as a "re-schedule" and flushes transaction information at the point of a WFI IWAIT. Since schedule end (SLOG 13) is not available yet, CPU time is reported as zero. Following on, transaction CPU time is only meaningful when viewed as an average.

The Region and Program Summary or Detail reports average CPU time and these should be used for CPU analysis.

Batch VSAM Statistics report

The Batch VSAM Statistics report provides VSAM usage statistics for batch applications, and is only produced for DB Monitor files built during the execution of the IMS batch system.

VSAM Statistics are based on:

- A specific application program PCB
- A data set the application program is using
- The type of DL/I call the application program issued

The VSAM Statistics report has no meaning for HSAM or SHSAM databases because neither of these databases can use VSAM as the access method.

Uses:

From the Batch VSAM Statistics report, you can determine which calls in an application program require a great many I/O operations. After you know this, you can improve performance by tuning either the database or the application program to reduce I/O operations. The following fields in the report tell actual I/O activity and are therefore the most important ones to monitor:

- Reads made
- User initiated writes
- Background writes

If you can reduce the averages in these fields, performance can be improved.

In tuning to reduce I/O operations, pay most attention to calls issued a large number of times. It is more profitable to save 1 second on a call executed 2000 times than to save 5 seconds on a call executed ten times (2000 versus 50 seconds). The Program Activity Detail report (see “Program Activity Detail reports” on page 423) tells you how many times each DL/I application program call is issued.

Monitor records: This report is derived from monitor records 24, 62, 63.

Report options

To obtain the report, select **Batch VSAM Statistics** from the Report Set (MON) panel and specify a DDname for the output data set for the report.

Report content

This is an example of the Batch VSAM Statistics report.

Report from 06Jan2018 09.32.07.95			IMS 15.1.0			IMS Performance Analyzer 4.4				Report to 06Jan2018 09.32.31.57			
VSAM Statistics													
PCBname	DDname	From DL/I VSAM Func	06Jan2018 IWAITS	9.32.09.55 Retrieves by RBA	To 06Jan2018 Retrieves by Key	9.32.29.72 ESDS Inserts	9.32.29.72 KSDS Inserts	Elapsed= Buf Recs Altered	0 Hrs Backgrnd Writes	0 Mins Check Points	20.173.391 Current Err Buffs	Secs Most Err Buffs	Get Calls
				Buffer Searches	Found in Buffer	Reads Made	User Init Writes	HS Reads	HS Writes	HS Reads Failed	HS Writes Failed	PLH Waits	
DBD02L1	DBD02P	GU	182	0.85 0.00	0.00 1.25	0.00 0.03	0.10 0.97	0.44 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.19
		ISRT	3	107.00 2.00	2.33 31.33	0.00 1.00	2.00 0.00	26.67 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	25.67
	** DD Totals **		185	2.57 0.03	0.04 1.74	0.00 0.04	0.13 0.96	0.86 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.61
	DBD02PX	GU	8	0.00 0.00	0.13 0.00	0.00 0.75	0.00 0.25	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.13
	DBD03P	GU	83	0.01 0.00	0.00 0.94	0.00 0.05	0.00 0.95	0.01 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.01
		ISRT	8	27.00 0.63	1.38 13.88	0.00 1.00	0.25 0.00	8.38 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	12.63
	** DD Totals **		91	2.38 0.05	0.12 2.08	0.00 0.13	0.02 0.87	0.75 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	1.12
	** PCB Totals **		284	2.44 0.04	0.07 1.80	0.00 0.09	0.09 0.91	0.80 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.76
	** Batch Totals **		343	2.19 0.03	0.06 1.57	0.00 0.17	0.11 0.82	0.76 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.72

Figure 247. Batch VSAM Statistics report

The report headings and content have the following meaning:

PCBname

The name of the PCB the report is providing information about. Remember that each application program has one or more PCBs. This field can only be used to identify which application program the report is providing information about if PCB names are unique to application programs.

DDname

The name of the data set the application program is using. Within one report, an application program (PCB) can access more than one data set. The statistics compiled are listed separately for each data set.

DL/I Func

DL/I call Function Code.

VSAM IWAITs

This field tells you, by type of DL/I call against a specific data set, the number of times IMS had to wait before processing could proceed. When IMS has to wait, it is almost always waiting for an I/O operation to take place, that is, data is being either read from the database to the buffer or written from the buffer back to the database.

The numbers in each column under all remaining fields in the report are averages. They tell the average number of times an activity occurred rather than the specific number of times. Averages are for waits. These numbers are truncated. For example, a value of 0.019 is printed as 0.01.

Retrieves by RBA

The number of retrieve by relative byte address (RBA) calls that were issued for the subpool. Retrieve by RBA calls are calls issued internally by DL/I. One retrieve by RBA call is issued for each direct-address pointer that must be followed in searching for a segment. For example, a GN call for a dependent segment in an HDAM database uses a series of RBA calls to search for the dependent segment, one call for each direct-address pointer it follows.

If you want to know the exact sequence of a search when a retrieve by RBA call is used, you can record the sequence by turning on the buffer handler trace and using a SNAP call to see the trace records. You can turn on the buffer handler trace using the BHTRACE= operand on the OPTIONS statement for the DFSVSAMP or DFSVSMnn data set. The SNAP call can be issued from the application program or by using the DFSDDLTO test utility.

One call from an application program can generate more than one retrieve by RBA call. The retrieve by RBA call might or might not require an I/O operation. Because the number in this field does not reflect the number of I/O operations to access a segment, do not use it to judge VSAM performance.

Retrieves by Key

The number of retrieve by key calls were issued for the subpool. Retrieve by key calls are calls issued internally by DL/I. The calls are issued to search a KSDS using a key as a qualification (where key is equal to or greater than X). For example, a GU call for a root segment in a HIDAM database causes DL/I to issue a retrieve by key call to access the index segment pointing to the requested root segment.

If you want to know the exact sequence of a search when key calls are used, you can record the sequence by turning on the buffer handler trace and using a SNAP call to see the trace records. You can turn on the buffer handler trace using the BHTRACE= operand on the OPTIONS statement for the DFSVSAMP or DFSVSMnn data set. The SNAP call can be issued from the application program or by using the DFSDDLTO test utility.

One call from an application program can generate more than one retrieve by key calls. The retrieve by key calls might or might not require an I/O operation. Because the number in this field does not reflect the number of I/O operations to access a segment, do not use it to judge VSAM performance.

ESDS Inserts

The number of logical records in your ESDS that were previously empty and now contain segments. When a dependent segment is inserted into an ESDS in a HISAM or HIDAM database, the segment might not fit into a

logical record that already contains other segments. In this case, the segment is put into a new ESDS logical record. When a dependent segment is inserted into a logical record in an ESDS in a HISAM database, other segments in the same logical record might need to be shifted into a new ESDS logical record to make room for the segment being inserted.

Look at this field from one report to the next. It helps you determine when you are running out of logical records in the primary space you have allocated. It is best to avoid using logical records from secondary space because this space is probably not close to the primary space.

KSDS Inserts

The number of logical records in your KSDS that were previously empty and now contain segments. HISAM databases use a new logical record when a root segment is inserted. HIDAM index databases use a new logical record for the index segment created when a root segment is inserted.

Look at this field from one report to the next. It helps you determine when you are running out of logical records in the primary space you have allocated. It is best to avoid using logical records from secondary space because this space is probably not close to the primary space. The distance between the two areas of space might cause extra seek time and therefore poor performance. In general, it is best to reorganize your database before you need to use secondary space.

Buf Recs Altered

The number of logical records, while in the buffer pool, that were marked as altered. When a segment is inserted or replaced in a logical record, the logical record in the buffer is marked as altered until it is written back to the database.

Backgrnd Writes

If you have specified use of the background write function, this field tells how many times the function was used. Background write, at intervals, writes buffers containing modified data back to the database. It does this so buffers are available for use when an application program needs them. Without background write, if an application program wants to read data into a buffer that already contains modified data, the application program has to wait while the contents of the buffer are written back to the database. The number of times background write was invoked is the same on each subpool report produced during a given execution of the monitor. This is because, once involved, background write writes buffers from all subpools.

Background write is specified in the BGWRT= operand of the OPTIONS statement for the DFSVSAMP or DFSVSMnn data set.

Check Points

The number of checkpoint calls that were issued in DL/I programs while the monitor was on.

Current® Err Buffs

The number of buffers currently in error.

Most Err Buffs

The maximum number of buffers in error during the monitor period.

Get Calls

The number of times VSAM GET calls were issued. VSAM GET calls are calls issued internally by DL/I. The GET call might be satisfied by data in

the buffer pool or it might require that data be read into the buffer pool. Because the number in this field does not reflect the number of I/O operations required to access a segment, do not use it to judge VSAM performance.

Buffer Searches

The number of times that the HD space management routine issued calls to search for space in which to insert segments.

If, from one monitor report to the next, the number in this field is increasing, it means that space for storing new segments is not available in the most desirable location. Eventually, you must reorganize your database to improve performance. In reorganizing, pay special attention to the operands affecting database space (the BYTES operand in the RMNAME= keyword in the DBD statement and the fbf and fspf operands in the FRSPC= keyword in the DATASET statement).

Found in Buffer

The number of times that a logical record was found in a CI that was already in the buffers. When this occurs, no I/O operations are required to access the desired segments.

If you are trying to improve performance, increase the number of buffers you have allocated. If you increase the number of buffers, you can monitor this field to see if the number in it increases, which indicates improved performance.

Reads Made

The number of times that a logical record was not found in a CI that was already in the buffers. When this occurs, an I/O operation is required to read the CI containing the logical record into the buffer pool. Because performance is always better when fewer I/O operations are performed, you might want to increase the number of buffers you have specified to see how that affects the number in this field. Specifying more buffers keeps more CIs (and therefore logical records) in the buffer pool. There is a break-even point in this process, however, where too many buffers are specified, and it takes longer to search and maintain the buffers than it takes to read a CI into the buffer.

The number of buffers is specified in the control statements for the DFSVSAMP or DFSVSMnn data sets.

User Init Writes

The number of user writes were initiated. This field tells you the number of times DL/I issued a write request to write data to the database. Write operations are issued when:

- A data set is closed. Database buffers containing data that has been altered by the data set being closed are written to the database.
- Abnormal termination occurs during application program processing. Database buffers containing data that has been altered are written to the database.
- The background write function is invoked. Selected database buffers containing data that has been altered are written to the database.
- A checkpoint call is issued. All altered database buffers are written to the database.

HS Reads

The total number of successful VSAM reads (MOVEPAGE and NON-MOVEPAGE) from hiperspace buffers.

HS Writes

The total number of successful VSAM writes (MOVEPAGE and NON-MOVEPAGE) to hiperspace buffers.

HS Reads Failed

The number of times that a VSAM read request from hiperspace failed, resulting in a read from DASD.

HS Writes Failed

The number of times that a VSAM write request to hiperspace failed, resulting in a write to DASD.

PLH Waits

The number of PLH waits.

DD Totals

For a given data set, the overall average number of times an activity occurred (except for the VSAM CALLS field, which tells total number of times).

PCB Totals

For a given PCB, the overall average number of times an activity occurred (except for the VSAM CALLS field, which tells total number of times).

Batch Totals

For the monitor reporting period, the overall average number of times an activity occurred (except for the VSAM CALLS field, which tells total number of times).

Resource Usage reports

The Resource Usage reports provide a detailed analysis of the usage of IMS resources.

The resources include:

- Buffer Pools; including Message Queue, OSAM, VSAM, and Message Formatting
- Latches
- Communication
- Multiple Systems Coupling
- External Subsystems

Buffer Pool and Latch Statistics reports

When requested, the Buffer Pool and Latch Statistics reports are always produced regardless of the global (or run-time) report interval specified as they provide summary statistics in the monitor start (90) and monitor end (91) records.

The Buffer Pool and Latch Statistics reports comprise the following subreports:

- Buffer Pool Statistics reports which show IMS buffer usage statistics for the Message Queue Pool, Database Buffer Pool, VSAM Buffer Pool, and Message Format Buffer Pool.
- Latch Statistics report which shows IMS latch usage counters.

Monitor records: The reports are derived from the monitor records: 90, 91.

Report options

To obtain the **Buffer Pool and Latch Statistics** reports, select it from the list of Resource Usage Reports in a Monitor Report Set.

Specify a DDname for the output data set for the reports. The default is STATRPT.

Report content: Buffer Pool Statistics

This is an example of the Buffer Pool Statistics report, produced along with the Latch Statistics report. Statistics are reported for the following four buffer pools: Message Queue Pool, Database Buffer Pool, VSAM Buffer Pool, Message Format Buffer Pool.

The reports are always produced, even if the monitor start and monitor end records are outside the reporting period. The monitor start and end records are logged when the /TRACE command is set to ON and OFF respectively.

The values when monitor tracing starts and ends, and the difference between these two values, are reported for each pool under the headings:

Start The value when tracing starts. The start time is shown in the column heading.

End The value when tracing ends. The end time is shown in the column heading.

Difference

The difference between the End and Start values.

Report from 14Jun2018 18.21.49.48	IMS 15.1.0	IMS Performance Analyzer 4.4	Report to 14Jun2018 18.52.22.79
Message Queue Pool			
	18.21.49 Start	18.52.22 End	Difference
Number of Locate calls from QMGR	180	2100	1920
Number of Record Release calls from QMGR	101	756	655
Number of Locate and Alter calls from QMGR	310	3281	2971
Number of Requests to Purge the Q Pool	2	2	0
Number of Address to DRRN Translation Requests	0	0	0
Number of Read Requests	5	5	0
Number of Write Requests(Total)	6	6	0
Number of Writes done by Purge	6	6	0
Number of Waits for Purge completion	0	0	0
Number of Waits because no Buffer available	0	0	0
Number of Waits for other DECB to Read this Buffer	0	0	0
Number of Waits for other DECB to Write this Buffer	0	0	0
Number of Waits for conflicting end DEQ Buffer req	0	0	0
Number of PSBs unchained from buffers	0	0	0
Number of calls to QMGR(Total)	234	2142	1908
Number of calls to Reposition a Lost Buffer	0	1	1
Number of calls to ENQ a Message	30	370	340
Number of calls to DEQ one or more Messages	30	331	301
Number of calls to Cancel Input or Output	41	56	15

Figure 248. Buffer Pool and Latch Statistics report: Message Queue Pool

	Fix Prefix/Buffers	:	N/N
	Subpool ID	:	
	Subpool Buffer Size	:	2048
	Total Buffers in Subpool	:	4
	18.21.49 Start	18.52.22 End	Difference
Number of Locate-type calls	0	1153	1153
Number of requests to create new Blocks	0	0	0
Number of Buffer Alter calls	0	289	289
Number of Purge calls	0	288	288
Number of Locate-type calls, Data already in OSAM pool	0	1150	1150
Number of Buffers searched by all Locate-type calls	0	1151	1151
Number of Read I/O requests	0	6	6
Number of Single Block Writes by Buffer Steal Routine	0	0	0
Number of Blocks written by Purge	0	289	289
Number of Locate calls waited due to Busy Id	0	0	0
Number of Locate calls waited due to Buffer Busy Write	0	0	0
Number of Locate calls waited due to Buffer Busy Read	0	0	0
Number of Buffer Steal/Purge waited for ownership Rlse	0	0	0
Number of Buffer Steal requests waited for Buffers	0	0	0
Total number of I/O errors for this Subpool	0	0	0
Number of Buffers locked due to Write errors	0	0	0
Number of CF Reads	0	0	0
Number of CF requests expected, but not Read	0	6	6
Number of Writes to CF (Prime)	0	0	0
Number of Writes to CF (Changed)	0	0	0
Number of CF requests not written, Storage Class full	0	0	0
Number of Blocks invalidated with XI	0	3	3
Number of successful XI calls	0	289	289
Number of Sequential Buffer Reads	0	0	0
Number of Sequential Buffer Anticipated Reads	0	0	0

Figure 249. Buffer Pool and Latch Statistics report: Database Buffer Pool

	Fix Index/Block/Data	:	N/N/N
	Shared Resource Pool ID	:	XXXX
	Shared Resource Pool Type:	:	D
	Subpool ID	:	1
	Subpool Buffer Size	:	1024
	Total Buffers in Subpool	:	8
	Number Hiperspace Buffers:	:	0
	18.21.49 Start	18.52.22 End	Difference
Number of Retrieve by RBA calls received by Buf Handler	0	152	152
Number of Retrieve by Key calls	0	243	243
Number of Logical Records inserted into ESDS	0	179	179
Number of Logical Records inserted into KSDS	0	363	363
Number of Logical Records altered in this Subpool	0	1243	1243
Number of times Background Write function invoked	0	12	12
Number of Synchronization calls received	0	6	6
Number of Write Error Buffers currently in the Subpool	0	0	0
Largest number of Write Errors in the Subpool	0	0	0
Number of VSAM Get calls issued	0	1796	1786
Number of VSAM SCHBFR calls issued	0	0	0
Number of times CI requested already in pool	0	865	865
Number of CI Read from External Storage	0	0	0
Number of VSAM Writes initiated by IMS	0	0	0
Number of VSAM Reads from HIPERSPACE Buffers	0	0	0
Number of VSAM Writes to HIPERSPACE Buffers	0	0	0
Number of failed VSAM Reads from HIPERSPACE Buffers	0	0	0
Number of failed VSAM Writes to HIPERSPACE Buffers	0	0	0
Number of PLH Waits	0	0	0

Figure 250. Buffer Pool and Latch Statistics report: VSAM Buffer Pool

	18.21.49 Start	18.52.22 End	Difference
Number of P/F requests	0	78	78
Number of I/F requests	2	158	156
Number of I/F I/Os	2	5	3
Number of times Pool Compress would be successful	0	0	0
Number of Directory I/O operations	6	8	2
Number of times Block washed for FRE	0	0	0
Number of times P/F request ignored	0	78	78
Number of F/B requests	2	158	156
Number of times F/B request ignored	0	0	0
Number of times I/F on F/B queue	0	153	153
Number of times I/F on I/F queue	0	0	0
Number of times F/B on I/F queue	2	158	156
Number of times P/F on I/F queue	0	0	0
Number of times P/F on F/B queue	0	0	0
Number of times there was no DIR Entry for a Block	1	2	1
Number of times I/O Errors POINT or READ Macro	0	0	0
Number of Immed. I/O Requests waited due to Maximum I/O	0	0	0
Number of requests satisfied by Index/Dynamic Directory	1	3	2

Figure 251. Buffer Pool and Latch Statistics report: Message Format Buffer Pool

Report content: Latch Statistics

This is an example of the Latch Statistics report, produced along with the Buffer Pool Statistics report.

Latch Statistics Counters

Latch Name	18.21.49		18.52.22		* Difference *	
	*** Start	***	*** End	***		
	Call	Wait	Call	Wait	Call	Wait
DISP SYS/Dispatcher	0	0	0	0	0	0
CTXT SYS/PC Table	0	0	0	0	0	0
DCSL DC/Checkpoint DC System	0	0	720	0	720	0
LUML DC/LU 6.2 LUM	0	0	0	0	0	0
CONV DC/Conversation Checkpt	0	0	0	0	0	0
TERM DC/Terminal	0	0	2	0	2	0
LUBT DC/LU62 LUB-TIB Chain	0	0	0	0	0	0
LRLT Log Router	0	0	0	0	0	0
LBMP LAT BMP/IRLM Lock Release	0	0	262	0	262	0
SCHD TM/Scheduling	0	0	47	0	47	0
TCTB TM/TCT Block	0	0	15	0	15	0
APSB TM/Allocate PSB (BLK MVR)	0	0	3	0	3	0
PDRB TM/PDIR Block (BLK MVR)	0	0	3	0	3	0
PSBP TM/PSB Pool (BLK MVR)	0	0	5	0	5	0
DMBP TM/DMB Pool (BLK MVR)	0	0	3	0	3	0
PSBB TM/PSB Block (BLK MVR)	0	0	0	0	0	0
DMBB TM/DMB Block (BLK MVR)	0	0	451	0	451	0
PDRP TM/PDIR Pool (BLK MVR)	0	0	2	0	2	0
DBAU TM/DBRC Auth (BLK MVR)	0	0	2	0	2	0
DDRB TM/DDIR Block (BLK MVR)	0	0	0	0	0	0
DDRP TM/DDIR Pool (BLK MVR)	0	0	0	0	0	0
DBBP DB/OSAM Buffer Pool	0	0	1457	0	1457	0
DBLR DB/DFSDBLR0 Module	0	0	0	0	0	0
SUBQ TM/TM Subqueues	0	0	128	0	128	0
DBSL DB/DB Checkpoint	0	0	0	0	0	0
USER DC/User	0	0	0	0	0	0
DBLT RSR Sharing Serialize	0	0	0	0	0	0
CCTL SYS/DBCTL Resource	0	0	0	0	0	0
VTCTB SYS/CBTS VTCTB Pool	0	0	166	0	166	0
VLQB SYS/CBTS LQB Pool	0	0	116	0	116	0
CBTS SYS/CBTS Pools (All)	0	0	781	0	781	0
BLKM TM/SMB Queue Hash Table	0	0	80	0	80	0
QMGR SYS/Queue Manager	0	0	9804	0	9804	0
QBSL SYS/Queue Buffer	0	0	0	0	0	0
SMGT SYS/Storage Management	0	0	571	0	571	0
DBLK SYS/Dependent Region	0	0	0	0	0	0
XCNQ DB/Exclusive ENQ/DEQ	0	0	0	0	0	0
ACTL SYS/Statistics	0	0	8613	10	8613	10
LOGL SYS/Logger	0	0	6828	0	6828	0
ALL Release Hold+Non-Hold	0	0	0	0	0	0
ALLR Release only Non-Hold	0	0	0	0	0	0

Figure 252. Buffer Pool and Latch Statistics report: Latch Statistics Counters

The report is always produced, even if the monitor start and monitor end records are outside the reporting period. The monitor start and end records are logged when the /TRACE command is set to ON and OFF.

The values when monitor tracing starts and ends, and the difference between them, are reported for each latch name under the headings:

Latch Name

The latch name and its function.

Start The values when tracing starts.

Call The number of calls requesting the lock.

Wait The number of lock request calls that had to wait for the lock to become available.

End The values for **Call** and **Wait** when tracing ends.

Difference

For **Call** and **Wait**, the difference between the corresponding End and Start values.

Note: When a system checkpoint is taken while the monitor is active, latch conflict statistics are reset to zero, thus corrupting the values presented in this report. If this situation exists, the following message is inserted at the top of the report:

```
*****
**** A Checkpoint occurred during Monitor run ****
**** Latch Statistics counters are invalid ****
*****
```

However, if the master terminal operator issues the CHECKPOINT command with the STATISTICS keyword parameter specified, latch conflict statistics are reset to zero, but the IMS monitor is not notified. In this case, the report program cannot detect that the statistics have been corrupted and does not issue this message.

You should not issue statistics checkpoints while the monitor is running.

Communication reports

The Communication reports are:

- **Communication Summary.** A summary of line or VTAM node activities.
- **Communication IWAIT.** Detailed information on IWAITs occurring while dispatching communication subtasks to lines or VTAM nodes.
- **Line Functions.** The functions of lines and VTAM nodes.

These reports are not available from DB Monitor data.

Monitor records: The Communication reports are derived from the following monitor records:

- Communication Summary. 20–21, 26–27, 30–33, 36–37, 40–41
- Communication IWAIT. 20–21, 26–27, 30–33, 36–37, 40–41
- Line Functions. 40, 41, 46

Report options

To obtain the reports, select the **Communication** report in a Monitor Report Set then select one or more of the reports: Communication Summary, Communication IWAIT, Line Functions.

Specify a DDname for the output data set for the reports. For all reports, distribution graphs can optionally be produced by specifying Distributions which define the attributes of the graphs.

The **Alternate Sequencing** Option is applicable to the three reports.

Report content: Communication Summary

The Communication Summary report presents summary information on the elapsed time and IWAITs for dispatching communication subtasks to teleprocessing lines or VTAM nodes.

The report is not produced if there is no activity on lines or nodes during the reporting period.

The contents of the Communication Start and End records are reflected in this report only when both are included in the processing.

The contents of the IWAIT Start and End records are reflected in **IWAIT Time** of this report only when both are included in the processing.

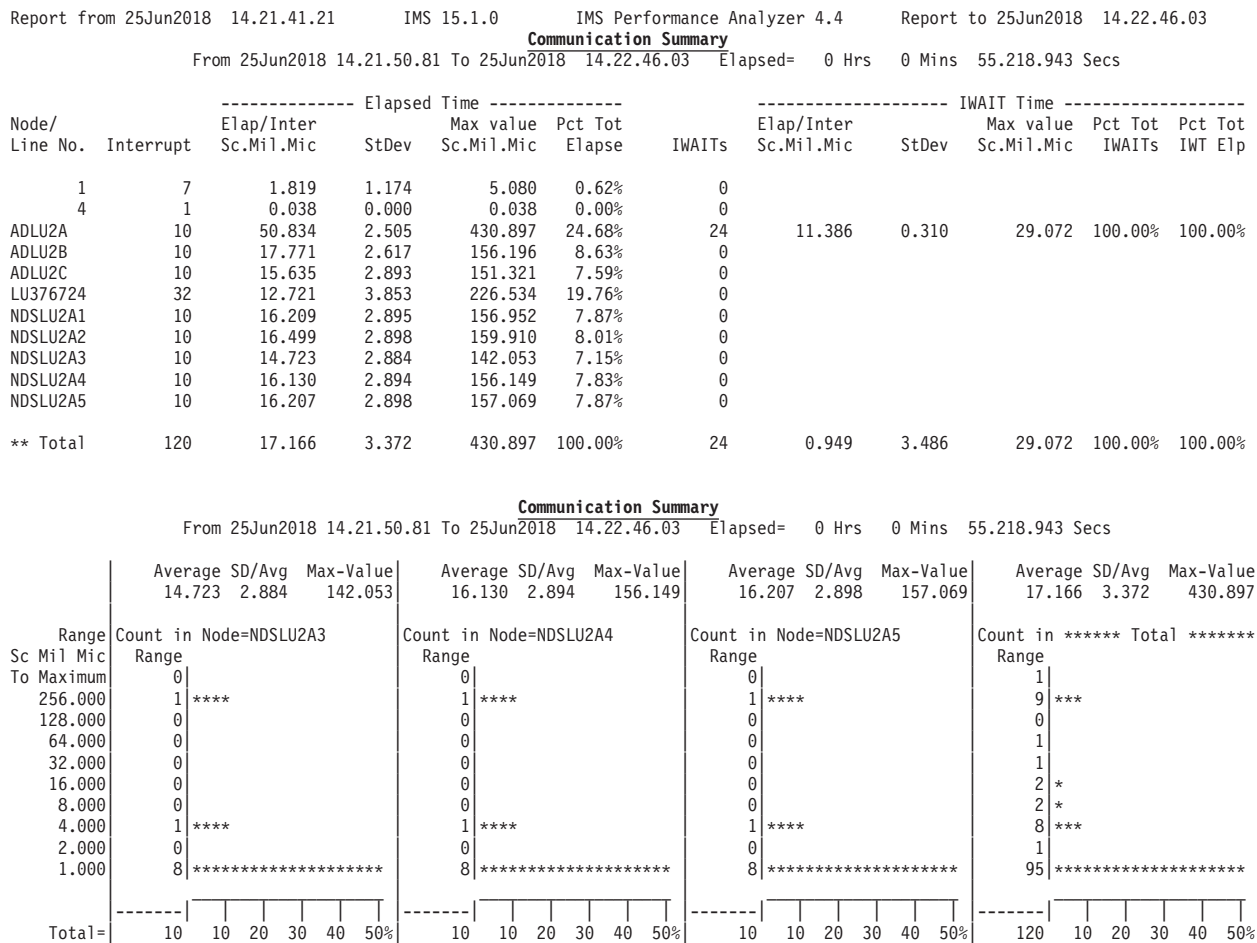


Figure 253. Communication report: Communication Summary

- The heading details at the top of each page are:
- From

Start time of region activity in the reporting period.
- To

End time of region activity in the reporting period.
- Elapsed

Elapsed time from start until end of region activity in the reporting period.
- The columns of the report are:
- Node/Line No.

The VTAM node name or teleprocessing line number being reported.
- Interrupt

The number of communication subtasks that were dispatched.
- Elapsed Time

The elapsed time for dispatching.
- Elap/Inter Sc.Mil.Mic

The average elapsed time per dispatch.
- StDev

The standard deviation of elapsed time per dispatch.

Max Value Sc.Mil.Mic

The maximum elapsed time per dispatch.

Pct Tot Elapse

The elapsed time for dispatching to each teleprocessing line or VTAM node, presented as a percentage of the total elapsed time for dispatching to all teleprocessing lines and VTAM nodes.

IWAITs

The number of IWAITs occurring during dispatching.

IWAIT Time

The IWAIT elapsed time of dispatch.

Elap/Inter Sc.Mil.Mic

The average IWAIT elapsed time per dispatch.

StDev The standard deviation of the IWAIT elapsed time per dispatch.

Max Value Sc.Mil.Mic

The maximum IWAIT elapsed time per dispatch.

Pct Tot IWAITs

The number of IWAITs occurring during dispatching to each line or node, presented as a percentage of the total number of IWAITs occurring during dispatching to lines and nodes.

Pct Tot IWT Elp

The elapsed time of IWAITs occurring during dispatching to each line or node, presented as a percentage of the total elapsed time of IWAITs occurring during dispatching to lines and nodes.

Distributions: If a Distribution for Communication Summary is specified, the distribution graphs for elapsed time of dispatch for each line or node and in total are produced.

If Alternate Sequencing is requested:

- The Communication Summary report header is suffixed by:
 - **Sorted by Dispatch Elapsed time** if sequencing by Occupancy or Calls is requested.
 - **Sorted by Dispatch IWAIT Elapsed time** if sequencing by Delay is requested.
- If a number or percentage (less than 100%) Limit is specified:
 - The report header is also suffixed by **LIMIT nn** or **LIMIT nn%**.
 - A **** Limit** line is printed to total the reported (Limited) data whilst the **** Total** line totals all (100%) of the data.

Report from 09May2018 18.29.32.35 IMS 15.1.0 IMS Performance Analyzer 4.4 Report to 09May2018 18.33.28.85
Communication Summary (Sorted by Dispatch IWAIT Elapsed time; LIMIT 5%)
 From 09May2018 18.29.32.40 To 09May2018 18.33.28.83 Elapsed= 0 Hrs 3 Mins 56.434.335 Secs

Node/ Line No.	Interrupt	Elapsed Time				IWAITs	IWAIT Time				Pct Tot IWAITs	Pct Tot IWT Elp
		Elap/Inter Sc.Mil.Mic	StDev	Max value Sc.Mil.Mic	Pct Tot Elapse		Elap/Inter Sc.Mil.Mic	StDev	Max value Sc.Mil.Mic	Pct Tot IWAITs		
DSW10403	32	72.117	4.293	1.779.892	0.13%	2	0.817	4.249	18.785	0.10%	0.01%	
DSW11259	22	140.203	3.751	2.529.040	0.17%	2	1.187	3.309	16.888	0.10%	0.01%	
DSWP5653	2	33.550	1.000	67.095	0.00%	2	13.044	0.010	13.177	0.10%	0.01%	
ET2P1594	14	8.137	2.573	79.564	0.01%	2	1.849	2.515	15.737	0.10%	0.01%	
TP001057	29	0.939	4.987	25.709	0.00%	2	0.876	3.692	13.907	0.10%	0.01%	
TA001333	39	0.751	5.343	25.446	0.00%	2	0.643	4.575	16.977	0.10%	0.01%	
DSW11239	6	443.832	2.102	2.529.110	0.15%	2	4.169	1.421	13.510	0.10%	0.01%	
ET2P0953	2	19.332	1.000	38.659	0.00%	2	12.369	0.253	15.496	0.10%	0.01%	
ET2P4878	16	5.733	2.127	47.677	0.01%	2	1.531	2.647	12.575	0.10%	0.01%	
DSWP5442	2	21.567	1.000	43.130	0.00%	2	12.219	0.125	13.743	0.10%	0.01%	
...												
DSWP5485	2	10.965	0.996	21.887	0.00%	2	10.806	0.241	13.411	0.10%	0.01%	
TP002425	29	0.803	3.460	11.300	0.00%	4	0.737	2.617	6.912	0.20%	0.01%	
ET2P1608	6	8.515	2.220	50.775	0.00%	2	3.460	2.038	19.174	0.10%	0.01%	
** Limit	10322	61.679	3.886	3.009.403	36.08%	1753	40.023	3.720	1.565.615	87.56%	99.70%	
** Total	86915	20.302	5.195	4.105.729	100.00%	2002	4.768	11.099	1.565.615	100.00%	100.00%	

Figure 254. Communication Summary report, Sequenced by Delay (with Limit)

Report content: Communication IWAIT

The Communication IWAIT report presents the elapsed time of IWAITs for each function that caused IWAITs for each teleprocessing line or VTAM node.

The report is not produced if, during the reporting period, there are no activities on the lines or nodes, or no IWAITs occurred within activities.

The contents of the IWAIT Start and End records are reflected in this report only when both are included in the processing.

Report from 06Apr2018 20.04.56.53 IMS 15.1.0 IMS Performance Analyzer 4.4 Report to 06Apr2018 20.06.40.27
Communication IWAIT
 From 06Apr2018 20.05.29.09 To 06Apr2018 20.05.55.32 Elapsed= 0 Hrs 0 Mins 26.229.227 Secs

Node/ Line No.	Function	Pool/ Format/ DDname	IWAITs	----- IWAIT Time -----		Pct Tot IWAITs	Pct Tot IWT Elp
				Elap/IWAIT Sc.Mil.Mic	Max value StDev		
FPEN0001	MFS Dir I/O	DCTLP1I	1	2.168	0.000	2.168	4.55%
	MFS Dir I/O	DCTLP10	1	2.052	0.000	2.052	3.15%
	MFS Blk I/O	DCTLP1I	1	3.086	0.000	3.086	4.74%
	MFS Blk I/O	DCTLP10	1	4.833	0.000	4.833	7.43%
...							
** Total			22	2.959	0.341	5.440	100.00%

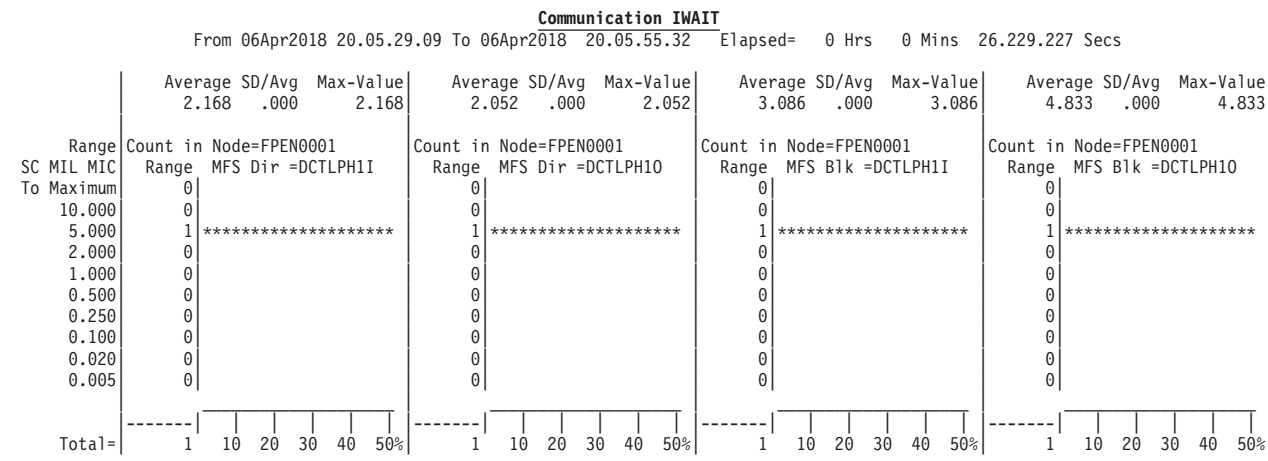


Figure 255. Communication report: Communication IWAIT

The heading details at the top of each page are:

From Start time of region activity in the reporting period.

To End time of region activity in the reporting period.

Elapsed

Elapsed time from start until end of region activity in the reporting period.

The columns of the report are:

Node/Line No.

The VTAM node name or teleprocessing line number being reported.

Function

The function that caused the IWAITs.

STG IWAITs for storage

MFS IWAITs for MFS

Dir I/O

I/O IWAITs for directory

Blk I/O

I/O IWAITs for block

Dir IWAIT caused by busy DCB for directory

Blk IWAIT caused by busy DCB for block

Other Other IWAITs

Pool/Format/DDname

Pool ID
 if IWAITs for storage
Format name
 if IWAITs for MFS
DDname
 if other IWAITs

IWAITs
 The number of IWAITs.

IWAIT Time
 The IWAIT elapsed time.

Elap/IWAIT Sc.Mil.Mic
 The average elapsed time per IWAIT.

StDev The standard deviation of elapsed time per IWAIT.

Max Value Sc.Mil.Mic
 The maximum elapsed time per IWAIT.

Pct Tot IWAITs
 The number of IWAITs for each function, presented as a percentage of the total number of IWAITs for each line or node.

Pct Tot IWT Elp
 The IWAIT elapsed time for each function, presented as a percentage of the total IWAIT elapsed time for each line or node.

Distributions: If a Distribution for Communication IWAIT is specified, the distribution graphs for IWAIT elapsed time for each line or node are presented by function.

If Alternate Sequencing is requested:

- The Communication IWAIT report header is suffixed by **Sorted by Total IWAIT Elapsed time**. Delay is the only sequence that is applicable to this report.
- If a number or percentage (less than 100%) Limit is specified:
 - The report header is also suffixed by **LIMIT nn** or **LIMIT nn%**.
 - A **** Limit** line is printed to total the reported (Limited) data whilst the **** Total** line totals all (100%) of the data.

Report from 09May2018 18.29.32.35 IMS 15.1.0 IMS Performance Analyzer 4.4 Report to 09May2018 18.33.28.85
Communication IWAIT (Sorted by Total IWAIT Elapsed time; LIMIT 5%)
 From 09May2018 18.29.33.51 To 09May2018 18.33.23.17 Elapsed= 0 Hrs 3 Mins 49.657.667 Secs

Node/ Line No.	Function	Pool/ Format/ DDname	IWAITs	Elap/IWAIT		IWAIT Time		Pct Tot IWAITs	Pct Tot IWT Elp
				Sc.Mil.Mic	StDev	Max value Sc.Mil.Mic			
DSWP5652	QMGR	LGMMSG	4	914.419	0.349	1.355.789		0.20%	0.88%
DSWP6403	QMGR	LGMMSG	4	895.484	0.224	1.171.407		0.20%	0.86%
DSWP5402	QMGR	LGMMSG	4	826.931	0.309	1.085.433		0.20%	0.80%
DSWP5406	QMGR	LGMMSG	6	500.499	0.464	754.072		0.30%	0.72%
ET2P1474	QMGR	LGMMSG	5	553.049	0.892	1.428.242		0.25%	0.67%
DSWP5064	QMGR	LGMMSG	4	646.311	0.370	977.239		0.20%	0.62%
DSW10747	QMGR	LGMMSG	4	610.966	0.646	1.098.716		0.20%	0.59%
ET2P1846	QMGR	LGMMSG	4	608.409	0.888	1.434.218		0.20%	0.59%
...									
DSWP5685	QMGR	LGMMSG	2	909.066	0.337	1.215.168		0.10%	0.44%
DSWP5848	QMGR	LGMMSG	2	908.121	0.317	1.195.725		0.10%	0.44%
** Limit			131	824.109	0.493	1.565.615		6.54%	26.05%
** Total			2002	206.982	1.364	1.565.615		100.00%	100.00%

Figure 256. Communication IWAIT report, Sequenced by Delay

Report content: Line Functions

The Communication Line Functions report presents the information on transmitted or received block sizes and turnaround intervals for each teleprocessing line and VTAM node.

The report is not produced if, during the reporting period, there are no activities on the lines or nodes.

Activities related to a system console are not reflected in this report.

The contents of the Communication Start and End records are reflected in this report only when both are included in the processing.

Report from 25Jun2018 14.21.41.21				IMS 15.1.0				IMS Performance Analyzer 4.4				Report to 25Jun2018 14.22.46.03			
Line Functions															
From 25Jun2018 14.21.50.81 To 25Jun2018 14.22.46.03						Elapsed= 0 Hrs 0 Mins 55.218.943 Secs									
		----- Received Blocks -----				----- Transmitted Blocks -----				----- Turnaround Interval -----					
Node/ Line No.	Device Type	Receive Blocks	Blksize /Block	Max StdDev	Blksize	Trans. Blocks	Blksize /Block	Max StdDev	Blksize	T/A Intvls	Elapse Sc.Mil.Mic	Max StdDev	Sc.Mil.Mic	Paging Requests	
1	CONSOLE	7	8955	0.00	8955	0	0	0.00	0	7	1.819	1.17	5.080	0	
4	3270R	0	0	0.00	0	0	0	0.00	0	1	0.038	0.00	0.038	0	
ADLU2A	SLU2	2	14	0.11	15	3	210	0.67	346	10	50.834	2.51	430.897	0	
ADLU2B	SLU2	2	14	0.11	15	3	210	0.67	346	10	17.771	2.62	156.196	0	
ADLU2C	SLU2	2	14	0.11	15	3	210	0.67	346	10	15.635	2.89	151.321	0	
LU376724	SLU1	4	15	0.57	29	13	101	0.55	218	32	12.721	3.85	226.534	0	
NDSL2A1	SLU2	2	14	0.11	15	3	212	0.67	350	10	16.209	2.90	156.952	0	
NDSL2A2	SLU2	2	14	0.11	15	3	212	0.67	350	10	16.499	2.90	159.910	0	
NDSL2A3	SLU2	2	14	0.11	15	3	212	0.67	350	10	14.723	2.88	142.053	0	
NDSL2A4	SLU2	2	14	0.11	15	3	212	0.67	350	10	16.130	2.89	156.149	0	
NDSL2A5	SLU2	2	14	0.11	15	3	210	0.67	346	10	16.207	2.90	157.069	0	
** Total		27	2332	1.68	8955	37	173	0.75	350	120	17.166	3.37	430.897	0	

Line Functions																	
From 25Jun2018 14.21.50.81 To 25Jun2018 14.22.46.03						Elapsed= 0 Hrs 0 Mins 55.218.943 Secs											
Received Blocksize/Block					Transmitted Blocksize/Block					Turnaround Interval							
Average	Std-Dev/Avg	Max Value			Average	Std-Dev/Avg	Max Value			Average	Std-Dev/Avg	Max Value					
15	.566	29			101	.552	218			12.721	3.853	226.534					
Range		Count in	Node=LU376724			Range		Count in	Node=LU376724			Range		Count in	Node=LU376724		
Block Size	Range		Device=SLU1			Block Size	Range		Device=SLU1			Sc Mil Mic	Range		Device=SLU1		
To Maximum	0					To Maximum	0					To Maximum	0				
1,000	0					1,000	0					2,000.000	0				
800	0					800	0					1,500.000	0				
400	0					400	1	***				1,000.000	0				
200	0					200	8	*****				800.000	0				
100	0					100	0					500.000	1	*			
60	0					60	2	*****				200.000	1	*			
40	1	*****				40	0					100.000	0				
20	1	*****				20	1	***				10.000	1	*			
10	2	*****				10	1	***				1.000	29	*****			
-----					-----					-----					-----		
Total=		4			Total=		13			Total=		32			-----		
		10 20 30 40 50%					10 20 30 40 50%					10 20 30 40 50%					

Figure 257. Communication report: Line Functions

The heading details at the top of each page are:

From Start time of region activity in the reporting period.

To End time of region activity in the reporting period.

Elapsed
Elapsed time from start until end of region activity in the reporting period.

The columns of the report are:

Node/Line No.
The VTAM node name or teleprocessing line number being reported.

Device Type
The device type.

Received Blocks
The size of received blocks presented as follows:

Receive Blocks
The number of blocks received.

Blksize/Block
The average block size per receive.

StDev The standard deviation of the block size per receive.

Max Blksize

The maximum block size per receive.

Transmitted Blocks

The size of transmitted blocks presented as follows:

Trans. Blocks

The number of blocks transmitted.

Blksize/Block

The average block size per transmission.

StDev The standard deviation of block size per transmission.

Max Blksize

The maximum block size per transmission.

Turnaround Interval

Turnaround intervals presented as follows:

T/A Intvls

The number of turnaround intervals.

Elapse Sc.Mil.Mic

The average elapsed time per turnaround.

StDev The standard deviation of elapsed time per turnaround.

Max Sc.Mil.Mic

The maximum elapsed time per turnaround.

Paging Requests

The number of requests for the next page in multiple-page messages from the MFS-supported terminal.

Distributions: If the corresponding Distributions are specified, the distribution graphs of the size of received or transmitted blocks and turnaround intervals are produced for each line and node.

If Alternate Sequencing is requested:

- The Communication Line Functions report header is suffixed by **Sorted by Total Elapsed time**. Occupancy is the only sequence that is applicable to this report.
- If a number or percentage (less than 100%) Limit is specified:
 - The report header is also suffixed by **LIMIT nn** or **LIMIT nn%**.
 - A **** Limit** line is printed to total the reported (Limited) data whilst the **** Total** line totals all (100%) of the data.

Report from 09May2018 18.29.32.35		IMS 15.1.0		IMS Performance Analyzer 4.4		Report to 09May2018 18.33.28.85									
Line Functions (Sorted by Total Elapsed time; LIMIT 5%)															
From 09May2018 18.29.32.40 To 09May2018 18.33.28.83				Elapsed=		0 Hrs 3 Mins 56.434.335 Secs									
Node/ Line No.	Device Type	----- Received Blocks -----				----- Transmitted Blocks -----				----- Turnaround Interval -----		-----		Paging Requests	
		Receive Blocks	Blksize /Block	StDev	Max Blksize	Trans. Blocks	Blksize /Block	StDev	Max Blksize	T/A Intvl's	Elapse Sc.Mil.Mic	StDev	Max Sc.Mil.Mic		
DSW10773	SLU2	7	51	1.04	151	10	199	1.04	591	20	24.247	2.67	237.236	0	
DSWP5932	SLU2	1	45	0.00	45	2	72	0.97	141	4	120.904	1.31	387.094	0	
DSW11343	SLU2	8	39	0.97	100	10	226	0.91	591	23	20.993	2.17	162.676	0	
DSW11276	SLU2	9	33	1.37	151	11	81	1.36	369	22	21.863	2.36	202.467	0	
DSW10839	SLU2	8	40	1.23	151	10	146	1.10	481	21	22.888	3.31	352.312	0	
ET0P2425	SLUP	3	122	0.00	122	2	249	0.16	289	7	68.500	2.32	457.330	0	
DSW10197	SLU2	8	90	0.97	249	12	358	1.45	1550	24	19.926	2.23	200.302	0	
JBBP5552	3600	3	146	0.23	194	2	166	0.25	207	7	67.818	1.62	280.847	0	
...															
DSW10199	SLU2	10	49	1.48	249	13	139	1.24	516	27	17.360	2.66	173.278	0	
DSW11337	SLU2	4	71	1.46	249	5	252	0.84	516	11	42.590	1.97	276.527	0	
DSW10604	SLU2	7	77	0.85	208	11	394	1.34	1550	23	20.346	2.20	184.841	0	
ET2P1982	SLU2	1	45	0.00	45	1	2	0.00	2	2	233.310	1.00	466.616	0	
ET0P4425	SLUP	3	170	0.20	194	2	127	0.00	127	7	66.458	1.76	327.619	0	
TA000787	SLU2	27	12	1.02	36	27	365	1.50	1289	62	7.479	7.74	459.786	0	
** Limit		4474	57	1.21	274	6055	281	1.73	3190	12650	67.778	3.75	4.105.729	0	
** Total		32025	78	0.82	274	34136	205	1.59	3190	86915	20.302	5.19	4.105.729		

Figure 258. Communication report: Line Functions, Sequenced by Occupancy (with Limit)

MSC reports

The Multiple Systems Coupling (MSC) reports are the MSC Summary, MSC Traffic, and MSC Queuing Summary.

- **MSC Summary.** Summary information on the number of cross-system messages.
- **MSC Traffic.** Detailed information on local system IDs and cross-system traffic.
- **MSC Queuing Summary.** Detailed information on the cross-system message queue.

The reports are not available from DB Monitor data.

The MSC reports are derived from the following monitor records:

- MSC Summary: 44, 45
- MSC Traffic: 44, 45, 90
- MSC Queuing Summary: 44, 45, 90

Report options

To obtain the reports, select the **MSC** report in a Monitor Report Set and select one or more of the reports: MSC Summary, MSC Traffic, MSC Queuing.

Specify a DDname for the output data set for the reports.

The **Alternate Sequencing** Option is applicable to this report.

Optionally, distribution graphs for the MSC Queuing Summary can be produced by specifying one or both Distributions for queue length per message or queue time per message.

Report content: MSC Summary

The MSC Summary report presents the number of enqueued and dequeued messages categorized by input name, destination name, relative link number, destination system ID.

The report is not produced if there are no cross-system messages during the reporting period.

Report from 04Feb2018 13.19.28.51		IMS 15.1.0		IMS Performance Analyzer 4.4		Report to 04Feb2018 13.20.42.21					
MSC Summary											
From 04Feb2018 13.19.28.51		To 04Feb2018 13.20.42.19		Elapsed= 0 Hrs 1 Mins 13.674.014 Secs							
Summary by Input Name			Summary by Destination Name			Summary by Relative Link			Summary by Destination SID		
Input Name	Enqueue Count	Dequeue Count	Dest Name	Enqueue Count	Dequeue Count	Link No.	Enqueue Count	Dequeue Count	Dest SID	Enqueue Count	Dequeue Count
..None..	7	26	AB01	2	2	1	326	309	2	547	0
CSQFED5E	0	1	DRJSYP	12	0	2	70	69	3	321	0
DFSG22	2	2	DRJSY4	16	24	3	86	86	4	62	0
DFSJ44	3	2	DRJSY5	6	19	4	386	403	5	109	0
DFSKH2	4	3	DFP1003	45	75	6	190	192	7	76	0
DFSK82	6	6	DFP1008	14	22	9	27	25	9	5	0
DFSLF0	0	1	DFP1009	6	9	10	25	26	12	185	309
DFSL66	13	11	DFP1018	0	1	11	0	2	13	45	69
DFSL67	3	2	DFP1025	4	6	15	0	14	14	58	86
RDBAH5	2	2	DFP1102	63	91	17	125	123	16	112	143

Figure 259. MSC reports: MSC Summary

The presentation format is common to all categories:

Input Name (or Dest Name, Link No., Dest SID)

The input name (or destination name, link number, or destination system ID).

Enqueue Count

The number of enqueued messages.

Dequeue Count

The number of dequeued messages.

If Alternate Sequencing is requested:

- The MSC Summary report header is suffixed by **Sorted by Enqueue Count**. Calls is the only sequencing option applicable to this report.
- If a number or percentage (less than 100%) Limit is specified, the report header is also suffixed by **LIMIT nn** or **LIMIT nn%**.

Report from 15Jan2018 16.06.43.44			IMS 15.1.0			IMS Performance Analyzer 4.4			Report to 15Jan2018 16.25.15.30		
MSC Summary (Sorted by Enqueue Count; LIMIT 3)											
From 15Jan2018 16.15.23.81			To 15Jan2018 16.24.29.89			Elapsed= 0 Hrs 9 Mins			06.075.874 Secs		
Summary by Input Name			Summary by Destination Name			Summary by Relative Link			Summary by Destination SID		
Input Name	Enqueue Count	Dequeue Count	Dest Name	Enqueue Count	Dequeue Count	Link No.	Enqueue Count	Dequeue Count	Dest SID	Enqueue Count	Dequeue Count
L62MVS1	15	15	TRAN31B0	7	9	10	15	15	31	7	9
			L62MVS1	6	0				12	5	0
			TRAN31B1	2	6				32	2	6

Figure 260. MSC Summary report, Sequenced by Calls

Report content: MSC Traffic

The MSC Traffic report presents, under each local system ID, the number of enqueued and dequeued cross-system messages by the combination of input name, destination name, input system ID, destination system ID, link number, and link type.

The report is not produced if there are no cross-system messages during the reporting period.

Report from 04Feb2018 13.19.28.51	IMS 15.1.0	IMS Performance Analyzer 4.4	Report to 04Feb2018 13.20.42.21				
MSC Traffic Report							
From 04Feb2018 13.19.28.51 To 04Feb2018 13.20.42.19		Elapsed=	0 Hrs 1 Mins 13.674.014 Secs				
Local SIDs = 1, 2, 3, 4, 5, 6, 7, 8, 9							
Input Name	Dest Name	Input SID	Dest SID	Link No.	Link Type	Enqueue Count	Dequeue Count
..None..	TEFJ87	79	9	48	VTAM	1	0
CSVFED3E	TFWP613	9	29	16	VTAM	0	1
DFBU22	KKKU4	2	42	25	C-C	1	1
DFBU22	T082554	2	42	25	C-C	1	1
DFCC67	T192838	3	73	42	VTAM	1	2
DFDT70	T082545	2	52	33	C-C	1	1
DFGH92	DFS1102	3	73	42	VTAM	2	3
DFGH92	DFS1108	3	73	42	VTAM	0	1
DFGH92	DFGH92	3	3	42	VTAM	4	0

Figure 261. MSC reports: MSC Traffic

The report contains the following data items:

Local SIDs

The local system IDs.

Input Name

The input name (terminal name or program name).

Input SID

ID of the system that created the message.

Dest SID

ID of the system that received the message.

Link No.

Link number of the communication link that was assigned when the system was defined.

Link Type

Types of link:

BSYNC

BISYNC

M-M Main storage to main storage

C-C Channel to channel

VTAM

VTAM

Enqueue Count

The number of enqueued messages. Messages with the local destination name appear only in Enqueue Count.

Dequeue Count

The number of dequeued messages. Messages created in a local system appear only in Dequeue Count.

If Alternate Sequencing is requested:

- The MSC Traffic report header is suffixed by **Sorted by Enqueue Count**. Calls is the only sequencing option applicable to this report.
- If a number or percentage (less than 100%) Limit is specified:
 - The report header is also suffixed by **LIMIT nn** or **LIMIT nn%**
 - The **** Limit** line gives the total of the reported (Limited) data whilst the ****Total** line gives the total of all (100%) of the data.

```
Report from 15Jan2018 16.06.43.44      IMS 15.1.0      IMS Performance Analyzer 4.4      Report to 15Jan2018 16.25.15.30
                                MSC Traffic Report (Sorted by Enqueue Count; LIMIT 2)
                                From 15Jan2018 16.15.23.81 To 15Jan2018 16.24.29.89 Elapsed= 0 Hrs 9 Mins 06.075.874 Secs

Local SIDs = 3, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 41, 44, 45, 300, 500, 1012, 2036

Input   Dest   Input   Dest   Link   Link   Enqueue   Dequeue
Name    Name    SID     SID    No.    Type   Count     Count
-----
L62MVS1 TRAN31B0 11      31     10     VTAM    7         9
L62MVS1 L62MVS1 12      12     10     VTAM    5         0

** Limit                      12         9
** Total Traffic **          15         15
```

Figure 262. MSC Traffic report, Sequenced by Calls (with Limit)

Report content: MSC Queuing Summary

The MSC Queuing Summary report presents the information on the number of queued messages and their waiting time by the combination of the enqueued link number or type and the dequeued link number or type.

The report is not produced if there are no cross-system messages during the reporting period.

The contents of the MSC Receive and Retrieve records are reflected in the report only when both are present.

Report from 04Feb2018 13.19.28.51 IMS 15.1.0 IMS Performance Analyzer 4.4 Report to 04Feb2018 13.20.42.21
MSC Queuing Summary
 From 04Feb2018 13.19.28.51 To 04Feb2018 13.20.42.19 Elapsed= 0 Hrs 1 Mins 13.674.014 Secs

Enqueue..... Link No. Type	Dequeue..... Link No. Type	Messages	Q Length /Message	StDev	Max Q Length	Q Time/Msg Sc.Mil.Mic	StDev	Max Sc.Mil.Mic	Pct Tot Messages
1 C-C	1 C-C	35	67	0.64	148	760.646	1.87	5.630.710	8.58%
3 C-C	3 C-C	3	38	0.52	55	716.926	1.41	2.150.271	0.74%
4 C-C	4 C-C	43	117	0.66	237	102.271	2.50	1.206.577	10.54%
5 C-C	5 C-C	19	65	0.18	76	22.457	1.99	200.861	4.66%
6 C-C	6 C-C	13	124	0.51	210	11.417	1.49	62.334	3.19%
6 C-C	38 C-C	6	122	0.57	218	589.764	2.14	3.413.587	1.47%
17 C-C	25 C-C	5	232	0.39	387	18.561	0.51	32.750	1.23%
42 VTAM	42 VTAM	107	177	0.66	401	89.343	5.97	5.511.042	26.23%
45 VTAM	5 C-C	7	137	0.26	167	67.825	1.94	388.766	1.72%
45 VTAM	45 VTAM	8	129	0.54	227	21.624	0.82	55.093	1.96%
** Total **		408	163	0.82	529	191.679	4.07	6.743.317	100.00%

Report from 04Feb2018 13.19.28.51 IMS 15.1.0 IMS Performance Analyzer 4.4 Report to 04Feb2018 13.20.42.21
MSC Queuing Summary
 From 04Feb2018 13.19.28.51 To 04Feb2018 13.20.42.19 Elapsed= 0 Hrs 1 Mins 13.674.014 Secs

Queue Length/Message				Queue Time/Message			
Average	Std-Dev/Avg	Max Value		Average	Std-Dev/Avg	Max Value	
177	.659	401		89.343	5.973	5.511.042	
Range	Count in	Enq Link - 42 VTAM		Range	Count in	Enq Link - 42 VTAM	
	Range	Deq Link - 42 VTAM		SC MIL MIC	Range	Deq Link - 42 VTAM	
To Maximum	0			To Maximum	1		
10,000	0			800.000	2 *		
5,000	0			400.000	16 *****		
1,000	71	*****		50.000	56 *****		
100	14	*****		10.000	21 *****		
50	22	*****		5.000	11 ****		
10	0			1.000	0		
5	0			0.500	0		
2	0			0.200	0		
1	0			0.100	0		
Total=	107	10 20 30 40 50%		Total=	107	10 20 30 40 50%	

Figure 263. MSC reports: MSC Queuing

The report contains the following data items:

Enqueue Link No.

The enqueued link number.

Enqueue Type

The enqueued link type.

Dequeue Link No.

The dequeued link number.

Dequeue Type

The dequeued link type. The types of link are the same as those for the MSC Traffic report:

BSYNC

BISYNC

M-M Main storage to main storage

C-C Channel to channel

VTAM

VTAM

Messages

The number of messages.

Queue Length

Q Length/Message

The average queue length per message from when it is enqueued until dequeued (from enqueue to dequeue).

StDev The standard deviation of the queue length per message from enqueue to dequeue.

Max Q Length

The maximum queue length per message from enqueue to dequeue.

Queue Time

Q Time/Msg Sc.Mil.Mic

The average elapsed time per message from enqueue to dequeue.

StDev The standard deviation of the elapsed time per message from enqueue to dequeue.

Max Sc.Mil.Mic

The maximum elapsed time per message from enqueue to dequeue.

Pct Tot Messages

The number of messages for each link number or type, presented as a percentage of the total number of cross-system messages.

If Alternate Sequencing is requested:

- The MSC Queuing report header is suffixed by **Sorted by Total IWAIT Elapsed time**. Delay is the only sequencing option applicable to this report.
- If a number or percentage (less than 100%) Limit is specified:
 - The report header is also suffixed by **LIMIT nn** or **LIMIT nn%**
 - The **** Limit** line gives the total of the reported (Limited) data whilst the ****Total** line gives the total of all (100%) of the data.

Distributions: If the corresponding Distributions are specified, this report includes distribution graphs of the queue length and the elapsed time in a queue for the combination of each enqueued link number and dequeued link number.

ESAF report

The External Subsystem (ESAF) report provides a detailed analysis of external subsystem activity in regions and by application programs. Individual subsystem activity is broken down by Region and Program, with statistics of ESAF activity per Transaction.

Monitor records: This report is derived from monitor records 02–29, 38–39, 47–49, 56–65.

Report options

To obtain the External Subsystem report, select the **ESAF** report in a Monitor Report Set and specify a DDname for the output data set for this report.

The **Alternate Sequencing** Option is applicable to this report.

Report content

This is an example of the four ESAF reports: Region Summary, Region Detail, Program Summary, Program Detail.

The Region Detail report breaks down external subsystem usage by Region ID.

The Program Detail report breaks down external subsystem usage by Program and Transaction Code within Region.

All reports have the same format, except for the addition of the PSBname and Trancode columns in the Program Detail report.

The following figures show the four reports with Alternate Sequencing activated. When Alternate Sequencing is requested:

- The ESAF report header is suffixed by **Sorted by Total Call Elapsed time**. Calls is the only sequencing option applicable to this report.
- If a number or percentage (less than 100%) Limit is specified, the report header is also suffixed by **LIMIT nn** or **LIMIT nn%**.

Report from 04Feb2018 13.19.28.51		IMS 15.1.0		IMS Performance Analyzer 4.4				Report to 04Feb2018 13.20.42.21			
External Subsystem: Region Summary (Sorted by Total Call Elapsed time; LIMIT 2)											
From 04Feb2018 13.19.28.57 To 04Feb2018 13.20.42.21				Elapsed= 0 Hrs 1 Mins 13.641.560 Secs							
----- Subsystem Calls -----											
-- Transaction --											
Rgn No.	SSID	Function	Mod	Count	Avg Elapse Sc.Mil.Mic	Std Dev	Max Elapse Sc.Mil.Mic	Count	Avg Elapse Sc.Mil.Mic	Calls /Tran	Pct Elaps
*Tot	DB2N	Normal Call	PR0	33631	4.077	40.127	16.975.719	2983	324.932	11.3	14.15%
		Signon	S00	1160	0.107	3.063	8.483			0.4	0.01%
		Create Thread	CT0	846	0.632	5.728	64.391			0.3	0.06%
		Commit PH1	P10	1153	1.915	2.684	91.087			0.4	0.23%
		Commit PH2	P20	232	5.183	1.942	96.114			0.1	0.12%
		Commit Verify	P30	838	2.794	3.263	98.724			0.3	0.24%
		Abort	AB0	1	0.817	0.000	0.817			0.0	0.00%
		** Total **		37861	3.791	40.678	16.975.719			12.7	14.81%
*Tot	MQ01	Normal Call	PR0	998	81.322	5.948	5.018.993	2983	324.932	0.3	8.37%
		Signon	S00	79	0.123	0.887	0.372			0.0	0.00%
		Create Thread	CT0	21	0.031	0.858	0.150			0.0	0.00%
		Commit PH1	P10	78	0.581	2.173	6.286			0.0	0.00%
		Commit PH2	P20	78	0.618	1.855	3.446			0.0	0.00%
		Commit Verify	P30	20	3.812	0.195	6.613			0.0	0.01%
		** Total **		1274	63.846	6.725	5.018.993			0.4	8.39%

Figure 264. ESAF report (Region Summary): Sequenced by Calls (with Limit)

External Subsystem: Region Detail (Sorted by Total Call Elapsed time; LIMIT 2)											
From 04Feb2018 13.19.28.57 To 04Feb2018 13.20.42.21				Elapsed= 0 Hrs		1 Mins		13.641.560 Secs			
----- Subsystem Calls -----											
-- Transaction --											
Rgn No.	SSID	Function	Mod	Count	Avg Elapse Sc.Mil.Mic	Std Dev	Max Elapse Sc.Mil.Mic	Count	Avg Elapse Sc.Mil.Mic	Calls /Tran	Pct Elaps
28	MQ01	Normal Call	PR0	41	1.541.438	1.170	5.018.993	1	69.660.964	41.0	90.72%
		Signon	S00	42	0.026	0.103	0.036			42.0	0.00%
		Commit PH1	P10	42	0.062	0.219	0.146			42.0	0.00%
		Commit PH2	P20	42	0.011	0.097	0.015			42.0	0.00%
		** Total **		167	378.462	2.940	5.018.993			167.0	90.73%
95	DB2N	Normal Call	PR0	432	126.296	10.393	16.975.719	1	45.743.862	432.0	99.99%
		Signon	S00	2	0.183	0.014	0.185			2.0	0.00%
		** Total **		434	125.715	10.417	16.975.719			434.0	99.99%

Figure 265. ESAF report (Region Detail): Sequenced by Calls (with Limit)

External Subsystem: Program Summary (Sorted by Total Call Elapsed time; LIMIT 2)													
From 04Feb2018 13.19.28.57 To 04Feb2018 13.20.42.21 Elapsed= 0 Hrs 1 Mins 13.641.560 Secs													
----- Subsystem Calls -----										-- Transaction --			
Rgn	PSBname	Trancode	SSID	Function	Mod	Count	Avg Elapse Sc.Mil.Mic	Std Dev	Max Elapse Sc.Mil.Mic	Count	Avg Elapse Sc.Mil.Mic	Calls /Tran	Pct Elaps
*Tot	CSQQTRMN		MQ01	Normal Call	PR0	41	1.541.438	1.170	5.018.993	1	69.660.964	41.0	90.72%
				Signon	S00	42	0.026	0.103	0.036			42.0	0.00%
				Commit PH1	P10	42	0.062	0.219	0.146			42.0	0.00%
				Commit PH2	P20	42	0.011	0.097	0.015			42.0	0.00%
				** Total **		167	378.462	2.940	5.018.993			167.0	90.73%
*Tot	AXI74	T17094	DB2N	Normal Call	PR0	432	126.296	10.393	16.975.719	1	45.743.862	432.0	99.99%
				Signon	S00	2	0.183	0.014	0.185			2.0	0.00%
				** Total **		434	125.715	10.417	16.975.719			434.0	99.99%

Figure 266. ESAF report (Program Summary): Sequenced by Calls (with Limit)

External Subsystem: Program Detail (Sorted by Total Call Elapsed time; LIMIT 2)													
From 04Feb2018 13.19.28.57 To 04Feb2018 13.20.42.21 Elapsed= 0 Hrs 1 Mins 13.641.560 Secs													
----- Subsystem Calls -----										-- Transaction --			
Rgn	PSBname	Trancode	SSID	Function	Mod	Count	Avg Elapse Sc.Mil.Mic	Std Dev	Max Elapse Sc.Mil.Mic	Count	Avg Elapse Sc.Mil.Mic	Calls /Tran	Pct Elaps
28	CSQQTRMN		MQ01	Normal Call	PR0	41	1.541.438	1.170	5.018.993	1	69.660.964	41.0	90.72%
				Signon	S00	42	0.026	0.103	0.036			42.0	0.00%
				Commit PH1	P10	42	0.062	0.219	0.146			42.0	0.00%
				Commit PH2	P20	42	0.011	0.097	0.015			42.0	0.00%
				** Total **		167	378.462	2.940	5.018.993			167.0	90.73%
95	AXI74	T17094	DB2N	Normal Call	PR0	432	126.296	10.393	16.975.719	1	45.743.862	432.0	99.99%
				Signon	S00	2	0.183	0.014	0.185			2.0	0.00%
				** Total **		434	125.715	10.417	16.975.719			434.0	99.99%

Figure 267. ESAF report (Program Detail): Sequenced by Calls (with Limit)

The report headings and content have the following meaning:

Rgn No.

The Region number.

PSBname

The PSB (program) name.

Trancode

The Transaction Code name.

SSID

The external subsystem name.

Function

A description of the ESAF call type.

Mod

The IMS module that issued the ESAF call.

Subsystem Calls

Count The number of ESAF calls.

Avg Elapse Sc.Mil.Mic

The average elapsed time of an ESAF call, in microseconds.

Std Dev

The standard deviation of the elapsed time of the ESAF calls.

Max Elapse Sc.Mil.Mic

The maximum elapsed time of an ESAF call, in microseconds.

Transaction

The number of transactions that issued the ESAF calls.

The number of transactions that issued the ESAF calls.

Avg Elapse Sc.Mil.Mic

The average elapsed time of the transactions, in microseconds.

Calls/Tran

The average number of ESAF calls made by a transaction.

Pct Elaps

The percentage of time transactions spent processing ESAF calls.

Synchronous Callout report

The Synchronous Callout report provides a detailed analysis of sync callout activity in regions and by application programs. Individual subsystem activity is broken down by Region and Program, with statistics of sync callout activity per Transaction.

Monitor records: This report is derived from monitor records 78, 79.

Related reference:

“SYNCCOUT: Synchronous Callout List report” on page 93

The Synchronous Callout List report provides a detailed analysis of synchronous callout activity in regions and by application programs.

Report options

To obtain the report, select the **Synchronous Callout** report in a Monitor Report Set and specify a DDname for the output data set for this report.

The Alternate Sequencing option is not applicable to this report.

The format of the operand is:

```
IMSPAMON      SYNCCOUT(  
[DDNAME(ddname)])      default SYNCCOUT
```

Report content

Similar to the ESAF report, the Synchronous Callout report provides a summary and detailed analysis of sync callout activity in regions and by transactions.

Report from 01Apr2009 15.05.10.62			IMS 10.1.0			IMS Performance Analyzer 4.4			Report to 01Apr2009 15.23.03.40		
Synchronous Callout Summary											
From 01Apr2009 15.19.25.67			To 01Apr2009 15.20.17.68			Elapsed= 0 Hrs			0 Mins 52.011.289 Secs		
----- Sync Call-Outs -----						-- Transaction --					
Rgn	Avg Elapse		Max Elapse		Max	Avg Elapse		Calls		Pct	
No. PSBname Trancode	Count	Sc.Mil.Mic	Std Dev	Sc.Mil.Mic	RC	Count	Sc.Mil.Mic	/Tran	Elaps		
*Tot JLMPGM01 JLMTRAN1	2	6.743.041	0.094	7.374.092	0	2	6.744.624	1.0	99.98%		
Synchronous Callout Detail											
From 01Apr2009 15.19.25.67			To 01Apr2009 15.20.17.68			Elapsed= 0 Hrs			0 Mins 52.011.289 Secs		
----- Sync Call-Outs -----						-- Transaction --					
Rgn	Avg Elapse		Max Elapse		Max	Avg Elapse		Calls		Pct	
No. PSBname Trancode	Count	Sc.Mil.Mic	Std Dev	Sc.Mil.Mic	RC	Count	Sc.Mil.Mic	/Tran	Elaps		
2 JLMPGM01 JLMTRAN1	2	6.743.041	0.094	7.374.092	0	2	6.744.624	1.0	99.98%		

Figure 268. Synchronous Callout report

The report columns are:

Rgn No.

The Region number.

PSBname

The PSB (program) name.

Trancode

The Transaction Code name.

Sync Call-Outs

Count The number of sync callouts.

Avg Elapse Sc.Mil.Mic

The average elapsed time of a sync callout, in microseconds.

Std Dev

The standard deviation of the elapsed time of the sync callouts.

Max Elapse Sc.Mil.Mic

The maximum elapsed time of a sync callout, in microseconds.

Max RC

The maximum return code from a sync callout request.

Transaction

Count The number of transactions that issued the sync callouts.

Avg Elapse Sc.Mil.Mic

The average elapsed time of the transactions, in microseconds.

Calls/Tran

The average number of sync callouts made by a transaction.

Pct Elaps

The percentage of time that transactions spent processing sync callouts.

Fast Path Analysis reports

The Fast Path Analysis reports provide an analysis of all Fast Path resources and functions, including DEDB resource contention, Fast Path buffers, BALG and shared EMHQ, OTHREAs, DEDB IWAITs, and VSO.

The reports are not available from DB Monitor data.

DEDB Resource Contention report

The DEDB Resource Contention report provides summary information about IWAITs on DEDB locks of various types, including CI, UOW, segment level, area, buffer overflow, MSDB, non-DBRC DB, command and dummy locks.

The report is not available from DB Monitor data.

Monitor records: This report is derived from monitor records 68, 69, 95.

Report options

To obtain the Fast Path DEDB Resource Contention report, select the **DEDB Resource Contention** report in a Monitor Report Set.

Specify a DDname for the output data set for the report and optionally specify a Distribution for Lock IWAIT Elapsed Time.

The **Alternate Sequencing** option is applicable to this report.

Report content: DEDB Lock IWAITS

This is an example of the Fast Path DEDB Resource Contention report showing the DEDB Lock IWAITS Summary.

This report provides summary information on IWAITS on the following DEDB lock IWAIT types:

Name	Description
-------------	--------------------

CI	IWAIT on CI Lock
-----------	------------------

UOW	IWAIT on UOW Lock
------------	-------------------

Segment Level	
----------------------	--

	IWAIT on Segment Level Lock
--	-----------------------------

Area	IWAIT on Area Lock
-------------	--------------------

Buffer Overflow	
------------------------	--

	IWAIT on Buffer Overflow Lock
--	-------------------------------

MSDB	
-------------	--

	IWAIT on MSDB Lock
--	--------------------

Non-DBRC DB	
--------------------	--

	IWAIT on Database not registered to DBRC Lock
--	---

Command	
----------------	--

	IWAIT on Command Lock
--	-----------------------

Dummy	
--------------	--

	IWAIT on Dummy Lock
--	---------------------

Fast Path DEDB Resource Contention Summary

From 09Jun2018 14.26.11.74 To 09Jun2018 14.29.21.57 Elapsed= 0 Hrs 3 Mins 09.836.240 Secs

**** CI Lock IWAIT ****

Area Name	Sharing Type	Counts	Elap/Count Sc.Mil.Mic	StDev	Max IWAIT Sc.Mil.Mic	Pct Tot Counts	Pct Tot IW Elp
DB23AR0	A	3	3.313	0.466	5.498	9.09%	0.05%
DB23AR1	A	4	2.222	0.551	3.386	12.12%	0.04%
DB23AR3	A	1	4.871.974	0.000	4.871.974	3.03%	24.50%
DB23AR4	A	1	0.257	0.000	0.257	3.03%	0.00%
DB23AR5	A	11	1.358.286	1.620	4.981.761	33.33%	75.15%
DD01AR0	A	13	3.880	0.499	6.863	39.39%	0.25%
** Total		33	602.504	2.668	4.981.761	100.00%	100.00%

Sharing Types:

A : Area / Non Level Share
 B : 1 IRLM Block Level Share
 C : 2 IRLM Block Level Share

**** Area Lock IWAIT ****

Area Name	Sharing Type	Counts	Elap/Count Sc.Mil.Mic	StDev	Max IWAIT Sc.Mil.Mic	Pct Tot Counts	Pct Tot IW Elp
BANKC00	C	11	18.813	0.129	22.795	39.29%	15.18%
BANKC01	C	17	68.036	2.828	837.022	60.71%	84.82%
** Total		28	48.699	3.118	837.022	100.00%	100.00%

Sharing Types:

A : Area / Non Level Share
 B : 1 IRLM Block Level Share
 C : 2 IRLM Block Level Share

**** CI Lock IWAIT ****

		Average SD/Avg 3.313 .471		Max-Value 5.498			Average SD/Avg 2.222 .556		Max-Value 3.386			Average SD/Avg 4.871.974 .005		Max-Value 4.871.974			Average SD/Avg 0.257 .005		Max-Value 0.257
Range	Count in	Areaname=DB23AR0			Range	Count in	Areaname=DB23AR1			Range	Count in	Areaname=DB23AR3			Range	Count in	Areaname=DB23AR4		
Sc Mil Mic	Range	Share Type=A			Sc Mil Mic	Range	Share Type=A			Sc Mil Mic	Range	Share Type=A			Sc Mil Mic	Range	Share Type=A		
To Maximum	0				To Maximum	0				To Maximum	1	*****			To Maximum	0			
256.000	0				256.000	0				256.000	0				256.000	0			
128.000	0				128.000	0				128.000	0				128.000	0			
64.000	0				64.000	0				64.000	0				64.000	0			
32.000	0				32.000	0				32.000	0				32.000	0			
16.000	0				16.000	0				16.000	0				16.000	0			
8.000	1	*****			8.000	0				8.000	0				8.000	0			
4.000	2	*****			4.000	2	*****			4.000	0				4.000	0			
2.000	0				2.000	1	*****			2.000	0				2.000	0			
1.000	0				1.000	1	*****			1.000	0				1.000	1	*****		
Total=	-----	3 10 20 30 40 50%			Total=	-----	4 10 20 30 40 50%			Total=	-----	1 10 20 30 40 50%			Total=	-----	1 10 20 30 40 50%		

		Average SD/Avg 1.358.286 1.624		Max-Value 4.981.761			Average SD/Avg 3.880 .503		Max-Value 6.863			Average SD/Avg 602.504 2.673		Max-Value 4.981.761				
Range	Count in	Areaname=DB23AR5			Range	Count in	Areaname=DD01AR0			Range	Count in	Areaname=** Total						
Sc Mil Mic	Range	Share Type=A			Sc Mil Mic	Range	Share Type=A			Sc Mil Mic	Range	Share Type=						
To Maximum	3	*****			To Maximum	0				To Maximum	4	*****						
256.000	0				256.000	0				256.000	0							
128.000	0				128.000	0				128.000	0							
64.000	1	****			64.000	0				64.000	1	*						
32.000	0				32.000	0				32.000	0							
16.000	2	*****			16.000	3	*****			16.000	5	*****						
8.000	1	****			8.000	2	*****			8.000	4	*****						
4.000	2	*****			4.000	3	*****			4.000	9	*****						
2.000	1	****			2.000	5	*****			2.000	7	*****						
1.000	1	****			1.000	0				1.000	3	****						
Total=	-----	11 10 20 30 40 50%			Total=	-----	13 10 20 30 40 50%			Total=	-----	33 10 20 30 40 50%						

Figure 269. DEDB Resource Contention report: DEDB Lock IWAIT Summary

The report heading at the top of the page has the following:

From Start time of region activity in the reporting period.

To End time of region activity in the reporting period.

Elapsed

Elapsed time from start until end of region activity in the reporting period.

Each section of the report includes the following items:

Area Name

The name of the area whose activity is being summarized.

Sharing Type

SHARELVL

Name

0 or 1 A : Area / Non Level Share

2 B : 1 IRLM Block Level Share

3 C : 2 IRLM Block Level Share

Counts

The number of locks of this type requested.

Elap/Count Sc.Mil.Mic

The average elapsed time to wait for this type of lock per request.

StDev The standard deviation of the elapsed time to wait for this type of lock per request.

Max IWAIT Sc.Mil.Mic

The maximum elapsed time to wait for this type of lock per request.

Pct Tot Counts

The number of waits for this type of lock in each area, presented as a percentage of the total number of waits for this type of lock in all areas.

Pct Tot IW Elp

The elapsed time to wait for this type of lock in each area, presented as a percentage of the total elapsed time to wait for this type of lock in all areas.

Distributions: If a Distribution for Lock IWAIT Elapsed Time is specified, the Elap/Count distribution graphs for each area are presented by lock IWAIT type.

If Alternate Sequencing is requested:

- The DEDB Resource Contention Summary report header is suffixed by **Sorted by Total IWAIT Elapsed time**. Delay is the only sequencing option applicable to this report.
- If a number or percentage (less than 100%) Limit is specified, the report header is also suffixed by **LIMIT nn** or **LIMIT nn%**.

Report from 09May2018 18.29.32.35		IMS 15.1.0		IMS Performance Analyzer 4.4		Report to 09May2018 18.33.28.85	
Fast Path DEDB Resource Contention Summary (Sorted by Total IWAIT Elapsed time; LIMIT 10%)							
**** CI Lock IWAIT ****		From 09May2018 18.29.32.90 To 09May2018 18.33.28.31		Elapsed= 0 Hrs 3 Mins 55.405.756 Secs		Sharing Types:	
Area Name	Sharing Type	Counts	Elap/Count Sc.Mil.Mic	StDev	Max IWAIT Sc.Mil.Mic	Pct Tot Counts	Pct Tot IW Elp
CMFA15	C	4	249.742	1.093	657.358	0.32%	0.20%
CMFA38	C	2	454.032	0.393	632.274	0.16%	0.18%
CMFA39	C	2	1.774	0.201	2.130	0.16%	0.00%
CMFA05	C	4	0.855	0.366	1.237	0.32%	0.00%
CMFA27	C	1	867.111	0.000	867.111	0.08%	0.17%
CMFA30	C	2	24.901	0.969	49.041	0.16%	0.01%
** Limit		15	188.728	1.525	867.111	1.20%	0.56%
** Total		1245	405.830	1.262	4.168.837	100.00%	100.00%

Figure 270. DEDB Resource Contention Summary report, Sequenced by Delay (with Limit)

Report content: DEDB Area Lock Activity

This is an example of the Fast Path DEDB Resource Contention report showing a summary of DEDB Area Lock Activity.

Report from 09Jun2018 14.25.56.36		IMS 15.1.0		IMS Performance Analyzer 4.4				Report to 09Jun2018 14.30.06.71					
Fast Path DEDB Lock Activity													
		From 09Jun2018 14.26.11.74 To 09Jun2018 14.29.21.57		Elapsed= 0 Hrs 3 Mins 09.831.742 Secs									
Area	Shr Loc	Lock	Average	Lock Elapsed	Maximum	** Pct Total **	IWAIT	Average	IWAIT	Elapsed	Maximum	** Pct Total **	
Name	Lvl Typ	Count	Sc.Mil.Mic	StDev	Sc.Mil.Mic	Locks Lock El	Count	Sc.Mil.Mic	StDev	Sc.Mil.Mic	IWAITS IWT Ela		
DB23AR0	1 CI	8	1.731.126	1.710	7.895.488	6.54% 8.87%	3	2.152	0.078	2.388	7.09% 0.04%		
DB23AR1	1 CI	16	3.561.822	2.561	27.694.288	13.08% 36.51%	4	2.280	0.532	3.508	10.32% 0.05%		
DB23AR4	1 CI	3	56.263	1.401	167.765	2.67% 0.11%	1	0.306	0.000	0.306	0.21% 0.00%		
DB23AR5	1 CI	36	1.525.901	1.846	10.159.705	30.34% 35.19%	11	1.422.873	1.395	4.985.499	27.43% 85.57%		
...													
DD01AR0	2 CI	40	417.830	4.100	7.888.613	34.54% 10.71%	13	3.898	0.542	9.214	32.65% 0.28%		
	UOW	2	26.282	0.571	41.278	0.73% 0.29%	0						
	Tot	42	398.654	3.499	7.888.613	36.43% 11.00%	13	3.898	0.542	9.214	32.65% 0.28%		
** Total	CI	153	1.020.175	3.514	27.694.288	99.27% 99.71%	33	554.285	2.475	4.985.499	100.00% 100.00%		
	UOW	2	26.282	0.571	41.278	0.73% 0.29%	0						
	Tot	155	1.001.324	2.345	27.694.288	100.00% 100.00%	33	554.285	2.475	4.985.499	100.00% 100.00%		

Figure 271. DEDB Resource Contention report: Fast Path DEDB Lock Activity

The report contains the following information:

Area Name

The name of the area whose activity is being summarized.

Shr Lvl

The Database Share Level (SHARELVL), either 0, 1, 2 or 3.

Loc Typ

The Lock Type, either CI or UOW. **Tot** is the combined CI and UOW total for the area, or grand total.

Lock Elapsed

Lock Count

The number of locks requested.

Average Sc.Mil.Mic

The average lock elapsed time.

StDev The standard deviation of lock elapsed time.

Maximum Sc.Mil.Mic

The maximum lock elapsed time.

Pct Total Locks

The number of locks presented as a percentage of the total number of locks for all areas.

Pct Total Lock El

The lock elapsed time presented as a percentage of the total lock elapsed time for all areas.

IWAIT Elapsed**IWAIT Count**

The number of IWAITs.

Average Sc.Mil.Mic

The average lock IWAIT elapsed time.

StDev The standard deviation of lock IWAIT elapsed time.

Maximum Sc.Mil.Mic

The maximum lock IWAIT elapsed time.

Pct Total IWAITs

The number of lock IWAITs presented as a percentage of the total number of lock IWAITs for all areas.

Pct Total IWT Ela

The lock IWAIT elapsed time presented as a percentage of the total lock IWAIT elapsed time for all areas.

If Alternate Sequencing is requested:

- The Fast Path DEDB Lock Activity report header is suffixed by **Sorted by Total IWAIT Elapsed time**. Delay is the only sequencing option applicable to this report.
- If a number or percentage (less than 100%) Limit is specified, the report header is also suffixed by **LIMIT nn** or **LIMIT nn%**.

Fast Path Buffer Statistics report

The Fast Path Buffer Statistics report provides statistical information on activities in the Fast Path buffers, for all regions combined and for each region.

The report is not available from DB Monitor data.

Monitor records: The report is derived from monitor record 43.

Report options

To obtain the report, select the **FP Buffer Statistics** report in a Monitor Report Set.

Specify a DDname for the output data set for the report, and optionally a Distribution to produce a distribution graph of Buffer Statistics.

The **Alternate Sequencing** Option is applicable to this report.

Report content

The Fast Path Buffer Statistics report presents the statistical information of the Fast Path buffers by transaction for all regions and for each region.

If there is no activity in the Fast Path buffers during the reporting period, the report is not produced.

Fast Path Buffer Statistics

Region Totals		From 08Jun2018 13.06.23.92 To 08Jun2018 13.09.52.02 Elapsed= 0 Hrs 3 Mins 28.096.284 Secs																	
Trans Code	No.of Sync	No.of Bufs Requested		No.of Bufs Updated		No.of Steal		No.of Invoc.		No.of Bufs Stolen		No.of Bufs Used (NBA)		No.of Bufs Used (OBA)		No.of Waits for OBA		Elapsed Time for OBA	
		Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
DDLTRN01	38	3	21	3	20	0	0	0	0	3	20	0	0	0	0	0	0	0.000	0.000
DDLTRN02	6	3	5	1	1	0	0	0	0	3	5	0	0	0	0	0	0	0.000	0.000
TXCDDS01	4	4	7	0	1	1	2	1	1	2	3	1	2	0	1	0	0	0.004	0.015
TXCDRN14	1	3	3	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0.000	0.000
** Total	49	3	21	2	20	0	2	0	1	3	20	0	2	0	1	0	0	0.000	0.015

Region No. 1		From 08Jun2018 13.06.23.92 To 08Jun2018 13.09.52.02 Elapsed= 0 Hrs 3 Mins 28.096.284 Secs																	
Trans Code	No.of Sync	No.of Bufs Requested		No.of Bufs Updated		No.of Steal		No.of Invoc.		No.of Bufs Stolen		No.of Bufs Used (NBA)		No.of Bufs Used (OBA)		No.of Waits for OBA		Elapsed Time for OBA	
		Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
DDLTRN01	38	3	21	3	20	0	0	0	0	3	20	0	0	0	0	0.000	0.000		
TXCDDS01	4	4	7	0	1	1	2	1	1	2	3	1	2	0	1	0.004	0.015		
TXCDRN14	1	3	3	0	0	0	0	0	0	3	3	0	0	0	0	0.000	0.000		
** Total	43	3	21	3	20	0	2	0	1	3	20	0	2	0	1	0.000	0.015		

Region Totals		From 08Jun2018 13.06.23.92 To 08Jun2018 13.09.52.02 Elapsed= 0 Hrs 3 Mins 28.096.284 Secs															
Trancode		DDLTRN01															
		Average SD/Avg Max-Value			Average SD/Avg Max-Value			Average SD/Avg Max-Value			Average SD/Avg Max-Value						
		2.79 1.58 21			2.97 1.40 20			0.00 .00 0			0.00 .00 0						
Range		Count in		** Buffer		Count in		** Buffer		Count in		** Steal		Count in		**Buffer	
Counts		Range		Requested **		Range		Updated **		Range		Invocation **		Range		Stolen **	
To Maximum		0				0				0				0			
50		1 *				0				0				0			
20		1 *				1 *				0				0			
15		1 *				2 **				0				0			
10		0				0				0				0			
5		0				2 **				0				0			
4		3 ***				4 ****				0				0			
3		5 *****				2 **				0				0			
2		9 *****				7 *****				0				0			
1		18 *****				20 *****				38 *****				38 *****			
Total=		38				38				38				38			
		-----				-----				-----				-----			
		10 20 30 40 50%				10 20 30 40 50%				10 20 30 40 50%				10 20 30 40 50%			

		Average SD/Avg		Max-Value			Average SD/Avg		Max-Value			Average SD/Avg		Max-Value		
		3.18	1.30	20			0.00	.00	0			0.00	.00	0		
Range	Count in	** Buffer			Count in	** Buffer			Count in	** Wait for			Count in	** Wait for		
Counts	Range	Used (NBA) **			Range	Used (OBA) **			Range	OBA(Count) **			Range	OBA(Count) **		
To Maximum	0				0				0				0			
50	0				0				0				0			
20	1 *				0				0				0			
15	2 **				0				0				0			
10	0				0				0				0			
5	3 ***				0				0				0			
4	3 ***				0				0				0			
3	6 *****				0				0				0			
2	4 ****				0				0				0			
1	19 *****				38 *****				38 *****				38 *****			
Total=	38				38				38				38			

Figure 272. Fast Path Buffer Statistics

The report heading at the top of each page has the following:

Region Totals or Region No. nn**Region Totals**

Designates that the report is a summary of system activity.

Region No. *nn*

Designates that the report is a summary of region activity for region *nn*.

From Start time of region activity in the reporting period.

To End time of region activity in the reporting period.

Elapsed

Elapsed time from start until end of region activity in the reporting period.

%NO-TRAN indicates that there are no transaction codes in the monitor input data, and is also printed for the regions not related to transactions such as batch regions.

The columns of the report are:

Trans Code

The name of the transaction code being analyzed.

In the DBCTL environment, this is a CICS transaction code if a DL/I call is issued against the DEDB in a CICS application program.

It is not always possible to determine the transaction code for activity in progress at the start of the IMS Performance Analyzer reporting interval. In this case, the transaction code is reported as %Trnnnnn where *nnnn* is the region number.

No.of Sync

The number of sync points.

The **Average** and **Maximum** values per transaction are presented for the following items:

No.of Bufs Requested

The number of Fast Path buffers requested.

No.of Bufs Updated

The number of buffers updated by DDEP, SDEP, and MSDB activity.

No.of Steal Invoc.

The number of STEAL requests to buffers that are not in use.

No.of Bufs Stolen

The number of successful STEALs to buffers that are not in use.

No.of Bufs Used (NBA)

The number of NBA (Normal Buffer Allocation) buffers used.

No.of Bufs Used (OBA)

The number of OBA (Overflow Buffer Allocation) buffers used.

No.of Waits for OBA

The number of requests that waited to obtain a buffer from OBA.

Elapsed Time for OBA

The elapsed time waiting to obtain buffers from OBA.

Distributions: If a Distribution for Fast Path Buffer Statistics is specified, seven distribution graphs for the above items, with the exception of Elapsed Time for OBA, are produced.

If Alternate Sequencing is requested:

- The Fast Path Buffer Statistics report header is suffixed by:

- **Sorted by Total Buffer Requests** if sequencing by Occupancy or Calls is requested. The Occupancy request is translated to a Calls request.
- **Sorted by Total Buffer Steals** if sequencing by Delay requested.
- If a number or percentage (less than 100%) Limit is specified:
 - The report header is also suffixed by **LIMIT nn** or **LIMIT nn%**
 - The **** Limit** line gives the total of the reported (Limited) data whilst the ****Total** line gives the total of all (100%) of the data.

Report from 09May2018 18.29.32.35		IMS 15.1.0				IMS Performance Analyzer 4.4				Report to 09May2018 18.33.28.85									
Fast Path Buffer Statistics (Sorted by Total Buffer Requests; LIMIT 30%)																			
Region No.	186	From 09Jun2018 18.31.16.29 To 09Jun2018 18.33.20.24						Elapsed=		0 Hrs 2 Mins 03.945.370 Secs									
Trans Code	No.of Sync	No.of Bufs Requested		No.of Bufs Updated		No.of Bufs Steal		No.of Bufs Invoc.		No.of Bufs Stolen		No.of Bufs Used (NBA)		No.of Bufs Used (OBA)		No.of Waits for OBA		Elapsed Time for OBA	
		Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
%Trn0186	7	3	4	2	4	0	0	0	0	3	4	0	0	0	0	0.000	0.000		
** Limit	7	3	4	2	4	0	0	0	0	3	4	0	0	0	0	0.000	0.000		
** Total	7	3	4	2	4	0	0	0	0	3	4	0	0	0	0	0.000	0.000		

Figure 273. Fast Path Buffer Statistics, Sequenced by Calls (with Limit)

Related concepts:

“Dependent region activity in progress” on page 503

Activity is reported for schedules and transactions in progress during the IMS PA reporting interval, including WFI, IFP, and BMP regions.

BALG/Shared EMHQ Analysis report

The BALG/Shared EMHQ Analysis report provides statistical information on Balancing Group (BALG) activities and the shared Expedited Message Handler queue (EMHQ).

The report is not available from DB Monitor data.

Monitor records: The report is derived from monitor record 47.

Report options

To obtain the Fast Path BALG/Shared EMHQ Analysis report, select the **BALG/Shared EMHQ** report in a Monitor Report Set.

Specify a DDname for the output data set for the report. Optionally, specify Distributions for the Queue Length per Message and Queue Time per Message distribution graphs.

Report content

The BALG/Shared EMHQ Analysis report presents the statistical information on Balancing Group (BALG) activities and the shared Expedited Message Handler Queue (EMHQ).

This report is not produced if there are no BALG or shared EMHQ activities during the reporting period.

Fast Path BALG/Shared EMHQ Analysis

From 08Jun2018 13.07.14.69 To 08Jun2018 13.09.21.73 Elapsed= 0 Hrs 2 Mins 07.044.819 Secs

PSBName	TranCode	Queue	Msg Counts	----- Length /Msg	Queue Length / Message StDev	Max Value	----- Pct Tot Counts	----- Elap/Msg Sc.Mil.Mic	Queue Time / Message StDev	----- Max Value Sc.Mil.Mic	----- Pct Tot Elaps
DDLTD01	TXCDS01	BALG	10	1	0.571	2	29.43%	8.048	0.524	13.542	31.32%
DDLTRN14	TXCDRN14	BALG	4	1	0.663	2	10.57%	20.674	0.514	24.436	8.68%
DRPTRS21	TXCDS21	BALG	15	1	0.465	2	40.43%	8.048	0.689	16.282	38.32%
DRPTRN17	TXCDRN17	BALG	7	1	0.667	2	19.57%	20.674	0.532	27.563	21.68%
** Total **			36	1	0.598	2	100.00%	11.655	0.755	27.563	100.00%

Queue Length/Message				Queue Time/Message			
Average		Std-Dev/Avg	Max Value	Average		Std-Dev/Avg	Max Value
1.40		.571	2	8.048		.524	13.542
Range		Count in	PSB=DDLTD01 Queue=	Range		Count in	PSB=DDLTD01 Queue=
Length	Range		TC =TXCDS01 BALG	Sc Mil Mic	Range		TC =TXCDS01 BALG
To Maximum	0			To Maximum	0		
90	0			10.000.000	0		
30	0			5.000.000	0		
15	0			1.000.000	0		
10	0			500.000	0		
5	0			100.000	0		
4	0			50.000	3	*****	
3	0			10.000	5	*****	
2	6	*****		5.000	2	*****	
1	4	*****		1.000	0		
----- -----				----- -----			
Total=		10	10 20 30 40 50%	Total=		10	10 20 30 40 50%

Queue Length/Message				Queue Time/Message			
Average	Std-Dev/Avg	Max Value		Average	Std-Dev/Avg	Max Value	
1.25	.663	2		20.674	.514	24.436	
Range	Count in	PSB=DDLTRN14 Queue=		Range	Count in	PSB=DDLTRN14 Queue=	
Length	Range	TC =TXCDRN14 BALG		Sc Mil Mic	Range	TC =TXCDRN14 BALG	
To Maximum	0			To Maximum	0		
90	0			10.000.000	0		
30	0			5.000.000	0		
15	0			1.000.000	0		
10	0			500.000	0		
5	0			100.000	0		
4	0			50.000	3	*****	
3	0			10.000	0		
2	2	*****		5.000	1	*****	
1	2	*****		1.000	0		
-----				-----			
Total=	4	10 20 30 40 50%		Total=	4	10 20 30 40 50%	

Figure 274. BALG/Shared EMHQ Analysis report

The report heading at the top of each page has the following:

From Start time of region activity in the reporting period.

To End time of region activity in the reporting period.

Elapsed

Elapsed time from start until end of region activity in the reporting period.

The time difference between From and To may show as 0 in the report because the report was created based on only one record.

The report columns are:

PSBname

The PSB whose activity is being analyzed.

TranCode

The transaction code whose activity is being analyzed.

It is not always possible to determine the transaction code for activity in progress at the start of the IMS Performance Analyzer reporting interval. In this case, the transaction code is reported as %Trnnnnn where *nnnn* is the region number.

Queue

BALG Balancing Group

EMHQ Shared EMH (Expedited Message Handler) Queue

Msg Counts

The number of message GU calls.

Queue Length / Message

Information on the length of the BALG/Shared EMHQ queues:

Length/Msg

The average queue length per message processed at GU call time.

StDev The standard deviation of the queue length.

Max Value

The maximum queue length for a message processed at GU call time.

Pct Tot Counts

The number of GU calls for this transaction shown as a percentage of the total number of GU calls for all transactions.

Queue Time / Message

The elapsed time of a GU call message staying in BALG/Shared EMHQ:

Elap/Msg Sc.Mil.Mic

The average elapsed time that GU call messages stayed in BALG/Shared EMHQ.

StDev The standard deviation of the elapsed queue time.

Max Value Sc.Mil.Mic

The maximum elapsed time that a message stayed in BALG/Shared EMHQ.

Pct Tot Elaps

The elapsed time that GU call messages stayed in BALG/Shared EMHQ for this transaction shown as a percentage of the total elapsed time of GU call messages for all transactions.

Distributions: If the corresponding Distributions are specified, the report includes distribution graphs for the BALG/Shared EMHQ queue length per message and for the elapsed time per transaction of a message staying in BALG/Shared EMHQ.

Related concepts:

“Dependent region activity in progress” on page 503

Activity is reported for schedules and transactions in progress during the IMS PA reporting interval, including WFI, IFP, and BMP regions.

OTHREAD Analysis report

The OTHREAD Analysis report is a summary analysis of activities in the OTHREAD queue.

The report is not available from DB Monitor data.

Monitor records: The report is derived from monitor records 72, 87.

Report options

To obtain the report, select the **OTHREAD Analysis** report in a Monitor Report Set.

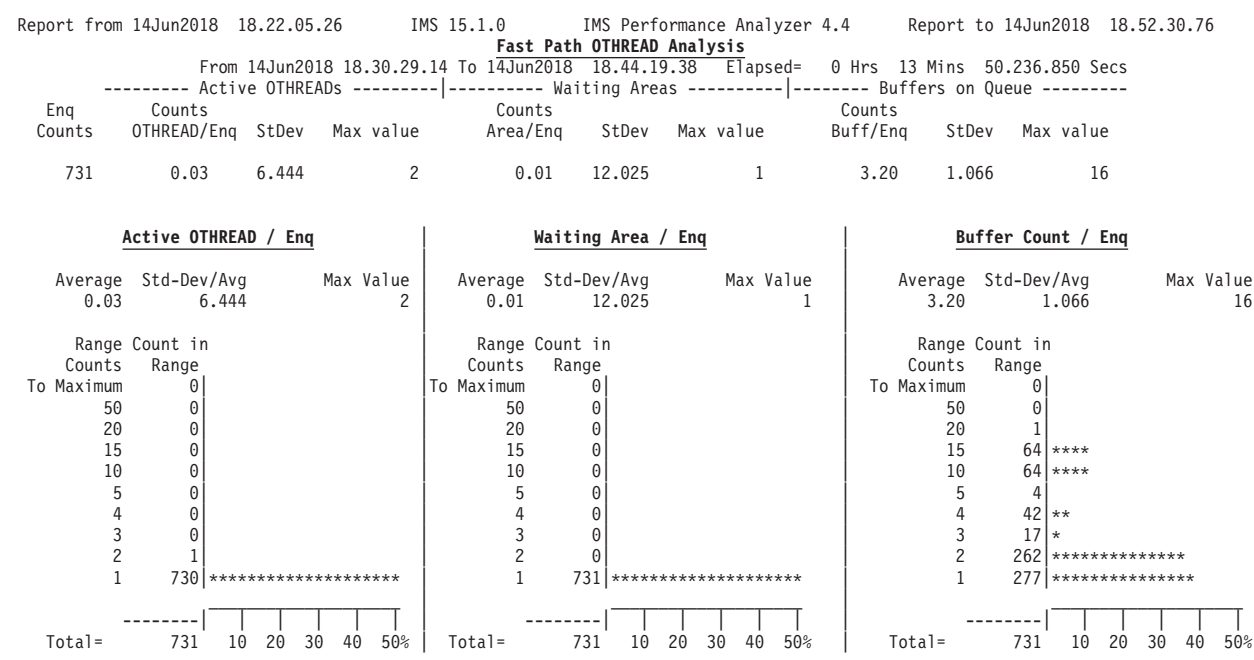
Specify a DDname for the output data set for the report. Optionally, specify up to three Distributions for the following distribution graphs:

- Active OTHREAD Counts
- Waiting Area
- Buffers on Queue

Report content

The OTHREAD Analysis report provides a summary analysis of OTHREAD activities.

If there are no activities in the OTHREAD queue during the reporting period, a report is not produced.



Report from 19Jun2018 10.57.53.58 IMS 15.1.0 IMS Performance Analyzer 4.4 Report to 19Jun2018 11.01.41.40

Fast Path OTHREAD Analysis

From 19Jun2018 10.49.38.15 To 19Jun2018 10.58.57.52 Elapsed= 0 Hrs 9 Mins 19.363.112 Secs

**** DEDB Write IWAIT ****

AD\$Name	Share Level	VS0	IWAITs	Elap/IWAIT Sc.Mil.Mic	Max value Sc.Mil.Mic	Pct Tot IWAITs	Pct Tot IWT Elp	CI Write Count CI/IWAIT	Max value
DB23AR0	1	NO	5	5.387	17.631	0.63%	1.89%	1	1
DB23AR1	1	NO	5	4.196	5.392	0.63%	0.38%	2	4
DB23AR2	1	NO	7	4.860	6.245	1.28%	1.07%	5	6
DD01AR0	1	NO	17	2.949	5.488	2.53%	1.58%	2	5
BANKC00	3	YES	426	4.404	140.204	47.53%	21.28%	2	8
BANKC01	3	YES	434	14.246	511.090	58.47%	74.72%	2	8
** Total			903	7.941	511.090	100.00%	100.00%	3	8

Figure 275. OTHREAD Analysis report

The report heading at the top of the page has the following:

From Start time of region activity in the reporting period.

To End time of region activity in the reporting period.

Elapsed

Elapsed time from start until end of region activity in the reporting period.

The report presents the following data for OTHREAD schedule and OTHREAD queue length:

Enq Counts

The number of OTHREAD requests (write requests).

Active OTHREADs

The number of SRB schedules:

Counts OTHREAD/Enq

The average number of SRBs scheduled for OTHREAD requests.

StDev The standard deviation of the number of SRBs scheduled for OTHREAD requests.

Max Value

The maximum number of SRBs scheduled for OTHREAD requests.

Waiting Areas

The number of areas waiting to be processed:

Counts Area/Enq

The average number of areas waiting to be processed at the time of the OTHREAD request.

StDev The standard deviation of the number of areas waiting to be processed at the time of the OTHREAD request.

Max Value

The maximum number of areas waiting to be processed at the time of the OTHREAD request.

Buffers on Queue

The length of the buffer queue to be written to the database:

Counts Buff/Enq

The average queue length on OTHREAD per enqueue request.

StDev The standard deviation of the queue length on OTHREAD per enqueue request.

Max Value

The maximum queue length on OTHREAD per enqueue request.

Distributions: If the corresponding Distributions are specified, the report includes distribution graphs for the active OTHREAD counts, waiting areas, and buffers on queue.

DEDB Write IWAIT: This report includes detailed information on IWAITs for DEDB:

ADSname

Area Data Set name.

Share Level

Database Share Level (SHARELVL) can be 0, 1, 2 or 3.

VSO The DEDB Area uses VSO (YES) or does not use VSO (NO).

IWAITs

The number of IWAITs.

Elap/IWAIT Sc.Mil.Mic

The average elapsed time per IWAIT.

Max Value Sc.Mil.Mic

The maximum IWAIT elapsed time.

Pct Tot IWAITs

The number of IWAITs as a percentage of the total number of IWAITs reported here. (The total of this column should be 100%; any difference results from rounding.)

Pct Tot IWT Elp

The IWAIT elapsed time as a percentage of the total IWAIT elapsed time for the IWAITs reported here.

CI Write Count

The number of CIs written at DEDB WRITE:

CI/IWAIT

The average number of CIs written per IWAIT.

Max Value

The maximum number of CIs written per IWAIT.

VSO Summary report

The DEDB VSO Summary provides summary information on VSO activity including VSO preload, VSO I/O activities for the various data base share levels, VSO Write IWAITs, VSO area castout operations, and VSO Coupling Facility I/O Waits.

The report is not available from DB Monitor data.

Monitor records: The report is derived from monitor records 72, 73, 84, 85, 88, 89, 94.

Report options

To obtain the report, select the **VSO Summary** report in a Monitor Report Set and specify a DDname for the output data set for the report.

The **Alternate Sequencing** Option is applicable to this report.

Report content

The VSO Summary report provides summary information on activities in the VSO area. The report has six sections: Preload, VSO I/O Activities for Share Level 0 and 1, VSO I/O Activities for Share Level 2 and 3, DEDB Write IWAIT, Castout, and CF I/O Wait.

The report is not produced if there are no activities in the VSO during the reporting period.

Report from 06Jun2018 14.57.22.94		IMS 15.1.0		IMS Performance Analyzer 4.4				Report to 06Jun2018 15.05.15. 02			
Fast Path DEDB VSO Summary											
From 06Jun2018 15.03.09.85 To 06Jun2018 15.03.11.32		Elapsed=		0 Hrs		0 Mins		1.473.389 Secs			
**** Preload ****											
Area Name	Share Level	Start Time HH.MM.SS.TH	End Time HH.MM.SS.TH	Elapse Time Sc.Mil.Mic		No. of CI Read					
BANKC00	1	15.03.09.85	15.03.09.90	52.019		150					
BANKC01	1	15.03.11.25	15.03.11.32	70.153		150					
** Total				122.172		300					
**** I/O Activities **** (SHARELVL 0/1)											
Area Name	Share Level	VSO Reads	VSO Writes	DASD Reads	DASD Writes	Castouts Scheduled					
BANKC00	1	393	457	64	393	163					
BANKC01	1	393	393	0	390	165					
** Total		786	850	64	783	328					
**** I/O Activities **** (SHARELVL 2/3)											
Area Name	Share Level	Look-aside	CF Reads	CF Writes	Read Hits	Valid Reads	DASD Reads	DASD Writes	Castouts Scheduled		
BANKC00	2	NO	393	457	-	-	64	393	163		
BANKC01	2	YES	393	393	123	112	0	390	165		
** Total			786	850	123	112	64	783	328		
**** DEDB Write IWAIT ****											
ADSName	Share Level	VSO	IWAITs	Elap/IWAIT Sc.Mil.Mic	Max value Sc.Mil.Mic	Pct Tot IWAITs	Pct Tot IWT Elp	---- CI Write Count ----			
				Sc.Mil.Mic	Sc.Mil.Mic			CI/IWAIT	Max value		
BANKC00	1	YES	426	4.404	140.204	49.53%	23.28%	2	8		
BANKC01	1	YES	434	14.246	511.090	50.47%	76.72%	2	8		
** Total			860	9.371	511.090	100.00%	100.00%	2	8		
**** CF I/O Wait ****											
From 14Jun2018 18.25.49.73 To 14Jun2018 18.39.21.84		Elapsed=		0 Hrs		13 Mins		32.107.462 Secs			
CF Structure Name		Read			Write			Castout			
		Found Count	Elap/IWAIT Sc.Mil.Mic	Max value Sc.Mil.Mic	Not Found	CI Count	Elap/IWAIT Sc.Mil.Mic	Max value Sc.Mil.Mic	CI Writes	Elapsed/CI Sc.Mil.Mic	Max value Sc.Mil.Mic
BANKC00STR1		393	1.011	10.035	12	457	2.479	12.250	457	2.479	12.250
BANKC01STR1		393	1.183	40.644	26	393	2.922	12.562	393	2.922	12.562
*** Total ***		786	1.097	40.644	1 38	850	2.684	12.562	850	2.684	12.562
**** Castout ****											
Area Name	Share Level	Start Time HH.MM.SS.TH	End Time HH.MM.SS.TH	Elapse Time Sc.Mil.Mic	CI Writes	Structure Name 1	Elapse Time Sc.Mil.Mic	Structure Name 2	Elapse Time Sc.Mil.Mic		
BANKC00	2	15.03.09.85	15.03.09.90	52.019	150	BANKC00STR1	1.011	BANKC00STR2	1.045		
BANKC01	2	15.03.11.25	15.03.11.32	70.153	150	BANKC01STR1	1.183	BANKC01STR2	1.246		
. . .											
** Total				154.678.543	45656	12.324.564		15.937.285			

Figure 276. DEDB VSO Summary report

Alternate Sequencing

If Alternate Sequencing is requested:

- The VSO Summary report sections are sequenced as follows:
 - Preload. No change, sorting is not applicable.
 - I/O Activities (SHARELVL 0/1). Section header is suffixed by:
 - Sorted by Total VSO R+W Counts** if sequencing by Occupancy or Calls is requested (Occupancy is translated to Calls).

- **Sorted by Total DASD R+W Counts** if sequencing by Delay is requested.
- 3. I/O Activities (SHARELVL 2/3). Section header is suffixed by:
 - **Sorted by Total VSO R+W Counts** if sequencing by Occupancy or Calls is requested (Occupancy is translated to Calls).
 - **Sorted by Total DASD R+W Counts** if sequencing by Delay is requested.
- 4. DEDB Write IWAIT. Section header is suffixed by **Sorted by Total IWAIT Elapsed time**. Only sequencing by Delay is applicable (Occupancy and Calls requests are translated to Delay).
- 5. CF I/O Wait. Section header is suffixed by **Sorted by Total R+W IWAIT Elapsed time**. Only sequencing by Delay is applicable (Occupancy and Calls requests are translated to Delay).
- 6. Castout. No change, sorting is not applicable.
- If a number or percentage (less than 100%) Limit is specified:
 - The report header is also suffixed by **LIMIT nn** or **LIMIT nn%**.
 - A **** Limit** line is printed to total the reported (Limited) data whilst the **** Total** line totals all (100%) of the data.

Fast Path DEDB VSO Summary

From 09May2018 18.30.34.78 To 09May2018 18.31.04.00 Elapsed= 0 Hrs 0 Mins 29.216.678 Secs										
**** I/O Activities (SHARELVL 2/3) **** (Sorted by Total DASD R+W Counts; LIMIT 10%)										
Area Name	Share Level	Look-aside	VSO (CF) Reads	VSO (CF) Writes	Read Hits	Valid Reads	DASD Reads	DASD Writes	Castouts Scheduled	
BOCTRA01	3	NO	26546	13284	N/A	N/A	8	2604	1	
FPITMA1C	3	NO	95	89	N/A	N/A	57	29	1	
STOREA01	3	YES	18880	12824	6815	6760	0	69	1	
FPITMA2C	3	NO	30	30	N/A	N/A	20	19	1	
** Limit			45551	26227	6815	6760	85	2721	4	
** Total			52534	26387	7158	6964	111	2741	34	
**** DEDB Write IWAIT **** (Sorted by Total IWAIT Elapsed time; LIMIT 10%)										
ADSname	Share Level	VSO	IWAITs	Elap/IWAIT Sc.Mil.Mic	Max value Sc.Mil.Mic	Pct Tot IWAITs	Pct Tot IWT Elp	CI Write Count CI/IWAIT	Max value	
BOCTRA01	3	YES	459	34.669	1.210.145	94.44%	38.35%	6	9	
** Limit			459	34.669	1.210.145	94.44%	38.35%	6	9	
** Total			486	85.378	6.738.536	100.00%	100.00%	6	9	
**** CF I/O Wait **** (Sorted by Total R+W IWAIT Elapsed time; LIMIT 10%)										
CF Structure Name	----- Read -----				----- Write -----			----- Castout -----		
	Found Count	Elap/IWAIT Sc.Mil.Mic	Max value Sc.Mil.Mic	Not Found	CI Count	Elap/IWAIT Sc.Mil.Mic	Max value Sc.Mil.Mic	CI Writes	Elapsed/CI Sc.Mil.Mic	Max value Sc.Mil.Mic
JBBBOCTR	18923	0.066	87.232	6	9533	0.154	0.994	2604	0.030	3.635
FP2STOREDBA	8454	0.045	4.511	0	6208	0.153	1.791	69	0.109	1.785
FP2EXCEPTA	3342	0.058	5.590	0	43	0.141	0.367	9	0.078	0.032
WH12STR1								0	0.000	0.000
** Limit	30719	0.059	87.232	6	15784	0.153	1.791	2682	0.032	3.635
*** Total ***	30719	0.059	87.232	6	15784	0.153	1.791	2741	0.033	3.635
**** Castout ****										
Area Name	Share Level	Start Time HH.MM.SS.TH	End Time HH.MM.SS.TH	Elapse Time Sc.Mil.Mic	CI Writes	Structure Name 1	Elapse Time Sc.Mil.Mic	Structure Name 2	Elapse Time Sc.Mil.Mic	
BOCTRA01	3	18.30.13.02	18.30.34.78	21.763.064	2604	JBBBOCTR	77.629			
STOREA01	3	18.30.34.84	18.30.36.48	1.636.324	69	FP2STOREDBA	7.511			
FPITMA3C	3	18.30.36.66	18.30.38.74	2.082.538	11	DSWFPITMA3C	0.863			
FPITMA2C	3	18.30.38.90	18.30.40.99	2.090.938	19	DSWFPITMA2C	1.066			
FPITMA1C	3	18.30.41.01	18.30.45.71	4.707.953	29	DSWFPITMA1C	1.785			
EXCEPA01	3	18.30.46.35	18.31.02.39	16.042.507	9	FP2EXCEPTA	0.703			
...										
AREAWH03	3	18.31.02.65	18.31.02.65	0.117	0	WH03STR1	0.000	WH03STR2	0.000	
AREADI03	3	18.31.03.94	18.31.03.94	0.172	0	DI03STR1	0.000			
AREADI02	3	18.31.03.98	18.31.03.98	0.150	0	DI02STR1	0.000			
AREADI01	3	18.31.04.00	18.31.04.00	0.221	0	DI01STR1	0.000			
** Total				48.329.708	2741		89.557		0.000	

Figure 277. VSO Summary report, Sequenced by Delay (with Limit)

The report heading at the top of each page has the following:

From Start time of region activity in the reporting period.

To End time of region activity in the reporting period.

Elapsed

Elapsed time from start until end of region activity in the reporting period.

1. Preload

This section provides information on preloads in the VSO area.

Area Name

The name of the area being summarized. If one area is preloaded more than once, the information on each preload is presented in a separate line.

Share Level

The Database Share Level (SHARELVL), either 0, 1, 2 or 3.

Start Time HH.MM.SS.TH

The start time for preloading the area. If there is no START monitor record, **, **, **, ** is shown.

End Time HH.MM.SS.TH

The end time for preloading the area. If there is no END monitor record, **, **, **, ** is shown.

Elapse Time Sc.Mil.Mic

The elapsed time for preloading the area. If there is no START or END record, ***, ***, *** is shown.

No.of CI Read

The number of CIs read to the data space from DASD when the area was preloaded. If there is no END monitor record, 0 is shown.

2. VSO I/O Activities for SHARELVL 0 and 1

This section provides information on I/O activities in the DEDB VSO area for Database Share Levels 0 or 1.

Area Name

The name of the area whose activity is being summarized.

Share Level

The Database Share Level (SHARELVL), either 0 or 1. VSO uses data spaces.

VSO Reads

The number of CIs read to the buffer from the data space.

VSO Writes

The number of CIs written to the data space from the buffer at the sync point.

DASD Reads

The number of CIs read to the data space from DASD when the area was not preloaded.

DASD Writes

The number of CIs written to DASD from the data space.

Castouts Scheduled

The number of schedules to the VSO output router.

3. VSO I/O Activities for SHARELVL 2 and 3

This section provides information on I/O activities in the DEDB VSO area for Database Share Levels 2 or 3.

Area Name

The name of the area whose activity is being summarized.

Share Level

The Database Share Level (SHARELVL), either 2 or 3. VSO uses the coupling facility.

Lookaside

Buffer Lookaside is active (YES) or not active (NO) for this area.

CF Reads

The number of CIs read to the buffer from the coupling facility.

CF Writes

The number of CIs written to the coupling facility from the buffer at the sync point.

Read Hits

The number of times the buffer was found in the pool.

Valid Reads

The number of times the buffer found in the pool was valid.

DASD Reads

The number of CIs read to the coupling facility from DASD when the area was not preloaded.

DASD Writes

The number of CIs written to DASD from the coupling facility.

Castouts Scheduled

The number of schedules to the VSO output router.

4. VSO Write IWAIT

This report is the same as the Fast Path OTHREAD Analysis DEDB Write IWAIT report, except that only DEDB areas using VSO are reported here.

ADSname

The data set name of the area whose activity is being summarized.

Share Level

The Database Share Level (SHARELVL), either 0, 1, 2 or 3.

VSO Always YES.

IWAITs

The number of IWAITs.

Elap/IWAIT Sc.Mil.Mic

The average elapsed time per IWAIT.

Max Value Sc.Mil.Mic

The maximum IWAIT elapsed time.

Pct Tot IWAITs

The number of IWAITs as a percentage of the total number of IWAITs reported here. (The total of this column should be 100%; any difference results from rounding.)

Pct Tot IWT Elp

The IWAIT elapsed time as a percentage of the total IWAIT elapsed time for the IWAITs reported here.

CI Write Count

The number of CIs written at DEDB WRITE:

CI/IWAIT

The average number of CIs written per IWAIT.

Max Value

The maximum number of CIs written per IWAIT.

5. CF I/O Wait

This section summarizes the use of the VSO coupling facility structures.

CF Structure Name

The name of the coupling facility structure.

Read Read IWAIT Activity.

Found Count

The number of CIs read successfully from the CF.

Elap/IWAIT Sc.Mil.Mic

The average elapsed time for CF Read IWAITs.

Max Value Sc.Mil.Mic

The maximum elapsed time for a CF Read IWAIT.

Not Found

The number of times a CF Read request failed because the CI entry was not found.

Write Write IWAIT Activity.

CI Count

The number of CIs written to the CF.

Elap/IWAIT Sc.Mil.Mic

The average elapsed time for CF Write IWAITs.

Max Value Sc.Mil.Mic

The maximum elapsed time for a CF Write IWAIT.

Castout

Castout I/O Activity.

CI Writes

The number of CIs written out during castout operations.

Elapsed/CI Sc.Mil.Mic

The average elapsed time for the castout operations.

Max Value Sc.Mil.Mic

The maximum elapsed time for a castout operation.

6. Castout

This report details in a chronological log every VSO Area castout operation performed.

Area Name

The name of the area whose activity is being reported.

Share Level

The Database Share Level (SHARELVL), either 0, 1, 2 or 3.

Start Time HH.MM.SS.TH

The start of castout operation.

End Time HH.MM.SS.TH

The end of castout operation.

EIapse Time Sc.Mil.Mic

The elapsed time of castout operation.

CI Writes

The number of CIs written to DASD during castout.

Structure Name 1

The primary CF Structure name that contains the VSO CIs.

EIapse Time Sc.Mil.Mic

The elapsed time of I/O operations with CF structure for this castout.

Structure Name 2

The (optional) duplex structure name that contains the VSO CIs.

EIapse Time Sc.Mil.Mic

The elapsed time of I/O operations with CF structure for this castout.

Monitor Data Analysis report

This report is a formatted presentation of the data in the monitor trace records. It provides a valuable aid to your analysis of the other IMS PA reports.

Monitor Record Trace report

The Monitor Record Trace report formats the records on the monitor input file to produce a chronological listing of the data.

Monitor records: This report is derived from all the monitor record types.

Uses

The Monitor Record Trace is a useful report for:

- Understanding the flow of internal IMS events, and the information that is recorded by IMS.
- Retrieving more information from your monitor records, not available from the standard reports.
- Diagnosing problems with your IMS subsystem.

Report options

To obtain the report, select the **Monitor Record Trace** in a Monitor Report Set.

Specify a DDname for the output data set for the report, and the maximum number of pages of output.

Optionally, nominate which record codes to include in the report by specifying an Object List or single monitor record code.

Report content

This is an example of the Monitor Record Trace report. Monitor record formats are defined in IMS macro DFSLOG4E. This Trace report formats the records according to that definition.

Report from 11Jun2018 12.57.40.76			IMS 15.1.0		IMS Performance Analyzer 4.4					Report to 11Jun2018 12.57.40.76					
										<u>Monitor Record Trace</u>					
Phys/Logical Record Number 1/1		Co de	Description	Time	Fl ag	Li ne	St at	Rs Cd	Regn	ITASK	Extension Data				
										00000172	*** Start of Monitor ***				
											MVS=9B MVSF=01 IMSR=1510 CFIG=38 SRLV=53				
											MN1F=09 MN4F=80 SECS= 0 WSAP= 0				
											PSTS= 255 SIDN= 13				
											*** Local SIDS ***				
											10 29 31 32 33 34 35				
											36 37 38 51 80 266				
...															
209/948		06	IFP Sch Start	125815886112	4F	00	81	00	0001	000001DD					
949		16	PSB Blk Ld IW St	125816016289	4F	00	81	00	0001	000001DD	NAME="DH41SK02" BLKZ= 0 FUNC="DMB "				
950		17	PSB Blk Ld IW Ed	125816020275	4F	00	81	00	0001	000001DD					
...															
965		07	IFP Sch End	125818438211	4F	00	81	00	0001	000001DD	PSBN="DDLTRN14" TRAN=" " QCNT= 0				
210/966		58	IRC10 Start	125818716116	4F	00	81	00	0001	0000021E	DQCT= 1 JOBN="IFPI1X1 " DBN="I/O PCB " FUN="GU " SLG=01				
...															
274/1095		38	IFP Msg IWAIT St	125818716502	4F	00	81	00	0001	0000021E					
1096		39	IFP Msg IWAIT Ed	125841940459	4F	00	81	00	0001	0000021E					
1097		47	BALG Dequeued	125841940483	4F	00	81	00	0001	0000021E	PSB="DDLTRN14" TRAN="TXCDRN14" MQT= 1				
1098		59	IRC10 End	125841940567	4F	00	81	00	0001	0000021E	QLN= 0 QFL=40				
1099		58	IRC10 Start	125841946006	4F	00	81	00	0001	0000021E	LEV=" " STC=" " SEG=" " SLG=I/O PCB				
1100		57	DEDB Read IWAIT	125841982501	4F	00	81	00	0001	0000021E	DBN="DEDBDD01" FUN="GHU " SLG=04				
1101		59	IRC10 End	125841982787	4F	00	81	00	0001	0000021E	ADN="DD01AR0 " ELP= 35837				
...															
1113		95	FP Lock Activity	125842068229	4F	00	81	00	0001	0000021E	LEV="01" STC=" " SEG="A1111111" SLG=DEDB				
...															
275/1118		43	FP Buf Activity	125842090789	4F	00	00	00	0001	0000021E	ARN="DD01AR0 " RID= 1 SLV=02 SHR=80				
										FLS=A1 FL2=00 RBA=00005800					
										IWE= 0 ELP= 41617					
...															
276/1119		87	OTHRD Activity	125842207187	4F	00	00	00	0000	00000006	TRAN=" " REQ= 4 UPD= 3				
										STE= 1 STN= 1 NBA= 3					
										OBA= 0 IWT= 0 ELP= 0					
										ACT= 0 WAR= 0 BUF= 2					
...															
625/1970		09	IFP Term End	125905251893	4F	00	81	00	0001	000003C8					
...															
657/2037		50	Checkpoint Start	125930444093	4F	00	81	00	0000	0000001C					
2038		51	Checkpoint End	125930898774	4F	00	81	00	0000	0000001C					
...															
659/2046		91	Monitor End	125930443665	4F	C5	80	00	0000	00000033	*** End of Monitor ***				
Code	Description		Count												
06	IFP Sch Start		1												
07	IFP Sch End		1												
09	IFP Term End		1												
14	Sched IWAIT Sta		4												
15	Sched IWAIT End		4												
16	PSB Blk Ld IW St		12												
17	PSB Blk Ld IW Ed		12												
...															
38	IFP Msg IWAIT St		3												
39	IFP Msg IWAIT Ed		3												
...															
43	FP Buf Activity		27												
47	BALG Dequeued		2												
50	Checkpoint Start		2												
51	Checkpoint End		1												
57	DEDB Read IWAIT		51												
58	IRC10 Start		306												
59	IRC10 End		306												
60	DL/I Call Start		70												
61	DL/I Call End		70												
...															
72	DEDB OTHRD IWT		16												
87	OTHRD Activity		17												
90	Monitor Start		10												
91	Monitor End		10												
95	FP Lock Activity		40												
Total			2055												

Figure 278. Monitor Record Trace report

Phys/Logical Record Number
The Physical Record Number is the relative number of the record in the

monitor file. Physical monitor records can contain multiple logical monitor records, each with their own code and extension. IMS PA deblocks the physical monitor records and presents them as Logical records. The **Logical Record Number** is the relative number of the logical record in the report.

Code Monitor record code (SL4ECODE)

Description

Monitor record code description

Time Record time stamp, precise to microseconds (SL4ETIME or SL4EXTIM)

Flag Tracing options flag (SL4EFLAG)

Line Line number/Code/Extension number (SL4ELINE)

Stat Logging status flag (SL4ESTAT)

Rs Cd Reason Code (SL4ERSNC)

Regn Region PST number (SL4EPSTN)

ITASK

ITASK number (SL4ETASK)

Extension Data

Monitor record code specific extension data (SL4EXTN)

Chapter 7. Understanding Monitor data

To understand IMS PA, you need to understand the operation of the IMS monitors.

In this book, the term *monitor* applies to both the IMS Monitor used in the IMS TM (formerly DC) environment and the IMS DB Monitor used in the IMS DB environment.

In cases where information applies to only one of the monitors, the term *IMS Monitor* or *DB Monitor* is used.

Monitors collect information during operation of the IMS system. Depending on specified options, the beginnings and endings of various events (such as DL/I calls, IWAITs, and region scheduling) are recorded in the monitor output data set, each identified by a unique record code. This information is in a format suitable for processing by IMS PA to produce reports on the performance of the IMS system.

For the list of monitor records that IMS PA uses for reporting, see Chapter 12, “Monitor records,” on page 613.

Operation of the Monitors

Monitor output data sets provide the input to the IMS PA monitor reports. The data recorded by the monitors depends on how their operation has been specified, which consequently affects the accuracy and content of the IMS PA reports.

The IMS PA Monitor Record Trace report provides a formatted print of monitor data set contents and is a very useful aid to understanding the data and interpreting the reports. See “Monitor Record Trace report” on page 497.

IMS SLOG macro

The basic mechanism used by the monitors for data collection during execution is the SLOG macro.

SLOG macros are used in selected IMS action modules to write to the monitor output data set. In this way, they record the beginning and ending of various events such as DL/I calls, IWAITs, and region scheduling, associating a unique record code with each type.

The time at which each SLOG macro is executed is marked by a Store Clock instruction time stamp. It is the function of the IMS PA batch report processors to match related SLOG calls, collect desired statistics, and produce reports to analyze the internal operation of IMS.

Monitor /TRACE and IMS TM STIMER options

The accuracy and content of the IMS PA reports depends on the data recorded in the monitor output data set.

The accuracy and content of the IMS PA reports depends on the data recorded in the monitor output data set. The data recorded by the monitor depends on a number of factors including:

- The Monitor /TRACE options which control the events to be recorded
- The IMS TM STIMER dependent region option which controls reporting of CPU time

Note: Elapsed time intervals reported by IMS PA account for all system activity, not just the time of the reported IMS activity.

Monitor record patterns

The logic used by the IMS PA monitor batch processor is structured for the usual or standard sequence of monitor records as recorded for typical IMS transactions and events. However, certain IMS execution events may result in monitor record sequences that are unexpected by IMS PA.

For example, when a message region terminates abnormally, a nonstandard sequence of monitor records is produced by IMS. In these cases, the IMS PA report processors may issue a number of diagnostic messages that indicate either an irregular sequence of records in the monitor trace, or an error in the monitor online formatting module. The appearance of these messages does not necessarily indicate an error in either IMS or IMS PA.

Essential terminology for Monitor reporting

The discussion and description of IMS PA monitor reports assumes you have a practical knowledge of IMS and some experience with performance analysis and the IMS monitors. IMS PA monitor reports are based solely on events and values recorded on the monitor output data sets.

In the report descriptions that follow, values are described, where applicable, in terms of monitor data.

The following descriptions and definitions are essential to understanding IMS PA monitor reports. You need to understand them so you can validly interpret the information in the reports.

ESAF Integration

If this option is active, External Subsystem calls are integrated into all Region and Program/Trancode reports.

ESAF call statistics are reported for each subsystem and contribute to the total call and IWAIT counts for regions and program/trancodes.

Note: If you are running your reports with ESAF Integration, the interpretation of the following fields changes accordingly (see “Terminology” on page 342):

Call
IWAIT
Sch-DLI

Schedule

In terms of application program activity, schedule time is the time required to load, initialize, and execute an application program in a dependent region.

An exception to this is described in “WFI and IFP region activity” on page 503.

The term *scheduling* refers to activity in the control region that is required to initiate an application in a dependent region.

Schedule time for a complete schedule is computed as the time elapsed between message scheduling end and message scheduling start (type 11 and 10 records for MPP regions, and type 03 and 02 records for BMP regions). If there is no message scheduling end record (type 11 or 03), as in the case of a schedule in progress, then scheduling time is computed from the first occurrence of a DL/I call (type 60 record).

Schedule start

Normally, schedule start is defined as the time at which processing in the control region ends and control is given to the dependent region controller.

Schedule start is identified by a message scheduling end record (type 03 or 11). In the absence of such a record, IMS PA creates a schedule for the dependent region when it encounters the start of a DL/I call (type 60 record).

Transaction

A transaction is a Get Unique (GU) to the I/O PCB with a blank return code (note that a transaction in progress is counted if a DL/I call is issued following the start of the trace interval).

Dependent region activity in progress

Activity is reported for schedules and transactions in progress during the IMS PA reporting interval, including WFI, IFP, and BMP regions.

Reporting for a dependent region starts from the first occurrence of either a DL/I call in the region or the first occurrence of scheduling activity in the control region on behalf of the dependent region (record types 10, 11, 14, 15 for MPP and 6, 7, 38, 39 for IFP). It is not always possible to determine the PSB name or the transaction code for activity in progress at the start of the IMS PA reporting interval. In this case, they are reported as %PSBnnnn or %TRNnnnn respectively, where nnnn is the region number.

Related reference:

“Report content” on page 481

The Fast Path Buffer Statistics report presents the statistical information of the Fast Path buffers by transaction for all regions and for each region.

“Report content” on page 484

The BALG/Shared EMHQ Analysis report presents the statistical information on Balancing Group (BALG) activities and the shared Expedited Message Handler Queue (EMHQ).

WFI and IFP region activity

Reporting of activity in a WFI or IFP region is a special case.

Based on the preceding definition for *schedule*, the complete execution of an application program in a region is one schedule; however, for analysis purposes, multiple schedules are reported for WFI or IFP region activity. In this case, the following definitions apply:

Schedule end: No messages on the message queue (a GET UNIQUE to the I/O PCB followed by a scheduler IWAIT).

Schedule start: Reinitiation of processing due to arrival of a message on the message queue (scheduler IWAIT end).

Region idle time: The time spent in scheduler IWAIT due to no messages.

All per schedule values are reported accordingly. CPU time is not reported unless the application program terminates during the IMS PA reporting interval. If reported, CPU time is the time for the entire program execution, not the CPU time during the reporting interval. WFI or IFP region activity is not reported on the histogram.

CPU time

Dependent region CPU time is accumulated by the region controller and recorded in the message scheduling start record (type 10) written when the application program terminates.

The value recorded depends on the STIMER dependent region option. CPU time is not available for IFP.

IWAIT time

This is an IMS internal wait state in which processing for a dependent region is suspended pending the completion of an event (for example, an input or output event) for that dependent region. IWAIT time is the duration of this wait state.

Reporting IWAITs: Note that IMS PA reports may show that an application program is interacting with (that is, IWAITing on) a database to which it is not related. This effect is caused by segments from various open databases sharing a common buffer pool. If program A frees space in a buffer pool by writing part of the data for program B to disk, this can cause an unexpected IWAIT to be recorded for program A against the database for program B. Such occurrences are particularly evident in the PSB Details by DDname IWAITed On reports.

Elapsed time

This is the time from the beginning to the end of an event, including any time spent in unrelated activity resulting from interruptions or wait states.

Region elapsed time

This is the total elapsed time in the trace interval from start to end of region activity.

The start (end) of region activity is determined from the first (last) occurrence of either a DL/I call in the dependent region or the first (last) occurrence of scheduling activity in the control region on behalf of the dependent region.

Trace interval

This is either the total duration of the monitor trace, or a subset of the trace as specified by the **Start** and **Stop** date and time, or the **Report Break Points** option on the Monitor Global Options panel.

Schedule to first DL/I call

This is the elapsed time required to load and initialize an application program in a dependent region.

The beginning of this interval is signalled by a monitor record logged when control region processing is completed for the dependent region. The end of this interval is signalled by a monitor record logged for the beginning of the first DL/I call in the dependent region, usually a GU to the I/O PCB. IMS fetches the first transaction for the application program by issuing a DL/I call from the control region before this interval. Therefore, the total DL/I calls shown by IMS PA for each schedule is one more than the number of DL/I calls issued from the dependent region during that schedule.

PCB feedback area

A basic source of information in several of the reports produced by IMS PA is the PCB feedback area.

This area is normally not cleared by IMS, but is used to hold information as the call sequences are executed. This means the information collected by the monitor and reported by IMS PA reflects information that remained in the PCB feedback area at the end of the call. For unsuccessful calls, the PCB feedback area contains information down to the successful level. If the call failed at level 0, it is possible that information from a previous call is reported.

Any reports that group information by segment name could, therefore, be misleading; however, the status code for the specific call shows whether the call was successful. When the information in the PCB reports appears confusing, use the Program Trace reports and check for nonblank status codes to determine the actual call.

Overflow values (***)

Occasionally a data item for the report exceeds the maximum value permitted under a column heading.

When this happens, the magnitude of the value is reduced by a factor of 1000, the result is placed in the report column, and the high-order positions of the column are filled with asterisks.

For example, the “Region Summary report” on page 350 has 9 bytes to show a Sch-DLI value. Therefore a value of 42,475,367 is reported as ***42,475 and a value of 214,784,123 is reported as **214,784.

Comparing IMS PA with other IBM programs

IMS PA processes the same input data as the IMS Monitor Report Print utility DFSUTR20 and the DB Monitor Report Print utility DFSUTR30, but IMS PA offers enhanced features and capability.

Comparing DFSUTR20

IMS PA processes the same input data as the IMS Monitor Report Print utility DFSUTR20. The reports produced by DFSUTR20 can be contrasted to those of IMS PA in the following ways.

- **Variety of reports.** IMS PA lets you select from a large variety of reports that categorize and display IMS system execution data in a format suited to the problem at hand. DFSUTR20 reports are limited to generalized summaries that may not directly yield the data you want without additional hand calculations.
- **Data presentation.** Numeric data is presented by IMS PA primarily as ratios, averages, and percentages. This presentation permits easy comparison of results,

both within a single trace period and, more importantly, from one monitor trace to another. In contrast, DFSUTR20 output consists primarily of average, total, and maximum values for data items. DFSUTR20 does not give percentages, and it expresses all time values in unedited microsecond units.

- **Data collation.** IMS PA places data entries into reports in alphanumeric collating sequence. This lets you easily find a given item (PSB name, transaction code, ddname, and so on) when the item is a member of a long list.
- **Alternate sequencing.** IMS PA provides alternative ways of sequencing the report data. The default is by name in alphanumeric collating sequence (ascending). The alternatives are by Occupancy, Calls, or Delay (descending) with the capability to limit reporting by number or percentage to easily identify the worst performers.
- **Graphic distributions.** IMS PA presents all distributions in an easy to understand, graphic format. Standard deviations, averages, and maximums are presented with each distribution. In contrast, DFSUTR20 presents distribution data in a nongraphic format.
- **Control flexibility.** With IMS PA, you can specify that reports be prepared from a subset of the total data recorded in a monitor trace. The subset can be based on a time interval within the trace. The selection can also be based on a subset of IMS user-oriented entities, such as a group of ddnames or application programs. IMS PA is able to process, in a single execution, several monitor data sets stacked or concatenated in the input data stream. DFSUTR20 always processes a single, entire monitor trace data set.
- **Additional functions.** The IMS PA Region Histogram and Program Trace reports display time sequence information that cannot be obtained using DFSUTR20. Also, plots versus time can be obtained for any selected variables that appear in the records of the trace input data set. While DFSUTR20 gives only the total number of trace records read, IMS PA tabulates the number of each record type read from the monitor trace data set and prints the number and percentage of each record type encountered.
- **Partial reports.** IMS PA maintains control during abend conditions (such as I/O data errors) and prints reports for the data that is processed up to that point. Under similar circumstances, DFSUTR20 terminates without partial reports.
- **VSAM IWAIT control.** VSAM IWAITs that do not result in actual I/O activity can be excluded from IMS PA reports; this is done by specifying the minimum time interval that is to be reported for VSAM IWAITs.
- **Reporting of schedules in progress.** IMS PA reports all dependent region activities in progress at the beginning of an IMS PA reporting interval. Schedules can be in progress for MPP, WFI, or BMP regions. WFI and BMP regions can account for a major part of IMS activity and are significant performance analysis factors. By using application and ddname grouping, BMP exclusions, or PSB select/nonselect features, you can compare the performance impact of WFI and BMP regions. This is done by making two IMS PA runs; one run includes all activities, and the other run excludes one or more BMPs. Alternatively, grouping could be used to obtain group reports on BMP, WFI, and MPP groups.
Selecting **Override 'IWAIT for no-message'** on the Monitor Global Options panel produces a report whose schedules are reported as in DFSUTR20, that is, wait-for-input events are not included in the schedule count.
- **Idle time computation.** IMS PA measures total dependent region elapsed time based on the earliest and latest observed region activity in the trace data stream. This ensures realistic idle time computations for dependent regions that start and end at arbitrary points in the trace period. DFSUTR20 equates total region elapsed time to total trace time. In addition, IMS PA reports scheduling activity

on behalf of the dependent regions as idle time. DFSUTR20 includes scheduling activity in calculating region occupancy. These differences result in different region idle time/region occupancy percentages for the two programs.

- **ISPF dialog.** Report options are specified using a CUA-compliant dialog under ISPF, allowing for validation of input before the report programs are executed. IMS PA can format reports in specified alternate formats so that reports are easily readable. DFSUTR20 report formats are fixed at printer width.
- **Comparison of numeric results.** In some cases, the values reported by IMS PA may appear to differ from those reported by DFSUTR20. The apparent discrepancies arise because of differences in the definition of terms used in the two report programs. Users of both IMS PA and DFSUTR20 should consult the respective documentation for definitions. Some of the major terminology differences are:

Elapsed

In IMS PA reports, the items in the Region Summary report labelled **Elap/Sched** show the time interval from control region scheduler end until termination start for an MPP. These values include the scheduler end to first DL/I call interval (**Sch-DLI**), as well as time used for buffer priming. This Elap/Sched time interval is not explicitly given in the DFSUTR20 region summary, which instead reports these component intervals separately. One of these intervals is titled **ELAPSED**, but it excludes Sch-DLI items.

The region elapsed time reported by IMS PA in the first column of the Region Summary report is determined from the times of trace records seen in each region on the trace. DFSUTR20 makes the assumption that all regions are active at the beginning of the trace interval; as a result, its region elapsed times are identical and are equated to the trace elapsed time. This causes a difference in the region occupancy and region idle percentages.

- Idle** IMS PA defines a region as idle both during the time the control region is working to schedule the region and while there are no messages to process. DFSUTR20 defines the control region activity as dependent region non-idle time and, consequently, computes a different region occupancy value than can be inferred from the idle value computed by IMS PA.

Message Queue calls

IMS PA includes the buffer priming DL/I call made by the message scheduler into the total message queue calls made by an MPP (and, therefore, by a region). The average number of all DL/I calls shown for a program scheduling is thus larger by 1 in IMS PA output than in the DFSUTR20 report. This difference, although generally not significant, affects all data items computed per call or per message queue call. Values computed per database call are not affected.

Blk Ldr Busy

Block Loader Busy. In the IMS PA Region Summary report, this term is not the same as **BLR BUSY** in the DFSUTR20 Region IWAIT report. In the latter case, only IWAITs taken by the scheduler for block loader busy are counted. IMS PA counts both these IWAITs and all block loader I/O IWAITs in the **busy** count in the Region Summary report, but differentiates between the two in the Total System IWAIT Summary report.

Scheds

IMS PA can generate pseudo-schedule events for programs that are already processing when the trace begins. It assigns the names %PSB and %TRAN to this activity. DFSUTR20 ignores all activity in a region before the first schedule event in the region. Also, IMS PA constructs pseudo-schedules for transactions in a WFI region. In these cases, since the number of schedules (and number of transactions) may be quite different, it is difficult to completely reconcile IMS PA and DFSUTR20 reports.

- **Fast Path.** IMS PA reports IMS IFP region and Fast Path database activity. DFSUTR20 does not report Fast Path activity.

Comparing DFSUTR30

The DB Monitor records a subset of those events recorded by the IMS Monitor. Therefore, IMS PA can process the same monitor trace data as the DB Monitor Report Print utility DFSUTR30.

This enables IMS PA to produce reports descriptive of IMS batch program and database events. Most of the features and advantages of IMS PA over DFSUTR20, as described in the preceding section, apply also to DFSUTR30. The exceptions are reports or values that are unique to the TM environment. The comparisons that remain valid for DFSUTR30 are as follows:

- Variety of reports
- Data presentation
- Data collation
- Graphic distributions
- Control flexibility
- Additional functions (except region histograms)
- VSAM IWAIT control
- ISPF CUA interface

Part 4. IMS Connect reporting

The first topic in this part provides a detailed description of each of the IMS PA Connect reports and extracts, their content and sample output. The reports and extracts are discussed in the order in which they are presented in the IMS Connect Report Set edit panel in the dialog. This is followed by a description of the IMS Connect data that provides the input to the IMS PA Connect reports and extracts.

Chapter 8. Analyzing IMS Connect reports and extracts

You can use IMS Performance Analyzer to analyze IMS Connect events that have been recorded in an IMS Connect Extensions journal data set. IMS Connect Extensions is an IBM tool that provides instrumentation for IMS Connect. The tool collects real-time data about IMS Connect events, which it then regularly archives.

IMS PA provides a comprehensive set of reports from the IMS Connect performance and accounting data collected by IMS Connect Extensions. The reports provide a summary and detailed analysis of IMS Connect transaction transit time, resource usage and resource availability.

Using Form-based combined reporting, IMS PA can process IMS Connect Extensions journals together with IMS logs to help you to:

- Pinpoint TCP/IP performance problems.
- Analyze event flow through IMS Connect and IMS.
- Audit TCP/IP security.

IMS Connect Extensions event collection

To understand the IMS Connect reports in IMS PA, you need to understand IMS Connect and the event data collected by IMS Connect Extensions.

For the list of IMS Connect event records reported by IMS PA, see Chapter 13, “IMS Connect records,” on page 615.

IMS Connect Extensions for z/OS enhances and augments the services of IMS Connect. A primary service provided by IMS Connect Extensions is to record details of incoming transaction requests as IMS Connect processes them. Records are collected as specific IMS Connect processing events occur (for example, exit read and exit write). These event records are recorded in Journal data sets, then optionally archived for later reporting and analysis.

The following figure shows event collection by IMS Connect Extensions with enhanced reporting and analysis by IMS Performance Analyzer (IMS PA) and IMS Problem Investigator (IMS PI).

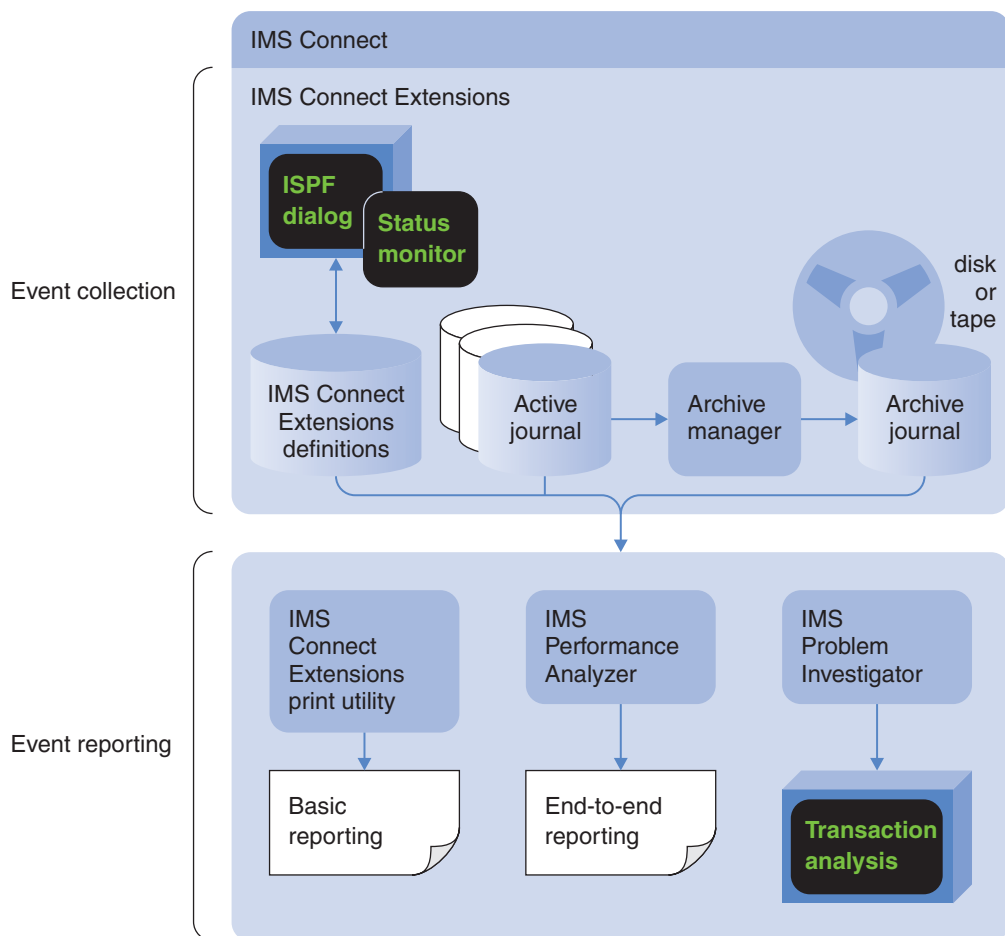


Figure 279. IMS Connect Extensions event collection with reporting by IMS PA and IMS PI

The event records provide performance, response time and throughput information, for example:

- Performance and response time information for IMS, IMS Connect and user message exits
- Availability information for datastores and ports
- Throughput information for different transactions types; for example, conversational, non-conversational and send only
- Resource availability

IMS Connect Extensions is continuously collecting events as incoming message requests are processed. The number and type of event records collected varies depending on the collection level specified for the IMS Connect system:

To collect IMS Connect event data for reporting, you need to ensure that IMS Connect Extensions Event Collection is active and that you specify a collection level that is appropriate to the type of reports that you want to produce. See "Collection levels" on page 620 for a description of the collection levels. "Required event records for IMS PA reports" on page 621 summarizes how the collection level affects the IMS PA reports.

Event records are initially written to an Active Journal data set on DASD, and then optionally copied (archived) to the Archive Journal data set (on tape or DASD). This is performed by the IMS Connect Extensions Archive Manager.

IMS PA produces reports from both Archive and Active journal data sets.

IMS PA is capable of producing combined IMS log and IMS Connect reports by merging input from the IMS log and IMS Connect Extensions journals to provide an end-to-end picture of IMS Connect transactions. Note that any program switch transactions in a combined report will not show any Connect data.

IMS Connect report categories

The IMS PA dialog presents the menu of IMS Connect reports in a tree structure that groups them by functional category. This allows you to request reports individually or by category.

The categories are:

- Transaction Transit reports
- Resource Usage reports
- Trace reports

There is also a category containing Connect Global Options. This is where you can specify options that apply globally to all or many reports in the Report Set.

Transaction Transit reports

These reports provide performance statistics to measure the performance of your IMS Connect transactions. Transaction Transit (response) time is broken down into its components; Input, Processing (by OTMA), Acknowledgement from the client and Output. They can help identify any bottlenecks in transaction flow, and are used for monitoring system performance, gathering diagnostic information, and tuning IMS.

- Connect Transit Analysis
- Connect Transit Log
- Connect Transit Extract

Transaction Transit reports (Form-based)

Form-based reports give you flexibility in transaction transit reporting. By using Report Forms, you can tailor the format and content of your reports, requesting just the fields of interest, the format of the data, and the order of the columns. You can create Form-based extracts and load them into DB2 tables.

Like the standard Transaction Transit Reports, the Form-based Transaction Transit reports provide performance detail about every transaction processed by IMS Connect using event information collected by IMS Connect Extensions.

- Connect Transit List
- Connect Transit Summary

Resource Usage reports

These reports contain detailed and summary information on the use and availability of various IMS Connect resources including TCP/IP Ports and Tpipes.

- Port Usage
- Resume Tpipe
- ACK/NAK
- Exception Events
- Gap Analysis

Trace reports

The Transit Event Trace report provides a list of transactions, detailing every event in the life of each transaction: when it started and all associated events in the order they occurred.

IMS Connect report reference table

This is a list of the IMS Connect reports and commands provided by IMS Performance Analyzer with cross-references to their descriptions, sample reports, and extracts.

The dialog is the primary mechanism for specifying reports. The dialog generates the JCL and batch commands which you can review or edit before submitting the job or saving it in a library to run later independently of the dialog. For more information on using the batch commands, refer to the “IMS Connect batch interface” in the *IMS Performance Analyzer for z/OS: User’s Guide*.

Table 24. IMS Connect reports and extracts: Batch commands and output examples

Report name	IMSPACEX command	Examples
Transaction Transit reports		
“Connect Transit Analysis report” on page 515	ANALYSIS	Figure 280 on page 518
“Connect Transit Log report” on page 522	LOG	Figure 285 on page 525
“Connect Transit extract” on page 527	TRANEXTR	Figure 286 on page 529
		“Summary extract record format” on page 530
		Figure 288 on page 533
IMS Connect and Combined Transit reports (Form-based)		
“Form-based Transit List report” on page 534	LIST	“Report content (default)” on page 534
		“COMBLIST: Combined IMS and Connect List report” on page 535
		“CONNLIST: Connect Transit Log report” on page 536
“Form-based Transit Summary report” on page 537	SUMMARY	“Report content (default)” on page 538
		“COMBSUMM: Combined IMS and Connect Summary report” on page 539
		“CONNACK: Connect ACK/NAK Summary report” on page 539
		“CONNPLEX: Connect PLEX Usage Summary report” on page 540
		“CONNTCOD: Connect Analysis by Trancode report” on page 540
		“CONNTCOD: Connect Analysis by Trancode report” on page 540
“IMS Connect Transaction Index” on page 541	INDEX	“Formatting IMS Connect Transaction Index records” on page 543
Resource Usage reports		

Table 24. IMS Connect reports and extracts: Batch commands and output examples (continued)

Report name	IMSPACEX command	Examples
"Connect Port Usage Report" on page 546	PORT	Figure 303 on page 547
"Connect Resume Tpipe report" on page 549	TPIPE	Figure 305 on page 550
"Connect ACK/NAK report" on page 554	ACKN	Figure 307 on page 555
"Connect Exception Events report" on page 557	EXCEPT	Figure 309 on page 558 Figure 310 on page 559
"Connect Gap Analysis report" on page 561	GAP	Figure 314 on page 563
Trace reports		
"Connect Transit Event Trace report" on page 563	TRACE	<p>"Example 1: Non-conversational transaction with Sync Level=NONE" on page 565</p> <p>"Example 2: Non-conversational transaction with Sync Level=CONFIRM" on page 566</p> <p>"Example 3: Conversational transaction with Sync Level=CONFIRM" on page 567</p> <p>"Example 4: Transaction where Client returned NAK" on page 568</p> <p>"Example 5: Transaction where OTMA returned NAK" on page 569</p> <p>"Example 6: Resume named Tpipe command with timeout" on page 569</p>

Connect Transaction Transit reports

These reports provide performance statistics to measure the performance of your IMS Connect transactions. They can help identify any bottlenecks in transaction flow, and are used for monitoring system performance, gathering diagnostic information, and tuning IMS.

Transaction Transit (response) time is broken down into its components; Input, Processing (by OTMA), Acknowledgement from the client and Output.

Connect Transit Analysis report

The IMS Connect Transit Analysis report provides a summary of IMS Connect transaction performance. Performance data can be summarized by one or two sort keys including Time of Day, Transaction Code, User ID, Datastore (origin and target) and Port number.

Performance statistics are provided as averages, and optionally, peak percentiles. For example, you can specify 90 to report the elapsed time within which 90% of transactions completed.

IMS Connect event records

The Transit Analysis report is derived from IMS Connect event records 3C, 3D, 3E, 3F, 40, 41, 42, 47, 48, 49. This report requires IMS Connect Extensions to collect event data at collection level 3 or 4.

Otherwise:

- If collection level 2, the report is produced but with Input READ Socket and SAF zero.
- If collection level 0 or 1, the report displays the message:
No observations in report period

Table 25. Connect Transit Analysis report: event records processed

Code (hex)	Event description	Collection level
3C	Prepare READ Socket	2
3D	Message Exit called for READ, XMIT, EXER	2
3E	Message Exit returned from READ, XMIT, EXER	1
3F	Begin SAF security request	3
40	End SAF security request	3
41	Message sent to OTMA	2
42	Message received from OTMA	2
47	Session Error	1
48	Trigger Event	2
49	READ Socket	3

Report options

To obtain an IMS Connect Transit Analysis report, select the Transaction Transit Analysis report in a Connect Report Set and specify report options.

The command is:

```
IMSPACEX      ANALYSIS(
                [BY(order1)|
                BY(order1,order2),]          default BY(TRANCODE)
                [DDNAME(ddname),]            default ANAL0001,ANAL0002,...
                [INTERVAL(hh:mm:ss),]        default 00:01:00 (1 minute)
                [PEAK(nnn),]                  50-100%, default no peak
                [INCL(TRANCODE(list))|EXCL(TRANCODE(list)),]
                [INCL(USERID(list))|EXCL(USERID(list)),]
                [INCL(DATASTORE(list))|EXCL(DATASTORE(list)),]
                [INCL(CLIENT(list))|EXCL(CLIENT(list)),]
                [INCL(PORT(list))|EXCL(PORT(list))])
IMSPACEX      EXECUTE
```

You can request multiple Analysis reports in the one job. The default DDname is ANALnnnn where nnnn is 0001 to 9999.

The sort order of each report is according to the order of the fields in the BY operand. The sort fields are the first one or two columns of the report, and can be any one or two of the following fields:

TRANCODE

Transaction Code (default)

TIME Time Interval

CLIENTID

Connect Client ID

DSORIG Originating Datastore

DSTARG Target Datastore

PORT TCP/IP Port Number

USERID User ID

Selection Criteria can be specified to filter the input data on one or more of the following:

- Transaction Code
- User ID
- Target Datastore (IMS ID)
- Connect Client ID
- TCP/IP Port Number

For each report, you can also specify:

- The time interval if you have requested that the report be summarized by TIME. The default interval is 00:01:00 (1 minute).
- The peak percentile transit time, between 50 and 100%. If specified, both averages and peak percentiles are reported. The default is to omit PEAK so that only averages are reported.

Report content

This is an example of a Transit Analysis report from IMS Connect event data.

The report was produced by the command:

```
IMSPACEX      ANALYSIS(  
                BY(  
                  TRANCODE,  
                  TIME),  
                DDNAME(ANAL0001),  
                INTERVAL(01:00:00),  
                PEAK(80),  
                INCL(TRANCODE(CEBTRAN5,DSPALLI,IVTCV)))  
IMSPACEX      EXECUTE
```

Transact Code	Time	Message Count		Response Time	----- Input -----	----- Process- -----	----- Output -----	Rate Time							
					Pre-OTMA	READ Sock	READ Ex	SAF	OTMA	Confirm	Post-OTMA	XMIT Ex	/Sec	Outs	NAK
DSPALLI	16.57.00	40	Avg	627.906	351.026	345.913	0.115	0.000	179.675	0.000	97.205	0.134	1	0	0
			80%	851.963	461.978	454.183	0.140	0.000	316.649	0.000	202.327	0.272			
	16.58.00	60	Avg	739.120	405.811	397.993	0.205	0.000	224.447	0.000	108.861	0.176	1	0	0
			80%	1.029.203	538.471	527.321	0.742	0.000	435.416	0.000	206.930	0.525			
	15.00.00	1	Avg	379.674	303.223	302.479	0.131	0.000	74.694	0.000	1.755	0.125	0	1	0
			80%	379.674	303.223	302.479	0.131	0.000	74.694	0.000	1.755	0.125			
	15.01.00	10	Avg	289.210	255.102	254.592	0.133	0.000	29.588	0.000	4.519	0.116	0	0	2
			80%	309.454	278.241	277.839	0.168	0.000	33.428	0.000	8.854	0.149			
DSPALLI	Subtotal	111	Avg	655.272	371.567	365.446	0.166	0.000	189.409	0.000	94.296	0.155	2	1	2
			80%	929.141	495.318	485.849	0.561	0.000	370.394	0.000	192.971	0.424			
DSPINV	16.57.00	30	Avg	480.970	301.331	299.460	0.213	0.000	169.187	0.000	10.451	0.148	1	0	2
			80%	610.752	337.667	334.985	0.694	0.000	266.476	0.000	24.619	0.238			
	16.58.00	70	Avg	764.766	357.845	345.964	0.112	0.000	273.601	0.000	133.319	0.121	1	0	0
			80%	1.087.110	552.226	533.146	0.146	0.000	475.206	0.000	291.942	0.165			
	15.00.00	1	Avg	427.369	332.736	331.765	0.203	0.000	86.633	0.000	7.998	0.148	0	4	2
			80%	427.369	332.736	331.765	0.203	0.000	86.633	0.000	7.998	0.148			
	15.01.00	10	Avg	282.230	250.199	249.740	0.105	0.000	29.774	0.000	2.256	0.121	0	1	1
			80%	304.595	274.617	274.140	0.119	0.000	34.776	0.000	3.137	0.126			
DSPINV	Subtotal	111	Avg	641.553	332.647	324.599	0.139	0.000	221.730	0.000	87.175	0.128	2	5	5
			80%	941.738	490.798	476.417	0.391	0.000	401.265	0.000	222.969	0.187			
Total		222	Avg	648.413	352.107	345.022	0.152	0.000	205.569	0.000	90.735	0.142	0	6	7
			80%	935.149	494.731	482.808	0.483	0.000	385.939	0.000	209.199	0.337			

Figure 280. IMS Connect Transit Analysis report: BY (TRANCODE, TIME), PEAK (80)

The first one or two columns in the report correspond to your specified ordering operands:

Transact Code

Transaction Code. Reported when BY (TRANCODE) is specified. It is the default if the BY operand is omitted.

When the input message is a command and not a transaction, a mnemonic prefixed by *CMD is reported in place of the Transaction Code. The mnemonics and their associated command and OTMA indicator name are:

*CMD A bucket for commands that are not any of the following.

*CMD_BID

Client Bid. OMCTLBID

*CMD_AVL

Server Available. OMCTLAVL

*CMD_RSN

Resynch. OMCTLRSN

*CMD_SPA

Suspend Input all Tpipes. OMCTLSPA

*CMD_RSA

Resume Input all Tpipes. OMCTLRSA

*CMD_SPN

Suspend Input named Tpipe. OMCTLSPN

*CMD_RSM

Resume Input named Tpipe. OMCTLRSM

*CMD_RTP

Resume Output named Tpipe. OMCTLRTP

*CMD_RHQ

Resume Output for Single Tpipe. OMCTLRHQ

*CMD_RCV

Recover. OMCTLRVCV

***CMD_PRP**
Prepare. OMCTLPRP
***CMD_CMM**
Commit. OMCTLCMM
***CMD_RBK**
Rollback. OMCTLRBK
***CMD_FGT**
Forget. OMCTLFGT

For more information on the commands, refer to the *IBM IMS Connect Guide and Reference*.

Time Time Interval. Reported when BY(TIME) is specified. Transit time is summarized for each time interval, for example every 15 minutes. The default is 00:01:00 (1 minute).

Client ID
Connect Client ID. Reported when BY(CLIENTID) is specified.

Origin Datastor
Originating destination datastore. Reported when BY(DSORIG) is specified.

Target Datastor
Target destination datastore. Reported when BY(DSTARG) is specified.

Port Number
TCP/IP Port number. Reported when BY(PORT) is specified.

User ID
User ID. Reported when BY(USERID) is specified.

Transit (or response) elapse time is broken down into its components and summarized as an average (Avg) and optionally, peak percentile (nnn%). One or two rows of information are presented:

Avg Average value. This is always reported.

nnn% Peak Transit Time

A statistical estimate, based on a normal distribution, that nnn% (between 50% and 100% as specified by you) of all transactions in the category being reported have transit times less than the reported value.

The peak percentile values are statistical estimates only, so care should be taken when interpreting the values if the transaction volume is low.

The **Total** row shows peak percentile values that are themselves statistical estimates, rather than the sum of the component estimates.

Peak percentiles are reported only if requested.

All times are in microseconds.

The following fields appear in the report after the two ordering fields:

Message Count
The number of transaction input messages processed.

Response Time
The elapsed time from when the transaction input message enters IMS Connect (Read Prepare) to when the transaction terminates (Trigger event).

Input

Pre-OTMA

Total Input time. The elapsed time from when the transaction input message enters IMS Connect (Read Prepare) to when the transaction is sent to IMS (OTMA) for processing.

Read Sock

The elapsed time taken for IMS Connect to read the incoming message, from when the transaction input message enters IMS Connect (Read Prepare) to when IMS Connect has completed reading the message (final Read Socket).

READ Ex

The elapsed time the input message spent being processed by the READ Message Exit.

For Sync Level NONE transactions, the READ Message Exit is called once for the input message.

For Sync Level CONFIRM transactions, the READ Message Exit is called twice, initially for the input message and a second time for the ACK response from the client.

SAF The accumulated elapsed time spent in all SAF calls for the message.

Process**OTMA**

The elapsed time OTMA spent processing the transaction, from when the message is sent to IMS (OTMA) to when the response is received back from OTMA.

Transaction messages are sent to OTMA for processing. In addition, for Sync Level CONFIRM transactions, the ACK response from the client is also sent to OTMA for processing.

Output**Confirm**

For Sync Level CONFIRM transactions only, the elapsed time from when OTMA completed processing the input message to when the ACK response from the client is sent back to OTMA.

Post-OTMA

For Sync Level NONE transactions, the elapsed time from when OTMA completed processing the input message to when the transaction terminates (Trigger event).

For Sync Level CONFIRM transactions, the elapsed time from when OTMA completed processing the ACK response to when the transaction terminates (Trigger event).

XMIT Ex

The elapsed time output messages (responses) spent being processed by the XMIT Message Exit.

Rate/Sec

The number of messages processed by IMS Connect per second.

The **Total Rate/Sec** is calculated by dividing the Total Message Count by the report elapsed time (the From-To period in the report heading).

Time Outs

The number of times IMS Connect timed-out while waiting for the message to be processed by OTMA.

NAK Total number of messages that had a negative response from either IMS OTMA or the client.

Examples

The following figures show different examples of the Transit Analysis report produced from IMS Connect event data collected by IMS Connect Extensions.

Example 1:

This report was produced by the command:

```
IMSPACEX    ANALYSIS(
              BY(TIME),
              DDNAME(ANAL0001),
              INTERVAL(00:15:00))
IMSPACEX    EXECUTE
```

IMS Performance Analyzer 4.4													
IMS Connect Transit Analysis - DVPCFGDA													
From 15Mar2018 10.48.30.65 To 15Mar2018 12.17.12.19													
												Page	1
Time	Message	Response	----- Input -----		-Process-		----- Output -----		Rate Time				NAK
15Mar	Count	Time	Pre-OTMA	READ Sock	READ Ex	SAF	OTMA	Confirm	Post-OTMA	XMIT Ex	/Sec	Outs	
10.45.00	98	Avg 2.668.618	46.477	45.823	0.353	0.000	829.553	1.792.240	1.703.379	0.256	0	0	8
11.00.00	60	Avg 428.757	179.695	178.613	0.186	0.000	89.847	73.244	33.342	0.134	0	8	4
11.15.00	30	Avg 424.602	71.608	70.240	0.200	0.000	0.000	0.779	0.565	0.114	0	8	0
11.30.00	27	Avg 1.291.387	253.199	252.602	0.230	0.000	11.878	224.508	1.626	0.218	0	27	8
11.45.00	75	Avg 1.199.803	246.214	245.440	0.415	0.000	13.154	227.254	1.518	0.207	0	73	21
12.00.00	94	Avg 593.221	89.251	82.086	0.202	0.000	17.649	365.749	303.489	0.110	0	5	1
12.15.00	25	Avg 1.016.233	232.182	231.775	0.205	0.000	13.873	688.295	506.278	0.128	0	8	2

Total	409	Avg 1.237.187	139.318	137.050	0.277	0.000	220.049	622.863	514.160	0.175	0	129	44

Figure 281. Connect Transit Analysis report: BY(TIME)

Example 2:

This report was produced by the command:

```
IMSPACEX    ANALYSIS(
              BY(CLIENTID,DSTARG),
              DDNAME(ANAL0002),
              INTERVAL(00:15:00))
IMSPACEX    EXECUTE
```

IMS Performance Analyzer 4.4														
IMS Connect Transit Analysis - DVPCFGDA														
From 15Mar2018 10.48.30.65 To 15Mar2018 12.17.12.19														
Client	Target	Message	Response	Input		Process-		Output		Page		Rate	Time	
ID	Datator	Count	Time	Pre-OTMA	READ Sock	READ Ex	SAF	OTMA	Confirm	Post-OTMA	XMIT Ex	/Sec	Outs	NAK
TRNOP006	IMD4	2	Avg 259.985	0.705	0.311	0.248	0.000	30.518	226.902	1.860	0.193	0	0	0
TRNOP007	IMD3	2	Avg 667.735	260.606	260.122	0.258	0.000	131.641	272.141	3.346	0.241	0	0	1
TRNOP008	IMD3	1	Avg 537.350	228.360	227.749	0.331	0.000	25.482	281.333	2.173	0.245	0	0	0
	IMD4	1	Avg 990.646	294.847	294.442	0.251	0.000	430.527	263.518	1.753	0.233	0	0	1
TRNOP008	Subtotal	2	Avg 763.998	261.604	261.096	0.291	0.000	228.005	272.426	1.963	0.239	0	0	1
TRNSK001	IMD4	1	Avg 292.900	241.819	241.306	0.145	0.000	48.537	0.000	2.543	0.116	0	0	0
TRNSK002	IMD3	3	Avg 310.502	257.745	257.244	0.214	0.000	51.339	0.000	1.417	0.098	0	0	0
TRNSK003	IMD3	1	Avg 591.995	285.888	285.412	0.189	0.000	43.675	260.697	1.733	0.303	0	0	0
TRNSK005	IMD3	1	Avg 277.551	221.995	220.755	0.131	0.000	49.637	0.000	5.919	0.121	0	0	0
TRRBS001	IMD3	44	Avg 1.011.679	245.818	245.076	0.551	0.000	12.067	272.726	1.527	0.210	0	44	13
TRRBS002	IMD4	62	Avg 1.354.974	248.101	247.405	0.222	0.000	12.715	207.611	1.531	0.210	0	62	18
TRRBS021	IMD3	2	Avg 232.667	212.318	211.900	0.118	0.000	18.615	0.000	1.733	0.050	0	0	0
TRRBS022	IMD4	2	Avg 233.323	213.182	212.749	0.127	0.000	18.407	0.000	1.733	0.120	0	0	0
TRSBS001	IMD3	25	Avg 328.068	61.946	60.240	0.189	0.000	0.000	1.238	0.414	0.104	0	6	0
TRSBS002	IMD4	35	Avg 290.775	71.526	70.180	0.182	0.000	0.000	0.450	0.766	0.089	0	7	1
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Total		409	Avg 1.237.187	139.318	137.050	0.277	0.000	220.049	622.863	514.160	0.175	0	129	44

Figure 282. Connect Transit Analysis report: BY(CLIENTID,DSTARG)

Example 3:

This report is from IMS Connect event data which IMS Connect Extensions collected at Collection Level 2. Observe that the Input READ Socket and SAF columns are zero. The report was produced by the command:

```
IMSPACEX      ANALYSIS(BY(TRANCODE),DDNAME(ANAL0001))
IMSPACEX      EXECUTE
```

IMS Performance Analyzer 4.4														
IMS Connect Transit Analysis - DVPCFGDA														
From 15Mar2018 09.13.03.24 To 25Mar2018 12.20.02.83														
Transact	Message	Response	Input		Process-		Output		Page		Rate	Time		
Code	Count	Time	Pre-OTMA	READ Sock	READ Ex	SAF	OTMA	Confirm	Post-OTMA	XMIT Ex	/Sec	Outs	NAK	
*CMD_RHQ	21	Avg 5.990.001	226.647	0.000	0.251	0.000	0.000	0.533	2.706	0.193	0	18	0	
*CMD_RTP	6	Avg 1.117.467	255.573	0.000	0.628	0.000	0.000	1.142	5.182	0.389	0	6	0	
DSPALLI	27	Avg 208.306	127.263	0.000	0.139	0.000	56.717	21.429	1.078	0.097	0	0	0	
DSPINV	3	Avg 457.838	284.210	0.000	0.161	0.000	171.497	0.000	2.131	0.125	0	0	0	
DVPTRAN2	3	Avg 303.374	249.602	0.000	0.140	0.000	46.403	0.000	3.863	0.214	0	1	0	
DVPTRAN5	11	Avg 605.844	174.973	0.000	0.284	0.000	30.407	453.993	343.915	0.121	0	1	1	
IVTCV	43	Avg 889.961	105.796	0.000	0.266	0.000	42.839	740.959	601.134	0.119	0	0	2	
IVTNO	50	Avg 809.099	238.666	0.000	0.278	0.000	36.246	313.807	2.017	0.201	0	49	22	
PART	27	Avg 516.720	226.470	0.000	0.158	0.000	240.555	32.505	7.364	0.094	0	1	0	
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Total	191	Avg 1.255.192	187.709	0.000	0.243	0.000	66.329	282.826	157.416	0.152	0	76	25	

Figure 283. Connect Transit Analysis report: BY(TRANCODE) for Collection Level 2 event data

Connect Transit Log report

The IMS Connect Transit Log provides performance details about every transaction processed by IMS Connect. Information from IMS Connect Extensions event

records is collected to provide a complete picture of transaction processing. The order of transactions in the report is based on when they end, and not when they start.

IMS Connect event records

The Transit Log report is derived from IMS Connect event records 3C, 3D, 3E, 3F, 40, 41, 42, 47, 48, 49. This report requires IMS Connect Extensions to collect event data at collection level 3 or 4.

Otherwise:

- If collection level 2, the report is produced but with Input READ Socket and SAF zero.
- If collection level 0 or 1, the report displays the message:
No observations in report period

Table 26. Connect Transit Log report: event records processed

Code (hex)	Event description	Collection level
3C	Prepare READ Socket	2
3D	Message Exit called for READ, XMIT, EXER	2
3E	Message Exit returned from READ, XMIT, EXER	1
3F	Begin SAF security request	3
40	End SAF security request	3
41	Message sent to OTMA	2
42	Message received from OTMA	2
47	Session Error	1
48	Trigger Event	2
49	READ Socket	3

Report options

To obtain an IMS Connect Transit Log report, select the Transaction Transit Log report in a Connect Report Set and specify the report options.

The command is:

```
IMSPACEX      LOG(
                [DDNAME(ddname),]          default LOG
                [NOADDIDENT|ADDIDENT,]
                [INCL(TRANCODE(list))|EXCL(TRANCODE(list)),]
                [INCL(USERID(list))|EXCL(USERID(list)),]
                [INCL(DATASTORE(list))|EXCL(DATASTORE(list)),]
                [INCL(CLIENT(list))|EXCL(CLIENT(list)),]
                [INCL(PORT(list))|EXCL(PORT(list))])
IMSPACEX      EXECUTE
```

For each input message, Transaction Code, Target Datastore and Port Number are always reported. Optionally, you can request the additional identification details User ID, Originating Datastore and Client ID.

Selection Criteria can be specified to filter the input data on one or more of the following:

- Transaction Code
- User ID
- Target Datastore (IMS ID)
- Connect Client ID
- TCP/IP Port Number

The report output is written to the data set specified by the Report Output DDname. The default is LOG.

Report content

The following figure shows an example of a Transaction Transit Log report applicable to IMS Connect event data.

The report was produced by the command:

```
IMSPACEX    LOG
IMSPACEX    EXECUTE
```

or

```
IMSPACEX    LOG(NOADDIDENT)
IMSPACEX    EXECUTE
```

IMS Performance Analyzer 4.4												
IMS Connect Transit Log - DVPCFGDA												
Log from 15Mar2018 10.48.46.40												
Start Time	Transact	Target	Port	Response	-----	Input	-----	-Process-	-----	Page	9	
HH.MM.SS.THmiju	Code	DataStor	Number	Time	Pre-OTMA	READ Sock	READ Ex	SAF	OTMA	Confirm	Post-OTMA	XMIT Ex E
10.48.46.407703	DVPTRANS	IMD3	8801	631.340	1.198	0.507	0.243	0.000	60.516	569.538	0.087	0.105
10.48.47.455008	DVPTRANS	IMD3	8801	641.975	0.839	0.388	0.161	0.000	43.400	597.644	0.090	0.117
10.48.48.403977	DVPTRANS	IMD3	8801	638.017	0.725	0.357	0.232	0.000	15.356	620.419	1.516	0.228
10.49.06.240175	IVTCV	IMD3	8801	294.089	0.743	0.249	0.199	0.000	75.222	218.048	0.075	0.116
10.49.06.837155	IVTCV	IMD3	8801	712.028	0.745	0.392	0.235	0.000	101.217	610.034	0.030	0.122
10.49.07.549765	IVTCV	IMD3	8801	2.668	0.523	0.234	0.088	0.000	0.749	0.000	1.394	0.045 N
10.49.20.627624	IVTCV	IMD3	8801	553.921	238.108	237.703	0.292	0.000	21.185	294.595	0.033	0.112
10.49.21.486274	IVTCV	IMD3	8801	610.756	0.835	0.435	0.229	0.000	10.200	599.644	0.075	0.058
10.49.22.401900	IVTCV	IMD3	8801	623.785	0.644	0.296	0.215	0.000	9.954	613.111	0.075	0.052
10.49.23.026219	IVTCV	IMD3	8801	2.618	0.599	0.251	0.044	0.000	0.736	0.000	1.282	0.104 N
10.49.46.989823	IVTCV	IMD3	8801	467.398	0.729	0.250	0.292	0.000	199.231	267.405	0.032	0.117
10.49.47.762563	IVTCV	IMD3	8801	693.966	0.743	0.298	0.221	0.000	23.973	669.201	0.047	0.113
10.49.48.457862	IVTCV	IMD3	8801	3.024	0.914	0.485	0.216	0.000	0.712	0.000	1.397	0.045 N
10.50.17.644034	DVPTRANS	IMD3	8801	2.696.652	302.567	302.003	0.344	0.000	86.355	2.307.654	0.075	0.110
10.50.21.110778	DVPTRANS	IMD3	8801	4.877.428	301.982	301.597	0.236	0.000	13.110	4.562.304	0.031	0.053
10.50.32.297230	DVPTRANS	IMD3	8801	1.417.832	0.756	0.370	0.231	0.000	15.107	1.401.937	0.030	0.115
10.50.34.118110	DVPTRANS	IMD3	8801	1.232.251	298.323	297.938	0.237	0.000	118.086	815.810	0.030	0.114
10.50.35.648306	DVPTRANS	IMD3	8801	1.096.759	290.238	289.867	0.237	0.000	15.997	789.034	1.488	0.222
10.51.07.119390	IVTCV	IMD4	8801	0:43	0.728	0.256	0.325	0.000	23.758	0:43	0.031	0.116
10.51.50.571677	IVTCV	IMD4	8801	3.716.608	263.082	262.695	0.237	0.000	35.675	3.417.819	0.031	0.116
10.51.56.334200	IVTCV	IMD4	8801	3.909.816	274.131	273.661	0.236	0.000	9.148	3.626.459	0.076	0.113
10.52.20.858335	IVTCV	IMD4	8801	0:39	1.394	0.875	0.170	0.000	53.750	0:39	0.114	0.117
10.52.59.441817	IVTCV	IMD4	8801	2.775	0.614	0.349	0.091	0.000	0.639	0.000	1.521	0.125 N
10.53.45.866715	IVTCV	IMD4	8801	4.574.039	234.843	234.080	0.202	0.000	17.106	4.322.012	0.075	0.120
10.53.51.460258	IVTCV	IMD4	8801	5.251.295	287.001	286.615	0.237	0.000	11.615	4.952.646	0.031	0.116
10.53.57.984824	IVTCV	IMD4	8801	3.492.361	249.933	249.562	0.237	0.000	10.261	3.232.127	0.038	0.113
10.54.02.589463	IVTCV	IMD4	8801	0:17	279.892	279.423	0.175	0.000	9.628	0:17	0.031	0.122
10.54.19.707582	IVTCV	IMD4	8801	4.655.497	0.587	0.323	0.149	0.000	60.187	4.594.646	0.075	0.057
10.54.25.861547	IVTCV	IMD4	8801	2.533.462	213.115	212.744	0.159	0.000	22.475	2.297.771	0.100	0.114
10.54.29.446920	IVTCV	IMD4	8801	2.289.139	252.184	251.796	0.258	0.000	9.482	2.025.988	1.484	0.160

Figure 284. Connect Transit Log report: NOADDIDENT

The following figure shows an example of a Transaction Transit Log report applicable to IMS Connect event data, and was produced by the following command:

```
IMSPACEX    LOG(ADDIDENT)
IMSPACEX    EXECUTE
```

IMS Performance Analyzer 4.4 IMS Connect Transit Log - DVPCFGDA Log from 01Apr2018 16.30.06.98												
Page 1												
Start Time HH.MM.SS.THmij	Transact /User ID	DataStor Targ/Org	Port/ ClientID	Response Time	----- Pre-OTMA	Input READ Sock	----- READ Ex	SAF	-Process- OTMA	----- Confirm	Output Post-OTMA	----- XMIT Ex E
16.30.06.980931	PART DVP	IMD4	3008 TRNBS002	342.609	223.962	223.098	0.115	0.000	116.820	0.000	1.826	0.115
16.30.17.434397	PART DVP	IMD4	3008 TRNBS002	294.391	270.927	270.553	0.054	0.000	21.807	0.000	1.657	0.114
16.30.18.473496	PART DVP	IMD4	3008 TRNBS002	264.422	240.549	240.088	0.115	0.000	22.214	0.000	1.658	0.114
16.30.19.488718	PART DVP	IMD4	3008 TRNBS002	254.594	231.325	230.868	0.054	0.000	21.392	0.000	1.876	0.123
16.30.20.479263	PART DVP	IMD4	3008 TRNBS002	279.771	252.025	251.580	0.056	0.000	26.009	0.000	1.736	0.130
16.57.15.932101	PART DVP	IMD3	3008 TRAN0004	359.903	253.588	253.060	0.108	0.000	104.542	0.000	1.771	0.058
16.57.15.933085	PART DVP	IMD3	3008 TRAN0007	382.867	253.933	253.578	0.109	0.000	127.192	0.000	1.742	0.118
16.57.17.027190	DSPALLI AXS	IMD3	3008 TRAN0006	322.100	259.058	258.091	0.106	0.000	61.133	0.000	1.908	0.124
16.57.17.026938	DSPALLI AXS	IMD3	3008 TRAN0004	359.538	265.055	262.039	0.113	0.000	92.711	0.000	1.771	0.124
16.57.17.026227	DSPALLI AXS	IMD3	3008 TRAN0005	396.272	267.414	266.786	0.113	0.000	126.155	0.000	2.701	0.124
16.57.17.025709	DSPALLI AXS	IMD3	3008 TRAN0002	431.862	269.526	268.924	0.108	0.000	159.996	0.000	2.340	0.128
16.57.17.023985	DSPALLI AXS	IMD3	3008 TRAN0000	471.160	273.394	272.234	0.109	0.000	196.012	0.000	1.752	0.124
16.57.17.025061	DSPALLI	IMD3	3008	509.480	274.056	273.428	0.051	0.000	233.595	0.000	1.828	0.123

Figure 285. Connect Transit Log report: ADDIDENT

In the report heading, **Log from** is the time stamp of the first record reported.

The Log report provides transaction details and various processing times. For each input message, Transaction Code, Target Datastore, and Port Number are always reported. If ADDIDENT is specified, the additional identification details User ID, Originating Datastore and Client ID are printed on a second line due to page width constraints. The column headings change to accommodate the dual use of the column.

The report is divided into four main sections. From left to right, section 1 provides transaction identification details such as time, transaction code, target datastore and port number, and total response time. Section 2 provides transaction pre-OTMA (Input) processing times. Section 3 provides OTMA processing time (including IMS processing). Section 4 provides post-OTMA (Output) processing times.

The transaction identification details are:

Start Time

Input message arrival time (Read Prepare time).

Transact Code

Transaction Code. Column heading is **Transact** when ADDIDENT is specified.

User ID

User ID. This is reported only if ADDIDENT is specified.

Target DataStor

Target destination datastore. The Datastore (IMS) to which IMS Connect sent this transaction for processing. Column heading is **Datastor Targ** when ADDIDENT is specified.

DataStor Org

Originating destination datastore. The Datastore (IMS) to which IMS Connect was originally going to send this transaction for processing. This is reported only if ADDIDENT is specified.

Port Number

The Port number from which the transaction was received. Column heading is **Port** when ADDIDENT is specified.

ClientID

The IMS Connect Client ID. This is reported only if ADDIDENT is specified.

Transit (or response) elapse time is broken down into its components.

All times are in microseconds.

Response Time

The elapsed time from when the transaction input message enters IMS Connect (Read Prepare) to when the transaction terminates (Trigger event).

Response time is displayed in microseconds. However, if the time exceeds 9,999,999 microseconds, it is displayed in hours, minutes and seconds in hh:mm:ss format.

Input**Pre-OTMA**

Total Input time. The elapsed time from when the transaction input message enters IMS Connect (Read Prepare) to when the transaction is sent to IMS (OTMA) for processing.

Read Sock

The elapsed time taken for IMS Connect to read the incoming message, from when the transaction input message enters IMS Connect (Read Prepare) to when IMS Connect has completed reading the message (final Read Socket).

READ Ex

The elapsed time the input message spent being processed by the READ Message Exit.

For Sync Level NONE transactions, the READ Message Exit is called once for the input message.

For Sync Level CONFIRM transactions, the READ Message Exit is called twice, initially for the input message and a second time for the ACK response from the client.

SAF The accumulated elapsed time spent in all SAF calls for the message.

Process**OTMA**

The elapsed time OTMA spent processing the transaction, from when the message is sent to IMS (OTMA) to when the response is received back from OTMA.

Transaction messages are sent to OTMA for processing. In addition, for Sync Level CONFIRM transactions, the ACK response from the client is also sent to OTMA for processing.

Output

Confirm

For Sync Level CONFIRM transactions only, the elapsed time from when OTMA completed processing the input message to when the ACK response from the client is sent back to OTMA.

Post-OTMA

For Sync Level NONE transactions, the elapsed time from when OTMA completed processing the input message to when the transaction terminates (Trigger event).

For Sync Level CONFIRM transactions, the elapsed time from when OTMA completed processing the ACK response to when the transaction terminates (Trigger event).

XMIT Ex

The elapsed time output messages (responses) spent being processed by the XMIT Message Exit.

E Error indicator:

T = Time Out

R = Rejected (by READ Message Exit)

N = NAK

Connect Transit extract

The IMS Connect Transit Extract gathers performance details about every transaction processed by IMS Connect. You can request a List or Summary extract, or both. The List Extract provides similar details to the Connect Transit Log report, while the Summary Extract summarizes these details over a specified time interval, typically 15 minute intervals.

The extract data is suitable for importing into DB2 or PC tools from where you can run queries or produce reports and graphs. Sample DB2 jobs are supplied in the SIPISAMP library to help you:

- Sample Load jobs IPICLLOD and IPICSLOD
- Sample DDL jobs IPICLDDL and IPICSDDL

Refer also to the section on DB2 Queries in the *IMS Performance Analyzer for z/OS: User's Guide*.

IMS Connect event records

The Connect Transit extracts are derived from IMS Connect event records 3C, 3D, 3E, 3F, 40, 41, 42, 47, 48, 49, 4A. The extract requires IMS Connect Extensions to collect event data at collection level 3 or 4.

Otherwise:

- If collection level 2, the extract data set is produced but with Input READ Socket, SAF and Acknowledgement zero.
- If collection level 0 or 1, the Extract Recap report displays the message:
No observations in report period

Table 27. Connect Transit Extract: event records processed

Code (hex)	Event description	Collection level
3C	Prepare READ Socket	2
3D	Message Exit called for READ, XMIT, EXER	2
3E	Message Exit returned from READ, XMIT, EXER	1
3F	Begin SAF security request	3
40	End SAF security request	3
41	Message sent to OTMA	2
42	Message received from OTMA	2
47	Session Error	1
48	Trigger Event	2
49	READ Socket	3
4A	WRITE Socket	3

Extract options

To specify the extract options, select the Transaction Transit **Extract** in the IMS Connect Report Set.

The command for the Connect Transit Extract is:

```
IMSPACEX      TRANEXTR(
                [DDNAME(ddname),]          default TRANEXTR
                [LIST,]
                [SUMMARY,]
                [EXTENDED,]
                [INTERVAL(hh:mm:ss),]      default 00:15:00 (15 minutes)
                [INCL(TRANCODE(list))|EXCL(TRANCODE(list)),]
                [INCL(USERID(list))|EXCL(USERID(list)),]
                [INCL(DATASTORE(list))|EXCL(DATASTORE(list)),]
                [INCL(CLIENT(list))|EXCL(CLIENT(list)),]
                [INCL(PORT(list))|EXCL(PORT(list))])
IMSPACEX      EXECUTE
```

Selection Criteria can be specified to filter the input data on one or more of the following:

- Transaction Code
- User ID
- Target Datastore (IMS ID)
- Connect Client ID
- TCP/IP Port Number

The Recap report output is written to the data set specified by the Report Output DDname. The default is TRANEXTR.

The List Extract, if requested, is written to the data set with DDname IPICTRLS. The default allocation attributes for a new data set are taken from the Total Transit Traffic specification in your Reporting Allocation Settings in Profile Options.

The Summary Extract, if requested, is written to the data set with DDname IPICTRSU. The default allocation attributes for a new data set are taken from the Summary Extract specification in your Reporting Allocation Settings in Profile Options.

The Summary Extract requires a time interval by which you want the data summarized. The default is 00:15:00 (15 minutes).

List extract record format

In the Connect List Extract, transaction transit activity is listed in a similar way to the Connect Transit Log report. The List Extract record layout is defined by the assembler macro IPICEXLI in the SIPIMAC library.

The extract record has the following format:

CTLLIST			CEX Transaction List Record
CTLDATE	CL10	Tran Date	'yyyy-mm-dd'
CTLDATES	CL1	Separator	'-'
CTLTIME	CL14	Tran Time	'hh.mm.ss.thmiju'
CTLTC	CL8	Transaction Code	
CTLUSID	CL8	User ID	
CTLDORG	CL8	Datastore (Original)	
CTLDSTGT	CL8	Datastore (Target)	
CTLCLID	CL8	Client ID	
CTLTPIPE	CL8	TPIPE name	
CTLPORT	CL5	Port Number	
CTLREJE	CL1	R = Transaction rejected	
CTLIMO	CL1	T = Transaction timeout	
CTLFAIL	CL1	F = Transaction failed	
CTLCLACK	CL1	A = Client sent ACK	
CTLCLNAK	CL1	N = Client sent NAK	
CTLOTNAK	CL1	O = OTMA NAK	
CTLRTPIP	CL1	N = RESUME TPIPE NOAUTO command	
		A = RESUME TPIPE AUTO command	
		S = RESUME TPIPE SINGLE command	
Transit Elapsed times (microseconds)			
CTLELIN	XL8	Pre-OTMA	
CTLELRD	XL8	Input READ Socket	
CTLELRX	XL8	Message Exit READ	
CTLELSF	XL8	SAF	
CTLELPR	XL8	Processing by OTMA	
CTLELXX	XL8	Message Exit XMIT	
CTLELAR	XL8	Acknowledgement READ Socket	
CTLELCF	XL8	Transaction Confirm	
CTLELOT	XL8	Post-OTMA	
CTLELRS	XL8	Response time	
Transaction counters			
CTLCACK#	XL2	Client ACK count	
CTLCNAK#	XL2	Client NAK count	
CTLONAK#	XL2	OTMA NAK count	
CTLRTPI#	XL4	Resume Tpipe message count	
CTLPTDEP	XL4	Port depth	
CTLNAKSC	XL2	OTMA NAK Sense Code	
CLTIMOV	CL3	Timeout value	
CLTIRM	XL1	Timeout value (raw)	
CLTIMOC	CL8	Timeout value (character)	
CLTIPADR	CL39	IP Address	

Figure 286. Record format of Connect Transit List extract

Many of the fields in the extract record are reported in the Connect Transit Analysis and Log reports. Refer to the report contents section of those two reports for a description of the common fields.

The following fields are in the extract record, but not in the Transit Analysis or Log reports:

CTLELAR

READ Socket Acknowledgement. The total elapsed time for all READ Socket Events issued after the response from OTMA has been sent to the client, in other words, the time taken to READ the Acknowledgement from the client.

CTLRTPI#

Resume Tpipe message count. The number of messages returned from OTMA in response to the Resume Tpipe commands.

CTLPTDEP

Port depth. The number of concurrently open Sockets on the Port from which the transaction was received. This field can be used to monitor the Socket usage at the time individual transactions were received by IMS Connect.

CTLNAKSC

OTMA NAK Sense Code. This field contains the Sense Code returned by OTMA when it issues a NAK. The OTMA sense codes for NAK messages are listed in Figure 345 on page 622. For more information, refer to the section “OTMA Sense Codes for NAK Messages” in the *IMS Open Transaction Manager Access Guide and Reference*.

CTLTIMOV

Transaction OTMA timeout value. This is the timeout value used by IMS Connect to time out a transaction that does not return from OTMA. This value is only displayed when the transaction had timed-out as indicated by field CTLIMO being set to T. For an explanation of timeout values, refer to the *IBM IMS Connect Guide and Reference*, SC18-7260.

CTLTIRM

Timeout value (raw format). IMS request message timer value, IRM_TIMER. For an explanation, refer to *IMS Connectivity in an On Demand Environment: A Practical Guide to IMS Connectivity*, SG24-6794.

CTLTIMOC

Timeout value. CTLTIRM value in character format.

CTLIPADR

IP address.

Summary extract record format

In the Connect Summary Extract, transaction transit activity is summarized by time interval. The Summary Extract record layout is defined by the assembler macro IPIEXSU in the SIPIMAC library.

The extract record has the following format:

CTSSUMM	CEX Transaction Summary Record		
CTSDATE	CL10	Tran Date 'yyyy-mm-dd'	
CTSDATES	CL1	Separator '-'	
CTSTIME	CL8	Tran Time 'hh.mm.ss'	
CTSTC	CL8	Tran Code	
CTSINTVL	XL8	Time Interval (seconds)	
Transit Elapsed times (microseconds)			
CTSELIN	XL8	Pre-OTMA	Total
CTSELIN2	XL8	Pre-OTMA	Sum-of-Squares
CTSELRD	XL8	Input READ Socket	Total
CTSELRD2	XL8	Input READ Socket	Sum-of-Squares
CTSELRX	XL8	Message Exit READ	Total
CTSELRX2	XL8	Message Exit READ	Sum-of-Squares
CTSELSF	XL8	SAF	Total
CTSELSF2	XL8	SAF	Sum-of-Squares
CTSELPR	XL8	Processing by OTMA	Total
CTSELPR2	XL8	Processing by OTMA	Sum-of-Squares
CTSELXX	XL8	Message Exit XMIT	Total
CTSELXX2	XL8	Message Exit XMIT	Sum-of-Squares
CTSELAR	XL8	Acknowledgement READ Socket	Total
CTSELAR2	XL8	Acknowledgement READ Socket	Sum-of-Squares
CTSELCF	XL8	Transaction Confirm	Total
CTSELCF2	XL8	Transaction Confirm	Sum-of-Squares
CTSELOT	XL8	Post-OTMA	Total
CTSELOT2	XL8	Post-OTMA	Sum-of-Squares
CTSELRS	XL8	Response time	Total
CTSELRS2	XL8	Response time	Sum-of-Squares
CTSTRAN#	XL4	Transaction count	
CTSREJE#	XL4	Rejected count	
CTSTIMO#	XL4	Timeout count	
CTSFAIL#	XL4	Failed count	
CTSCACK#	XL4	Client ACK count	
CTSCNAK#	XL4	Client NAK count	
CTSONAK#	XL4	OTMA NAK count	
CTSRTPI#	XL4	Resume Tpipe message count	
CTSPDAVG	XL4	Average Port depth	
CTSPDMAX	XL4	Maximum Port depth	
CTSPDMIN	XL4	Minimum Port depth	

Figure 287. Record format of Connect Transit Summary extract

Many of the fields in the extract record are reported in the Connect Transit Analysis and Log reports. Refer to the report contents section of those two reports for a description of the common fields.

The following fields are in the extract record, but not in the Transit Analysis or Log reports:

CTSELAR

READ Socket Acknowledgement. The total elapsed time for all READ Socket Events issued after the response from OTMA has been sent to the client, in other words, the time taken to READ the Acknowledgement from the client.

CTSRTPI#

Resume Tpipe message count. The number of messages returned from OTMA in response to the Resume Tpipe commands.

CTSPDAVG

Average Port Socket Depth. The average Port Socket depth. This is the number of concurrently open Sockets on the Port when the transaction was received, for all Ports from which the transaction was received.

CTSPDMAX

Maximum Port Socket Depth. The highest Port Socket depth. This is the number of concurrently open Sockets on the Port when the transaction was received, of any Port from which the transaction was received.

CTSPDMIN

Minimum Port Socket Depth. The lowest Port Socket depth. This is the number of concurrently open Sockets on the Port when the transaction was received, of any Port from which the transaction was received.

Sums-of-Squares are used to calculate standard deviation and peak percentiles.

For more information about running SQL Queries against the extract data, see the following samples in the SIPISAMP Library:

```
IPICQML1
IPICQML2
IPICQMS1
IPICQMS2
```

Report content: Recap

This is an example of the Recap report produced at the end of IMS Connect List and Summary extract processing.

The List and Summary extracts were requested by a command and data set specification such as the following:

```
/* IMS Connect List Extract File
//IPICTRL DD DSN=IPID.TREXLS1,
//          DISP=(NEW,CATLG),
//          UNIT=SYSDA,SPACE=(CYL,(5,5),RLSE)
/* IMS Connect Summary Extract File
//IPICTRSU DD DSN=IPID.TREXSUM1,
//           DISP=(NEW,CATLG),
//           UNIT=SYSDA,SPACE=(CYL,(1,1),RLSE)
//
IMSPACEX    TRANEXTR(
             DDNAME(TRANEXTR),
             LIST,
             SUMMARY,
             INTERVAL(01:00:00))
IMSPACEX    EXECUTE
```

```
List   Extract Data Set: IPID.TREXLST1
      Record Count :    1,455
      Start       : 2014-03-16-12.05.06.31793
      END        : 2014-03-23-10.23.22.47862

Summary Extract Data Set: IPID.TREXSUM1
      Record Count :      72
      Start       : 2014-03-16-12.00.00
      END        : 2014-03-23-10.00.00
      Interval    : 01:00:00
```

Figure 288. Connect Transit Extract Recap report

Connect and Combined Transit reports (Form-based)

Form-based reporting allows you to personalize the format and content of Transaction Transit reports and extracts to meet your individual requirements. By reporting against a Group of IMS and Connect systems, you can get a complete end-to-end transit picture of IMS Connect transactions.

For Connect and combined reporting, you can select fields from all the IMS Connect and associated IMS fields available to IMS PA. This is done using Report Forms in the dialog or the FIELDS operand in batch commands.

List and Summary reports are available to run against IMS and Connect systems and their Log and Journal files. You can request multiple reports in a single job and single pass of the data. They enable comprehensive, flexible analysis of transaction transit information giving you a good insight into different facets of response tuning.

Refer to the Chapter 16, “Glossary of Report Form field names,” on page 629 for a description of the data fields available for Form-based reporting.

Sample Report Forms

A set of sample Report Forms is provided with IMS Performance Analyzer to demonstrate how Form-based Connect and combined Transaction Transit reports can be tailored to meet your specific requirements.

A Report Form is a user-defined template for the design of a report. The batch equivalent is the FIELDS operand. The sample reports available in this category are:

List reports

COMBLIST

Combined IMS and Connect List

CONNLIST

Connect Transit Log

Summary reports

COMBSUMM

Combined IMS and Connect Summary

CONNACK

Connect ACK/NAK Summary

CONNPLEX

Connect PLEX Usage Summary

CONNTCOD

Connect Analysis by Trancode Summary

For more information on the fields generated in the sample reports, you can use dialog option 10 **Report Forms** to display the list of sample forms, select the form you are interested in, then enter line action **H** for help information on any field.

Form-based Transit List report

The Form-based Transaction Transit List report is a detailed list of transaction transit records in transaction completion sequence.

You can tailor the format and content of the reports and extracts by specifying Report Forms, include only the first or all output messages, the minimum transaction Completion Level, the data Precision, what Digit Grouping to use, and the Selection Criteria for filtering the input records. Additional extract options are delimiters, field labels, and whether to format numeric fields for DB2 or spreadsheet analysis.

Report options

To obtain an IMS Connect Transit Form-based List report or extract, select the Transaction Transit (Form-based) **List** report in a Connect Report Set and specify the report options.

For a complete description of options available, refer to the *IMS Performance Analyzer for z/OS: User's Guide*.

Report content (default)

The default Connect or Combined Transit List report can be requested with the IMSPACEX LIST command. The order of transactions in the report is based on when they end, and not when they start.

```
IMSPACEX    LIST
IMSPACEX    EXECUTE
```

This produces the same result as the following command in which you can see the defaults explicitly specified:


```

IMSPACEX      LIST(
                DDNAME(LIST0001),
                NOGROUP,
                COMPLVLC(2),
                STARTLVL(2),
                COMPLVL(3),
                PRECISION(3),
                NOMATCH,
                FIELDS(STARTCON(TIME),
                        TRANCODE,
                        TARGDS,
                        PORT,
                        RESPCON,
                        PREOTMA,
                        INREAD,
                        READEXIT,
                        SAFTIME,
                        PROCOTMA,
                        CONFIRM,
                        POSTOTMA,
                        XMITEXIT,
                        FAILED))
IMSPACEX      EXECUTE

```

The following figure shows the default report format but with PRECISION(6).

IMS Performance Analyzer 4.4													
Connect Transit List													
LISTDD Printed at 15:31:27 06Aug2008				Data from 10.41.52 02Jul2007									
CON Tran	Target	CON Resp	PreOTMA	ReadSock	ReadExit	SAF Call	OTMAproc	Confirm	PostOTMA	XmitExit	Failure		
Start	Trancode	Datastor	Port	Time	Time	In Time	Time	Time	Time	Time	Time	Reason	
10.45.53.540765	CEXTCONV	IADE	3101	88881336	171	49	31	-	88880531	-	633	33	
10.48.11.776304	PART	IADE	3101	295901	215	35	30	-	294453	-	1232	36	
10.48.12.111803	DSPALLI	IADE	3101	61360	222	34	29	-	60464	-	673	28	
10.48.12.213586	DSPINV	IADE	3101	48621	221	34	28	-	47465	-	933	354	
10.48.12.303358	PART	IADE	3101	57354	222	101	29	-	56577	-	554	28	
10.48.30.332568	PART	IADE	3101	36280	3979	47	30	-	31752	-	548	28	
10.48.30.412113	PART	IADE	3101	46568	244	46	53	-	42539	3272	511	53	
10.49.10.976199	IVTNO	IADE	3101	699651	1473	1008	239	-	694887	2778	512	71	
10.49.11.717849	IVTNO	IADE	3101	455873	303	118	62	-	452222	2862	485	64	
10.49.12.215962	*CMD_RHQ	IADE	3101	256721	218	39	46	-	250487	138	473	53	
10.49.12.258567	*CMD_RHQ	IADE	3101	670673	410507	34	47	-	250757	138	705	61	
10.49.40.176318	IVTNO	IADE	3101	536192	277	39	54	-	532607	2831	475	92	
10.49.40.748846	IVTNO	IADE	3101	469777	221	43	59	-	466988	2089	479	75	
10.49.41.254770	*CMD_RHQ	IADE	3101	448757	2067	47	72	-	250803	413	585	88	
10.49.50.245823	IVTNO	IADE	3101	494379	224	39	61	-	491225	2476	453	84	
10.49.50.787934	IVTNO	IADE	3101	680656	368	42	51	-	677393	2362	531	65	
10.49.51.509955	*CMD_RHQ	IADE	3101	232766	188	39	46	-	-	128	227657	59	SESSION
10.49.55.587685	*CMD_RTP	IADE	3101	2001915	244	64	28	-	2000329	-	1341	33	
10.50.36.752985	*CMD_RTP	IADE	3101	2002524	204	37	25	-	2000862	-	1457	36	
11.11.30.669524	DVPTRANS	IADE	3101	88882403	330	81	32	-	88880538	-	1534	32	
11.22.09.512833	IVTFD	IADE	3101	38896	217	35	30	-	38124	-	554	25	
11.23.24.960566	IVTNO	IADE	3101	83716	233	36	30	-	82630	-	852	29	
11.23.25.084937	IVTNO	IADE	3101	18962	215	38	28	-	18252	-	495	23	

Figure 289. Form-based Connect Transit List report (default)

Refer to the Chapter 16, “Glossary of Report Form field names,” on page 629 for the field names, descriptions, and column headings. Field descriptions are also available from the dialog using option 10 **Report Forms**. Edit or view a form, then enter line action **H** for help information on any field. The field help information is also available from the form field prompt list.

COMBLIST: Combined IMS and Connect List report

The Combined IMS and Connect List report lists all IMS Connect transactions, providing IMS Connect and IMS log information in a single report. You can use sample report form **COMBLIST** to format this report.

For each transaction you can identify both IMS Connect and IMS system latencies that may be the cause of excessive response time. Only transactions identified in the IMS Connect Extensions journal are reported. If the associated transaction from the IMS log is located then the combined information is reported as a single IMS Connect transaction instance. If the associated transaction from the IMS log is not located then the IMS Connect transaction is reported but with IMS system information missing from the report.

IMS Performance Analyzer 4.4 Combined IMS and Connect List													
LIST0250 Printed at 14:18:42 23Sep2014				Data from 15.45.28 20Nov2013				Page 1					
Input LTERM	CON Tran	PreOTMA Start Time	PostOTMA Time	CON Resp Time	IMS Tran Start	Program	PST	Cls	Pr	DB Call Count	CPU Time	Userid	Output... LTERM...
3101	CEXTCONV	15.45.28.265842	0.000159	0.000005	39.30675	15.45.28.267035	CEXTPGM	1	5	8	5 0.004626	CEX001	3101...
-	CEXTCONV	15.46.07.589860	-	0.000003	0.000099	-	-	-	-	-	-	CEX001	...
-	CEXTCONV	15.46.12.597605	-	0.000004	0.000159	-	-	-	-	-	-	CEX001	...
3101	CEXTCONV	15.46.32.612004	0.000069	0.000002	0.019563	15.46.32.618075	CEXTPGM	1	5	8	0 0.000271	CEX001	...
3101	CEXSconv	15.46.32.612004	-	-	-	15.46.32.621731	CEXSPGM	1	15	8	5 0.003542	-	3101...
3101	CEXTCONV	15.46.32.647556	0.000079	0.000003	0.010193	15.46.32.651251	CEXTPGM	1	5	8	0 0.000205	CEX001	...
3101	CEXSconv	15.46.32.647556	-	-	-	15.46.32.652377	CEXSPGM	1	15	8	5 0.001558	-	3101...
3101	CEXSconv	15.46.32.657849	0.000128	0.000003	0.012891	15.46.32.661966	CEXSPGM	1	15	8	0 0.000194	CEX001	...
3101	CEXTCONV	15.46.32.657849	-	-	-	15.46.32.663268	CEXTPGM	1	5	8	5 0.001565	-	3101...
-	CEXTCONV	15.46.32.680655	-	0.000003	0.000095	-	-	-	-	-	-	CEX001	...
3101	CEXSconv	15.46.40.495533	0.000227	0.000004	0.010465	15.46.40.496132	CEXSPGM	1	15	8	5 0.004244	CEX001	3101...
3101	CEXSconv	15.46.40.506162	0.000168	0.000003	0.011199	15.46.40.510909	CEXSPGM	1	15	8	5 0.001579	CEX001	3101...
:	CEXSconv	15.46.45.525490	-	0.000004	0.000112	-	-	-	-	-	-	CEX001	...
:													

Figure 290. Combined IMS and Connect List report

CONNLIST: Connect Transit Log report

The Connect Transit Log report lists all transactions processed by IMS Connect. You can use sample report form **CONNLIST** to format this report.

The report highlights identification information including transaction code, datastore and start time, as well as a breakdown of response time into its transit time components.

IMS Performance Analyzer 4.4												
Connect Transit Log												
LIST0001 Printed at 15:46:41 13Apr2018				Data from 13.59.57 14Feb2018								
CON Tran	Target	CON Resp	Input	ReadSock	ReadExit	SAF Call	OTMAproc	Confirm	Output	XmitExit		
Start	Trancode Datasort Port	Time	Time	In Time	Time	Time	Time	Time	Time	Time	Time	Failure
13.59.57.395063	IVTNO	3102	2.554.704	254.828	254.576	0.105	0.000	283.806	2.015.324	0.745	0.064	
14.00.06.151186	IVTNO	3101	1.428.417	250.503	250.295	0.098	0.000	254.357	922.745	0.811	0.062	
14.00.24.854391	*CMD_RHQ	3102	2.069.908	252.631	252.452	0.080	0.000	250.269	0.181	2.621	0.065	
14.00.30.333077	*CMD_RHQ	3102	2.733.478	302.045	301.848	0.081	0.000	250.213	0.164	0.892	0.069	
14.00.37.061123	*CMD_RHQ	3102	2.997.152	211.750	211.607	0.085	0.000	250.507	0.163	0.773	0.057	
14.01.08.360517	IVTNO	3102	1.674.874	288.160	287.962	0.086	0.000	252.417	1.133.507	0.789	0.063	
14.01.17.547914	IVTNO	3102	1.290.497	249.898	249.670	0.084	0.000	253.001	786.316	1.281	0.068	
14.01.32.766349	*CMD_RHQ	3102	4.451.187	213.544	213.317	0.144	0.000	250.521	0.401	0.850	0.094	
14.01.48.137693	IVTNO	3101	1.589.921	232.731	232.529	0.088	0.000	252.950	1.097.637	6.600	0.065	
14.02.03.160875	IVTNO	3101	1.431.263	297.664	297.337	0.088	0.000	253.038	879.715	0.845	0.062	
14.02.12.629900	*CMD_RHQ	3102	4.961.451	281.089	280.903	0.131	0.000	250.377	0.351	0.907	0.096	
14.02.36.520801	DVPTRAN2	3101	237.585	230.618	230.421	0.046	0.000	6.026	0.000	0.941	0.030	
14.02.42.049173	DVPTRAN2	3102	239.248	231.802	231.596	0.047	0.000	6.047	0.000	1.397	0.072	
14.03.08.210996	*CMD_RTP	3102	4.052.563	213.055	212.849	0.186	0.000	250.485	0.294	0.726	0.119	
14.05.03.069393	*CMD_RHQ	3101	1.590.619	240.480	240.329	0.081	0.000	251.064	0.157	0.849	0.064	
14.05.05.867939	*CMD_RHQ	3101	2.423.570	257.621	257.442	0.081	0.000	250.463	0.159	0.787	0.061	
14.06.03.501294	*CMD_RHQ	3101	3.948.404	245.896	245.715	0.127	0.000	250.989	0.307	0.926	0.095	
14.06.42.002249	*CMD_RHQ	3101	3.342.481	265.592	265.419	0.132	0.000	250.657	0.314	10.012	0.094	
14.07.31.888339	*CMD_RTP	3102	4.927.291	266.613	266.412	0.153	0.000	250.886	0.300	0.876	0.137	
08.37.25.236711	IVTNO	3101	4.576.753	219.539	219.257	0.105	0.000	13.548	4.093.355	0.809	0.064	
12.36.36.153848	DSPALLI	3102	23.524	20.877	20.539	0.044	0.000	0.000	0.000	2.647	0.000	
12.36.50.973147	DSPALLI	3101	5.398.611	240.234	240.054	0.088	0.000	266.512	4.890.968	0.895	0.069	
12.37.03.099852	DSPALLI	3101	21.799	20.024	19.741	0.041	0.000	0.000	0.000	1.774	0.000	
12.37.30.786042	PART	3102	21.502	20.403	20.087	0.041	0.000	0.000	0.000	1.098	0.000	
12.38.16.592204	DSPALLI	3101	21.547	19.731	19.436	0.041	0.000	0.000	0.000	1.816	0.000	
12.44.47.634606	DSPALLI	3101	20.997	20.466	20.138	0.042	0.000	0.000	0.000	0.530	0.000	
12.44.59.928004	PART	3102	19.950	19.365	19.052	0.047	0.000	0.000	0.000	0.584	0.000	
12.45.22.172265	*CMD_RTP	3101	13.981.894	227.703	227.487	0.354	0.000	250.510	1.190	0.874	0.242	
14.30.21.766305	DSPALLI	3101	20.553	20.012	19.639	0.054	0.000	0.000	0.000	0.540	0.000	
14.30.27.404899	PART	3101	20.089	19.343	19.025	0.044	0.000	0.000	0.000	0.745	0.000	

Figure 291. Connect Transit Log report

Form-based Transit Summary report

The Form-based Transaction Transit Summary provides a summary of transaction performance.

You can tailor the format and content of the reports and extracts by specifying Report Forms, the Time Interval for summarizing activity over time, the Totals Level to include the grand total and optional sub-totals, the minimum transaction Start Level and Completion Level, the data Precision and Transaction Mix, what Digit Grouping to use, and the Selection Criteria for filtering the input records.

Additional extract options are delimiters, field labels, and whether to format numeric fields for DB2 or spreadsheet analysis.

Report options

To obtain an IMS Connect Transit Form-based Summary report or extract, select the Transaction Transit (Form-based) **Summary** report in a Connect Report Set and specify the report options.

The level of summarization can be varied depending on the number of key fields. You can specify up to 8 key fields to summarize and sort by, and you can request up to 7 levels of sub-totaling. See the example in Figure 33 on page 96.

If you specify NOTOTALS, no totals are printed. TOTALS(0) provides only the grand total, no sub-totals. TOTALS(1) to TOTALS(7) provides the grand total and subtotals to the corresponding key level. The grand total line is labeled **Total** or **T*** if the column is narrow.

For a complete description of options available, refer to the *IMS Performance Analyzer for z/OS: User's Guide*.

Report content (default)

The default Connect or Combined Transit Summary report can be requested with the IMSPACEX SUMMARY command.

```
IMSPACEX    SUMMARY
IMSPACEX    EXECUTE
```

This produces the same result as the following command in which you can see the defaults explicitly specified.

```
IMSPACEX    SUMMARY (
              DDNAME(SUMM0001),
              NOGROUP,
              TOTALS(0),
              INTERVAL(00:01:00),
              COMPLVLC(2),
              STARTLVL(2),
              COMPLVL(3),
              PRECISION(3,0),
              NOMATCH,
              FIELDS(TRANCODE(ASCEND),
                    TRANCNT,
                    RESPCON(AVE),
                    PREOTMA(AVE),
                    INREAD(AVE),
                    READEXIT(AVE),
                    SAFTIME(AVE),
                    PROCOTMA(AVE),
                    CONFIRM(AVE),
                    POSTOTMA(AVE),
                    XMITEXIT(AVE)))
IMSPACEX    EXECUTE
```

The following report is the default format but with PRECISION(6,0).

IMS Performance Analyzer 4.4											
Connect Transit Summary											
SUMMDD	Printed at 15:31:27 06Aug2018			Data from 10.41.52 02Jul2018 to 12.39.06 02Jul2018							
Trancode	Tran Count	Avg CON Resp Time	Avg PreOTMA Time	Avg ReadSock In Time	Avg ReadExit Time	SAF	Avg Call Time	Avg OTMAproc Time	Avg Confirm Time	90% PostOTMA Time	Avg XmitExit Time
*CMD_RHQ	4	402229	103245	40	53	-	250682	204	202906		65
*CMD_RTP	2	2002220	224	51	27	-	2000596	-	1457		35
CEXTCONV	2	44460455	213	47	43	-	44458775	2282	633		32
CEXTNONC	4	630777	293	61	54	-	625611	-	14843		35
DSPALLI	3	188073	233	51	45	-	185205	3051	673		48
DSPINV	1	48621	221	34	28	-	47465	-	933		354
DVPTRAN5	1	88882403	330	81	32	-	88880538	-	1534		32
IVTFD	9	36467	230	40	29	-	33586	-	8478		27
IVTFM	9	24232	269	44	32	-	23438	-	636		27
IVTNO	11	516680	359	134	67	-	513755	2481	684		70
PART	15	131347	479	50	34	-	129698	3209	1035		37
Total	61	3192665	7080	63	42	-	3229447	2108	42279		47

Figure 292. Form-based Connect Transit Summary report (default)

Refer to Chapter 16, “Glossary of Report Form field names,” on page 629 for the field names, descriptions, and column headings. Field descriptions are also available from the dialog using option 10 **Report Forms**. Edit or view a form, then

enter line action **H** for help information on any field. The field help information is also available from the form field prompt list.

COMBSUMM: Combined IMS and Connect Summary report

The Combined IMS and Connect Summary report summarizes IMS Connect transaction activity, providing IMS Connect and IMS log information in a single report. You can use sample report form **COMBSUMM** to format this report.

For each transaction code, the number of transactions processed is reported enabling you to identify both IMS Connect and IMS system latencies that may be the cause of excessive response time. Only transactions identified in the IMS Connect Extensions journal are reported. If the associated transaction from the IMS log is located then the combined information is reported as a single IMS Connect transaction instance. If the associated transaction from the IMS log is not located then the IMS Connect transaction is reported but with IMS system information missing from the report.

IMS Performance Analyzer 4.4																			
Combined IMS and Connect Summary																			
SUMM0001 Printed at 15:44:01 13Apr2018 Data From 13.59.57 14Feb2018 to 12.12.13 21Feb2018																			
IMS Tran	Tran	Avg	Avg	Min	Max	Min	Avg	Avg	Avg	90%	90%	90%	90%	Max	Avg	Avg	Avg	Avg	
Start	Trancode	Count	Input	Output	CON Resp	CON Resp	Total	InputQ	Process	OutputQ	IMS Resp	InputQ	Process	OutputQ	IMS Resp	Total	DB Call	DC Call	CPU
			Time	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time	Count	Count	Count
14.04.00	IVTNO	2	292.399	0.799	1.265.679	1.295.473	6.753	0.304	13.494	0.000	11.854	0.358	20.593	0.001	19.012	20.843	1	2	0
14.05.00	IVTNO	2	229.723	0.914	1.777.593	1.904.461	3.267	0.129	3.323	0.000	2.929	0.147	3.492	0.001	3.299	3.637	1	2	0
14.06.00	IVTNO	2	238.439	0.835	1.569.057	2.887.314	4.277	0.122	5.096	0.000	3.927	0.129	6.044	0.001	3.964	6.159	1	2	0
14.07.00	DVPTRAN2	2	264.361	1.034	270.009	271.816	13.480.645	0.230	4.419	18.958.354	4.215	0.314	4.724	24.440.325	4.478	24.445.360	0	4	0
14.32.00	DSPALLI	1	19.696	1.921	21.618	21.618	22.180	0.496	21.684	0.000	20.104	0.497	21.685	0.001	20.105	22.180	6	9	0
14.33.00	DSPALLI	1	19.688	1.961	21.649	21.649	21.530	0.453	21.077	0.000	20.775	0.454	21.078	0.001	20.776	21.530	6	9	0
14.33.00	PART	1	18.751	0.975	19.726	19.726	12.347	0.585	11.762	0.000	12.204	0.586	11.763	0.001	12.205	12.347	1	2	0
-	*CMD_RHQ	11	244.595	1.772	1.590.619	4.961.451	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0	0	0
-	*CMD_RTP	8	249.343	1.039	1.904.733	13.981.894	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0	0	0
-	DISPLAY	10	245.851	0.022	1.011.058	2.739.187	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0	0	0
-	DSPALLI	10	68.702	1.152	19.830	5.396.611	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0	0	0
-	DSPINV	1	292.901	1.269	337.180	337.180	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0	0	0
-	DVPTRAN2	3	239.693	1.151	237.585	268.733	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0	0	0
-	DVPTRANS	2	248.952	1.424	89.101.548	89.160.418	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0	0	0
-	END	1	228.843	0.324	1.034.805	1.034.805	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0	0	0
-	IVTCV	5	205.037	0.122	221.352	2.911.378	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0	0	0
-	IVTNO	10	259.561	1.586	274.468	4.576.753	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0	0	0
-	PART	10	141.731	0.637	19.950	2.393.591	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0	0	0
Total		82	202.751	1.004	19.726	89.160.418	3.267	0.282	9.744	3.446.973	8.994	0.501	19.578	13.768.818	18.608	24.445.360	2	4	0

Figure 293. Combined IMS and Connect Summary report

CONNACK: Connect ACK/NAK Summary report

The Connect ACK/NAK Summary report summarizes IMS Connect transaction acknowledgement activity. You can use sample report form **CONNACK** to format this report.

For each transaction code, the number of transactions processed is reported and the IMS and client acknowledgement counts provide an indication of the number of transactions that were either positively or negatively acknowledged.

Acknowledgement must be provided by:

- IMS to indicate that the transactions was either successfully processed (ACK) or failed to complete successfully (NAK)
- For SYNCLEVEL=CONFIRM only, the Connect client must either accept the transaction response (ACK) or reject it (NAK).

IMS Performance Analyzer 4.4												
Connect ACK/NAK Summary												
SUMM0001 Printed at 15:46:41 13Apr2018				Data from 13.59.57 14Feb2018 to 12.12.13 21Feb2018								
Trancode	CON Tran	IMS Cli	Tran	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg
Start	ACK	ACK	Count	CON Resp Time	Input Time	ReadSock In Time	ReadExit Time	SAF Call Time	OTMAproc Time	Confirm Time	Output Time	XmitExit Time
*CMD_RHQ	14.00.00	ACK	3	2.600.179	255.475	255.302	0.082	0.000	250.330	0.169	1.429	0.064
*CMD_RHQ	14.01.00	ACK	1	4.451.187	213.544	213.317	0.144	0.000	250.521	0.401	0.850	0.094
*CMD_RHQ	14.02.00	ACK	1	4.961.451	281.089	280.903	0.131	0.000	250.377	0.351	0.907	0.096
*CMD_RHQ	14.05.00	ACK	2	2.007.095	249.051	248.886	0.081	0.000	250.764	0.158	0.818	0.063
*CMD_RHQ	14.06.00	ACK	2	3.645.443	255.744	255.567	0.130	0.000	250.823	0.311	5.469	0.095
*CMD_RHQ	17.30.00	ACK	1	2.565.971	211.064	210.894	0.084	0.000	0.000	0.293	0.452	0.032
*CMD_RHQ	17.30.00	NAK	1	2.655.584	208.832	208.597	0.083	0.000	0.000	0.345	0.425	0.032
*CMD_RTP	14.03.00	ACK	1	4.052.563	213.055	212.849	0.186	0.000	250.485	0.294	0.726	0.119
*CMD_RTP	14.07.00	ACK	1	4.927.291	266.613	266.412	0.153	0.000	250.886	0.300	0.876	0.137
*CMD_RTP	12.45.00	ACK	1	13.981.894	227.703	227.487	0.354	0.000	250.510	1.190	0.874	0.242
*CMD_RTP	14.30.00	ACK	1	5.305.681	296.273	295.742	0.149	0.000	250.276	0.333	1.096	0.104
*CMD_RTP	14.31.00	ACK	1	4.334.135	220.164	219.981	0.139	0.000	251.396	0.319	1.168	0.121
*CMD_RTP	14.32.00	ACK	2	1.916.033	240.502	240.297	0.085	0.000	251.050	0.172	1.266	0.074
*CMD_RTP	14.33.00	ACK	1	3.607.604	289.930	289.733	0.129	0.000	250.260	0.451	1.043	0.115
DISPLAY	17.26.00	ACK	2	2.425.526	262.811	262.591	0.097	0.000	11.815	2.150.877	0.022	0.031
DISPLAY	17.26.00	NAK	1	1.680.708	270.797	270.591	0.087	0.000	7.871	1.402.016	0.022	0.030
DISPLAY	17.29.00	ACK	4	1.151.955	222.678	222.515	0.086	0.000	10.810	918.445	0.022	0.031
DISPLAY	11.33.00	ACK	2	1.634.283	275.519	275.313	0.094	0.000	13.373	1.345.366	0.024	0.032
DISPLAY	11.33.00	NAK	1	1.730.857	220.342	220.151	0.095	0.000	9.732	1.500.758	0.023	0.029
DSPALLI	12.36.00		1	23.524	20.877	20.539	0.044	0.000	0.000	0.000	2.647	0.000
DSPALLI	12.36.00	ACK	1	5.398.611	240.234	240.054	0.088	0.000	266.512	4.890.968	0.895	0.069
DSPALLI	12.37.00		1	21.799	20.024	19.741	0.041	0.000	0.000	0.000	1.774	0.000
DSPALLI	12.38.00		1	21.547	19.731	19.436	0.041	0.000	0.000	0.000	1.816	0.000
DSPALLI	12.44.00		1	20.997	20.466	20.138	0.042	0.000	0.000	0.000	0.530	0.000
DSPALLI	14.30.00		2	20.216	19.642	19.304	0.049	0.000	0.000	0.000	0.574	0.000
DSPALLI	14.32.00		2	20.724	19.340	19.079	0.043	0.000	0.000	0.000	1.383	0.000
DSPALLI	14.33.00		1	21.649	19.688	19.377	0.042	0.000	0.000	0.000	1.961	0.000
DSPALLI	17.29.00		1	20.893	19.842	19.524	0.041	0.000	0.000	0.000	1.050	0.000
DSPALLI	17.29.00	ACK	1	2.994.816	287.575	287.391	0.115	0.000	296.909	2.409.520	0.811	0.068
DSPINV	17.26.00		1	337.180	292.901	292.722	0.046	0.000	43.009	0.000	1.269	0.038
DVPTRAN2	14.02.00		2	238.417	231.210	231.009	0.047	0.000	6.037	0.000	1.169	0.051
DVPTRAN2	14.07.00		2	270.913	264.361	264.176	0.047	0.000	5.518	0.000	1.034	0.034
DVPTRAN2	17.28.00		1	268.733	256.660	256.517	0.044	0.000	10.956	0.000	1.116	0.029
DVPTRAN5	11.29.00		1	89.160.418	279.194	278.880	0.062	0.000	88.880.850	0.000	0.372	0.038
DVPTRAN5	11.32.00		1	89.101.548	218.709	218.507	0.047	0.000	88.880.363	0.000	2.475	0.038
END	17.29.00	ACK	1	1.034.805	228.843	228.707	0.091	0.000	7.607	798.030	0.324	0.060

Figure 294. Connect ACK/NAK Summary report

CONNPLEX: Connect PLEX Usage Summary report

The Connect PLEX Usage Summary report provides a high-level breakdown of Connect transaction activity across all your IMS Connect systems and IMS datastores. You can use sample report form **CONNPLEX** to format this report.

For each IMS Connect system, transaction activity and performance is reported for every IMS datastore that processes transactions on behalf of the Connect system.

IMS Performance Analyzer 4.4											
Connect PLEX Usage Summary											
SUMM0003 Printed at 15:46:41 13Apr2018				Data from 13.59.57 14Feb2018 to 12.12.13 21Feb2018							
Connect System	Target Daststor	Tran Count	Avg CON Resp Time	90% CON Resp Time	Max CON Resp Time	Avg OTMAproc Time	90% OTMAproc Time	Max OTMAproc Time	Avg IMS Resp Time	90% IMS Resp Time	Max IMS Resp Time
HWSVP4		82	3.912.980	21.481.455	89.160.418	2.282.704	19.945.181	88.880.850	8.994	18.608	20.775
Total		82	3.912.980	21.481.455	89.160.418	2.282.704	19.945.181	88.880.850	8.994	18.608	20.775

Figure 295. Connect PLEX Usage Summary report

CONNTCOD: Connect Analysis by Trancode report

The Connect Analysis by Trancode report provides a breakdown of IMS Connect transaction performance by transaction code. You can use sample report form **CONNTCOD** to format this report.

For each transaction code you can see at a glance how the transaction performed, and if necessary identify the phase of processing that caused excessive response time in IMS Connect, including Socket IO, message exit and SAF processing, OTMA, and client acknowledgement.

IMS Performance Analyzer 4.4											
Connect Analysis by Trancode											
SUMM0002 Printed at 15:46:41 13Apr2018			Data from 13.59.57 14Feb2018 to 12.12.13 21Feb2018								
Trancode	Tran Count	Avg CON Resp Time	Avg Input Time	Avg ReadSock In Time	Avg ReadExit Time	Avg SAF Call Time	Avg OTMAproc Time	Avg Confirm Time	Avg Output Time	Avg XmitExit Time	
*CMD_RHQ	11	3.067.255	244.595	244.411	0.101	0.000	205.005	0.258	1.772	0.069	
*CMD_RTP	8	5.005.154	249.343	249.100	0.160	0.000	250.739	0.404	1.039	0.123	
DISPLAY	10	1.613.900	245.851	245.661	0.091	0.000	11.122	1.356.904	0.022	0.031	
DSPALLI	12	717.143	60.533	60.247	0.053	0.000	46.952	608.374	1.283	0.011	
DSPINV	1	337.180	292.901	292.722	0.046	0.000	43.009	0.000	1.269	0.038	
DVPTRAN2	5	257.478	249.560	249.377	0.046	0.000	6.813	0.000	1.104	0.040	
DVPTRAN5	2	89.130.983	248.952	248.694	0.055	0.000	88.880.607	0.000	1.424	0.038	
END	1	1.034.805	228.843	228.707	0.091	0.000	7.607	798.030	0.324	0.060	
IVTCV	5	1.819.633	205.037	248.979	0.085	0.000	207.484	1.362.819	0.122	0.030	
IVTNO	16	1.790.809	251.670	251.452	0.096	0.000	202.406	1.304.221	1.310	0.063	
PART	11	333.288	130.551	130.271	0.053	0.000	11.299	190.771	0.667	0.018	
Total	82	3.912.980	202.751	205.216	0.085	0.000	2.282.704	627.485	1.004	0.048	

Figure 296. Connect Analysis by Trancode report

IMS Connect Transaction Index

The IMS Connect Transaction Index is a specialized extract file created by IMS Performance Analyzer batch reporting. Each record in the index represents an IMS transaction and contains cumulative information from the IMS Connect Extensions journal about that transaction.

Creating an IMS Connect Transaction Index

The IMS Connect Transaction Index is requested from an IMS Performance Analyzer CEX report set and associated INDEX batch command.

Procedure

1. On the IMS PA primary option menu, select option 3 **Report Sets**.
2. Select or create a CEX report set.
3. In the **Transaction Transit Reports (Form-based)** category, select **Transaction Index**.

```

File View SysDefs Options Help
-----
EDIT Report Set - SAMPCEX Line 1 of 8
Command ==> Scroll ==> PAGE

Description . . . Sample CEX Report Set

Enter "/" to select action.

--- ** Reports ** Active
+ Options No
+ Transaction Transit Reports No
- Transaction Transit Reports (Form-based) No
  List No
  Summary No
  S Transaction Index No
+ Resource Usage Reports No
+ Trace Reports No
  ** End of Reports **

```

Figure 297. IMS PA CEX Report Set: Select Transaction Index

- Specify the IMS Connect Transaction Index data set name and disposition.

```

File Options Help
-----
SAMPCEX - Transaction Index
Command ==>

Specify the Transaction Index data set name and disposition.

Name: 'IPI000.QADATA.I2CEXIDX' Disp: OLD

```

Figure 298. IMS PA: Specify IMS Connect Transaction Index data set name

- Enter RUN to run the report set, including the IMS Connect Transaction Index request. The generated command is IMSPACEX INDEX.
- Specify report set run-time options, and then press Enter to submit the job.

Using the index with IMS Problem Investigator to diagnose transaction problems

After creating an IMS Connect Transaction Index with IMS Performance Analyzer, you can use it in IMS Problem Investigator to diagnose problem transactions.

The IMS Connect Transaction Index can be analyzed on its own, or in conjunction with the IMS Connect Extensions journals and IMS log files used to create it. The index is a useful diagnostic mechanism that provides a summary insight into the dynamics of the transaction and provides a shortcut to the cause of the problem.

Processing the IMS Connect Transaction Index:

Select the IMS Connect Transaction Index together with the IMS Connect Extensions journals used to create the index. The files are merged and displayed as if they are a single data source.

In the following example, a CA20 filter is specified to display just the index records, hiding all other records from display until they are required.

File Menu Edit Help			
Process Log Files		Row 33 of 38 More: < >	
Command ==>		Scroll ==> PAGE	
Select a Log File to browse.		IMS Release 131 +	Zone
/	Log File	Rel +	Filter + Zone
	*CEX INDEX		
ss	'IPI000.QADATA.DGNCEX01.ICON220.JRNL010'		CA20
	'IPI000.QADATA.DGNCEX01.ICON220.JRNL011'		
	'IPI000.QADATA.DGNCEX01.ICON220.JRNL012'		
	'IPI000.QADATA.DGNCEX01.ICON220.JRNL013'		
ss	'IPI000.QADATA.I2CEXIDX'		
***** Bottom of data *****			

Figure 299. IMS Problem Investigator: Merge the IMS Connect Transaction Index and original journal files

The following browse panel is the list of all transactions contained in the index, matching the initial filter setting of CA20.

File Menu Edit Mode Navigate Filter Time Labels Options Help			
BROWSE	IPI000.QADATA.DGNCEX01.ICON220.JRNL010	Record 00000055	More: < >
Command ==> F PART		Scroll ==> CSR	
Forwards / Backwards . .		Time of Day . . 18.00.00.000000	
Code	Description	Date 2011-09-08 Thursday	Time (Local)
/	-----		
—	CA20 Connect Transaction TranCode=CEXTCONV	09.26.53.841714	
—	CA20 Connect Transaction TranCode=TIME	09.26.53.973130	
—	CA20 Connect Transaction TranCode=WAIT(5)	09.26.54.131862	
—	CA20 Connect Transaction TranCode=WAIT(20)	09.26.54.165552	
—	CA20 Connect Transaction TranCode=SWITCH	09.26.54.196957	
—	CA20 Connect Transaction TranCode=SWITCH	09.26.54.245134	
—	CA20 Connect Transaction TranCode=SWITCH	09.26.54.296699	
—	CA20 Connect Transaction TranCode=SWITCH	09.26.54.357403	
—	CA20 Connect Transaction TranCode=TIME	09.26.54.416015	
—	CA20 Connect Transaction TranCode=ABEND(40)	09.26.54.442242	
—	CA20 Connect Transaction TranCode=CEXS CONV	09.27.21.150298	
—	CA20 Connect Transaction TranCode=TIME	09.27.21.184749	
—	CA20 Connect Transaction TranCode=WAIT(5)	09.27.21.246913	
—	CA20 Connect Transaction TranCode=SWITCH	09.27.21.280837	
—	CA20 Connect Transaction TranCode=SWITCH	09.27.21.335215	

Figure 300. IMS Problem Investigator: Filtered list of IMS Connect Transaction Index records

Locate a record of interest. In this example, we have entered a FIND command to locate the PART transaction.

Formatting IMS Connect Transaction Index records:

You can use IMS Problem Investigator to format and browse the contents of the index records in the same way as any other log record.

The following figure shows formatted records in the IMS Connect Transaction Index.

File				Menu	Edit	Mode	Navigate	Filter	Time	Labels	Options	Help

BROWSE		IPI000.QADATA.I2CEXIDX							Record 000024 String found			
Command ==>									Scroll ==> CSR_			
Forwards / Backwards . .									Time of Day . . 18.00.00.000000			
Code Description		Date 2011-09-08 Thursday							Time (Local)			

/	-----											
S_	CA20	Connect Transaction								09.30.08.996476		
TranCode=PART Userid=CEX001 ClientID=IPIprt11 Port=3101												
LogToken=C8574490FB91B742 SSN=0B7 Response=0.420973 CM=0 SYNCLEVEL=1												
TOV=DEFAULT Socket=Tran												

---	CA20	Connect Transaction								09.30.09.279825		
TranCode=PART Userid=CEX001 ClientID=IPIprt12 Port=3101												
LogToken=C857449140A3D201 SSN=0B9 Response=0.279710 CM=0 SYNCLEVEL=1												
TOV=DEFAULT Socket=Tran												

---	CA20	Connect Transaction								09.30.09.368052		
TranCode=PART Userid=CEX001 ClientID=IPIprt13 Port=3101												
LogToken=C857449156428201 SSN=0BB Response=0.289590 CM=0 SYNCLEVEL=1												
TOV=DEFAULT Socket=Tran												

Figure 301. IMS PI: select an index record

Select an index record to view its contents. All the fields in the record are displayed.

```

BROWSE      IPI000.QADATA.I2CEXIDX                      Record 00002497 Line 00000000
Command ==>                                     Scroll ==> CSR_
Form      ==> +      Use Form in Filter                      Format ==> STD_
***** Top of data *****
+0004 Code... CA20  Connect Transaction
+01FC STCK... C8574490FBC7C041      LSN.... 0000000000000076
      Date... 2011-09-08 Thursday    Time... 09.30.08.996476.015

+0000 LL..... 020C      ZZ..... 0000      Type..... CA
+0005 Subtype... 20      Ver..... 03

+0030 Base..... Base section
+0030 TASKid.... 0104      CollectTask..... +1
+0033 CEXTECLTask..... +4      ComplLvl.... F4
+0038 Key..... Connect Identification key
+0038 HWSname... 'HWSVDP4 ' LogonTK.... C8574490FB91B742
+0048 OTMASSN... 000000B7      InputTK.... 0000000000000000
+0058 EVIDfirst..... 3C      EVIDprev... 48      Aflag1.... 51
+005B Aflag2.... 04      Pflag1.... 38      Pflag2.... 30
+44F2 TOValue... ' 0.00'
+005F TranStart..... '2011-09-08-09.30.08.996476'
+0079 TraceStart..... '09.30.08.996476'      NAKSC..... 0000
+008A Port..... +3101      Socket..... +4      Eflag1.... 73
+008F Eflag2.... EC
+0090 SVTData.... SVT/IRM Data
+0090 Trancode... 'PART ' Userid..... 'CEX001 '
+00A0 OriginDS... 'ICDE ' TargetDS... '
+00B0 ClientID... 'IPIPR11' Tpibe..... 'IPIPR11'
+00C0 XMLadapter.....
+00C8 Tmember... 'XCFMICDE' AltLterm... '
+00D8 ReRoute... ' ReadExit... 'HWSSMPL1' SyncFlag... 41
+00F9 SockFlag... 00      DSIDFlag... 10
+00FB ClientFlag..... 00      IRMTimer... 00
+00FE SenseCode..... 0000
+00D0 IPaddress..... '172.17.69.25 '
+01E8 PortDepth..... +7      RTPmsgct... +0
+01F0 CliACKct... +1      CliNAKct... +0
+01F4 OTMANAKct..... +0

+0110 Events.... Transaction Event Time section
+0110 StartTime..... 09.30.08.996476
+0118 ExitTime... 09.30.09.416929
+0128 OTMAinTime..... 09.30.09.166282
+0130 OTMAoutTime..... 09.30.09.416882
+0140 RdSockTime..... 09.30.09.417186
+0138 TriggerTime..... 09.30.09.417449
+0160 Timezone... Time zone offset fields
+0160 LSOffset... 0      LDTOffset..... 08.00.00.000000

+0170 Transit.... Transaction Transit accounting section
+0170 OTMAdelay..... 0      InputElap..... 0.000282
+0180 RdSockElap..... 0.000073
+0188 READxElap..... 0.000080      RXMLxElap..... 0
+0198 SAFelap... 0      OTMAelap... 0.166945
+01A8 XMITxElap..... 0.000073
+01B0 RdACKelap..... 0.001903      CONFelap... 0.002578
+01C0 TrACKelap..... 0.250599      RTPelap... 0
+01D0 OutputElap..... 0.000567      RespTime... 0.420973

```

Figure 302. IMS PI: analyze the index record contents

Tab to any point-and-shoot field and press Enter to zoom for more information about the field.

Connect Resource Usage reports

The Connect Resource Usage reports show detailed and summary information on the use and availability of various IMS Connect resources including TCP/IP Ports and Tpipes.

Connect Port Usage Report

The IMS Connect Port Usage report provides a summary of the TCP/IP ports used by the IMS Connect system. For each Port, average statistics are provided for port depth, message processed count, and ACCEPT, READ and WRITE Socket counts.

Peak percentile statistics are provided for Input READ and ACK/NAK READ Socket counts.

The report can optionally be summarized by time interval.

IMS Connect event records

The Connect Port Usage report is derived from IMS Connect event records 0B, 3C, 42, 47, 48, 49, 4A. The report requires IMS Connect Extensions to collect event data at collection level 3 or 4.

Otherwise:

- If collection level 2, the report is produced but with WRITE Count and Length zero. READ Count and Length accumulates both Prepare READ Socket (record 3C) and READ Socket (record 49). However, if collection level 2, READ Count and Length shows only Prepare READ Socket (3C) since READ Socket (49) is not collected at this level.
- If collection level 0 or 1, the report displays the message:
No observations in report period

Table 28. Connect Port Usage report: event records processed

Code (hex)	Event description	Collection level
0B	End ACCEPT Socket	3
3C	Prepare READ Socket	2
42	Message received from OTMA	2
47	Session Error	1
48	Trigger Event	2
49	READ Socket	3
4A	WRITE Socket	3

Report options

To specify the report options, select the Resource Usage **Port Usage** report in an IMS Connect Report Set.

The command for the Connect Port Usage report is:

```

IMSPACEX      PORT(
                [DDNAME(ddname),]          default PORT
                [INTERVAL(hh:mm:ss),]      default 00:01:00 (1 minute)
                [PEAK(nnn),]              50-100%, default 90%
                [INCL(PORT(list))|EXCL(PORT(list))])
IMSPACEX      EXECUTE

```

The report output is written to the data set specified by the Report Output DDname. The default is PORT.

Selection Criteria can be specified for TCP/IP Port Number.

You can also specify:

- The time interval if you want to summarize by time interval. This is optional. If you specify INTERVAL without specifying the time interval, the default interval is 00:01:00 (1 minute).
- The peak percentile, between 50 and 100%. The default is 90%.

Report content

The following figure shows an example of the Connect Port Usage report.

The report was produced by the command:

```

IMSPACEX      PORT(
                DDNAME(PORT),
                PEAK(90))
IMSPACEX      EXECUTE

```

IMS Performance Analyzer 4.4													
IMS Connect Port Usage - DVPCFGDA													
From 08Mar2018 08.47.44.11 To 25Mar2018 12.20.02.83													
Port	-- Depth --	Message	ACCEPT	READ	Input	READ	ACK/NAK	READ	WRITE	Page 1			
	Avg	Count	Count	Count	Len	Average	90% Peak	Average	90% Peak	Count	Len		
8801	11	26	1010	443	3681	32	668.505	1.888.699	773.304	4.310.637	910	128	
8802	33	83	2500	2514	7412	6	1.072.717	2.006.237	0.000	0.000	2500	91	
8803	0	0	0	14	0	0	0.000	0.000	0.000	0.000	0	0	
8804	0	0	0	14	0	0	0.000	0.000	0.000	0.000	0	0	
8805	0	0	0	14	0	0	0.000	0.000	0.000	0.000	0	0	
8806	0	0	0	14	0	0	0.000	0.000	0.000	0.000	0	0	
8807	0	0	0	14	0	0	0.000	0.000	0.000	0.000	0	0	
8808	0	0	0	14	0	0	0.000	0.000	0.000	0.000	0	0	
8809	0	0	0	14	0	0	0.000	0.000	0.000	0.000	0	0	

Figure 303. Connect Port Usage report

The following figure provides another example of the Connect Port Usage report, summarized by time interval. It was produced by the following command:

```

IMSPACEX      PORT(
                PEAK(90),
                INTERVAL(00:30:00))
IMSPACEX      EXECUTE

```

IMS Performance Analyzer 4.4													
IMS Connect Port Usage - DVPCFGDA													
From 15Mar2018 09.13.03.24 To 15Mar2018 12.17.31.35													
Time	Port	-- Depth --	Message	ACCEPT	READ	Len	Input	READ	ACK/NAK	READ	Page	WRITE	
15Mar		Avg Max	Count	Count	Count		Average	90% Peak	Average	90% Peak	Count	Len	
09.00.00	8801	0 0	145	0	145	9	271.292	758.455	0.000	0.000	0	0	
09.30.00	8801	0 6	86	11	202	29	261.551	603.822	491.318	725.573	31	94	
10.00.00	8801	10 13	104	108	502	34	297.231	413.940	299.271	543.689	157	161	
	8802	0 0	0	4	0	0	0.000	0.000	0.000	0.000	0	0	
10.30.00	8801	15 23	179	51	887	34	1.126.722	2.371.758	1.330.005	7.364.750	206	97	
	8802	0 0	0	2	0	0	0.000	0.000	0.000	0.000	0	0	
11.00.00	8801	18 23	93	93	372	36	319.420	504.425	358.919	846.734	103	278	
	8802	0 0	0	3	0	0	0.000	0.000	0.000	0.000	0	0	
	8809	0 0	0	3	0	0	0.000	0.000	0.000	0.000	0	0	

Figure 304. Connect Port Usage report, summarized by time

In the report heading, **From** is the time stamp of the first record reported and **To** is the time stamp of the last record reported.

The IMS Connect Port Usage report provides useful information regarding the Port utilization within a HWS system. Broken down by Interval (optional) and Port number, the report shows the following:

Time Report interval time. Optional, and will not be displayed if INTERVAL is not specified, in which case the data is summarized for the whole of the report period.

Port Port number.

The following fields appear in the report after the two ordering fields:

Depth Avg

The average number of Sockets currently open against this Port at any one time.

Depth Max

The maximum number of Sockets currently open against this Port at any one time.

Message Count

Number of input messages processed.

ACCEPT Count

Number of ACCEPT Socket commands issued.

READ Count

Number of READ Socket commands issued.

READ Len

Average length of data received by READ Socket commands.

Input READ Average

Average time for READ Socket commands for input messages.

Input READ nn% Peak

Peak percentile time for READ Socket commands.

The peak values are statistical estimates only, based on a normal distribution, so care should be taken when interpreting the values if the transaction volume is low.

ACK/NAK READ Average

Average time for acknowledgement READ Socket commands.

ACK/NAK READ nn% Peak

Peak percentile time for acknowledgement READ Socket commands.

The peak values are statistical estimates only, based on a normal distribution, so care should be taken when interpreting the values if the transaction volume is low.

WRITE Count

Number of WRITE Socket commands.

WRITE Len

Average length of data sent by WRITE Socket commands.

Connect Resume Tpipe report

The IMS Connect Resume Tpipe report provides a summary of Resume Tpipe command activity. The standard version of the report provides command statistics, including command count, and a breakdown by command type: Auto (with timeout), No Auto and Single.

Command statistics include count of commands issued, IMS messages received, Negative responses (Tpipe queue empty), NAK and timeout interval.

The extended version of the report supports all of the different resume tpipe types and options.

The standard report can optionally be summarized by time interval, but the extended report cannot.

IMS Connect event records

The Connect Resume Tpipe report is derived from IMS Connect event records 3D, 3E, 41, 42. The report requires IMS Connect Extensions to collect event data at collection level 2, 3 or 4.

Otherwise, if collection level is 0 or 1, the report displays the message:

No observations in report period

Table 29. Connect Resume Tpipe report: event records processed

Code (hex)	Event description	Collection level
3D	Message Exit called for READ, XMIT, EXER	2
3E	Message Exit returned from READ, XMIT, EXER	1
41	Message sent to OTMA	2
42	Message received from OTMA	2

Report options

To specify the report options, select the Resource Usage **Resume Tpipe** report in an IMS Connect Report Set.

The command for the Connect Resume Tpipe report is:

```
IMSPACEX  TPIPE(  
           [DDNAME(ddname),]  
           [INTERVAL(00:01:00),]  
           FORMAT1|FORMAT2,  
           [INCL|EXCL(TPIPE(tpipe1,tpipe2,...))])  
IMSPACEX  EXECUTE
```

Selection criteria can be specified for Tpipe.

The report output is written to the data set specified by the Report Output DDname. The default is TPIPE.

For the standard report, but not the extended report, you can also specify the time interval if you want to summarize over time. The default interval is 00:01:00 (1 minute).

FORMAT1 produces the standard report, which is the default option. FORMAT2 produces the extended report.

Report content: standard format

The following figure shows an example of the Connect Resume Tpipe: standard format report.

The report was produced by the command:

```
IMSPACEX      TPIPE(
              DDNAME(TPIPE),
              FORMAT1)
IMSPACEX      EXECUTE
```

IMS Performance Analyzer 4.4																
IMS Connect Resume Tpipe - DVPCFGDA																
From 15Mar2018 10.48.30.65 To 15Mar2018 12.17.12.19																
Page 1																
----- Noauto ----- Auto ----- Single -----																
--- Msg --- Avg --- Msg --- Avg																
Tpipe	Count	NResp	Fail	Avg	Max	Timeout	Count	NResp	Fail	Avg	Max	Timeout	Count	NResp	Fail	Timeout
CEX30001	1	0	0	2	2	0.25	0	0	0	0	0	0.00	0	0	0	0.00
CEX30002	0	0	0	0	0	0.00	0	0	0	0	0	0.00	1	1	0	7.00
CEX40001	1	0	0	2	2	0.25	0	0	0	0	0	0.00	0	0	0	0.00
CEX40002	1	1	0	0	0	3.00	0	0	0	0	0	0.00	0	0	0	0.00
TXRBS001	5	0	0	1	2	0.25	3	2	0	0	2	3.41	2	0	0	0.25
TXRBS002	17	2	0	0	2	0.45	1	0	0	2	2	5.00	0	0	0	0.00
TXSBS001	2	0	0	4	7	0.25	3	0	0	2	3	0.25	3	1	0	0.83
TXSBS002	2	0	1	3	5	0.25	5	0	0	2	5	0.25	5	1	0	0.60

Figure 305. Connect Resume Tpipe standard report

The following figure provides another example of the Connect Resume Tpipe standard report, summarized by time interval. It was produced by the following command:

```
IMSPACEX      TPIPE(
              DDNAME(TPIPE),
              INTERVAL(00:01:00),
              FORMAT1)
IMSPACEX      EXECUTE
```


Time 15Mar	Tpipe	----- Noauto -----						----- Auto -----						----- Single -----			
		Count	NResp	Fail	Avg	Max	Avg Timeout	Count	NResp	Fail	Avg	Max	Avg Timeout	Count	NResp	Fail	Avg Timeout
09.25.00	TRRBS001	1	0	0	2	2	0.25	0	0	0	0	0	0.00	0	0	0	0.00
09.26.00	TRRBS001	0	0	0	0	0	0.00	0	0	0	0	0	0.00	2	0	0	0.25
	TRRBS002	2	0	0	2	2	0.25	0	0	0	0	0	0.00	0	0	0	0.00
09.27.00	CEX30001	1	0	0	2	2	0.25	0	0	0	0	0	0.00	0	0	0	0.00
	TRRBS001	1	0	0	2	2	0.25	0	0	0	0	0	0.00	0	0	0	0.00
	TRRBS002	0	0	0	0	0	0.00	1	0	0	2	2	0.25	0	0	0	0.00
09.28.00	CEX40002	0	0	0	0	0	0.00	0	0	0	0	0	0.00	1	1	0	7.00
	TRRBS001	0	0	0	0	0	0.00	2	1	0	1	2	5.00	0	0	0	0.00
10.14.00	TRRBS001	1	0	0	2	2	0.25	0	0	0	0	0	0.00	0	0	0	0.00
10.15.00	TRRBS001	1	0	0	2	2	0.25	0	0	0	0	0	0.00	0	0	0	0.00
	TRRBS002	0	0	0	0	0	0.00	0	0	0	0	0	0.00	2	0	0	0.25
10.16.00	CEX40001	1	0	0	2	2	0.25	0	0	0	0	0	0.00	0	0	0	0.00
10.24.00	CEX40001	1	0	0	2	2	0.25	0	0	0	0	0	0.00	0	0	0	0.00
10.25.00	TRRBS001	1	0	0	2	2	0.25	2	1	0	1	2	5.00	0	0	0	0.00
	16034180	1	1	0	0	0	2.00	0	0	0	0	0	0.00	0	0	0	0.00
10.26.00	CEX40002	1	1	0	0	0	3.00	0	0	0	0	0	0.00	1	1	0	7.00
11.36.00	TRRBS002	1	0	0	1	1	0.25	0	0	0	0	0	0.00	0	0	0	0.00

Figure 306. Connect Resume Tpipe standard report, summarized by time

In the report heading, **From** is the time stamp of the first record reported and **To** is the time stamp of the last record reported.

The Resume Tpipe standard report provides statistics on the execution of all Resume Tpipe commands issued during the reporting interval. The report is sorted by Tpipe name within optional interval and provides statistics for No Auto, Auto and Single Resume Tpipe commands.

The report provides the following information for each Tpipe:

Time Report interval time segment. Optional, and will not be displayed if INTERVAL is not specified, in which case the data is summarized for the whole of the report period.

Tpipe Tpipe name.

If this report includes a Tpipe name that you do not recognize, it is probably due to the Client ID and Tpipe name not being set in the command. In this case, the READ Message Exit will generate a random number for the Client ID, which will also be used as the Tpipe name. An example of this can be seen in the sample report in Figure 306 at 10:25:00 with the Tpipe name of 16034180.

Noauto / Auto / Single

Resume Tpipe Noauto, Auto, and Single command statistics.

Count The number of commands issued.

NResp

The number of commands that timed out without receiving any response messages.

Fail The number of commands that failed due to NAK, session errors or other error conditions.

Msg Avg

The average number of messages received per command (not applicable to Single).

Msg Max

The highest number of messages received for any command (not applicable to Single).

Avg Timeout

The average timeout for all commands in *mm.ss.th*.

Report content: extended format

The extended format report supports all of the different resume tpipe types and options, and the IMS V14 parallel resume tpipe option. However, the extended format report does not support reporting by time interval.

The following figure shows an example of the Connect Resume Tpipe: extended format report.

The report was produced by the command:

```
IMSPACEX      TPIPE(  
              DDNAME(TPIPE),  
              FORMAT2)  
IMSPACEX      EXECUTE
```

IMS Performance Analyzer 4.4 IMS Connect Resume Tpipe - HWS MVP4											
From 210ct2018 10.48.22.85 To 210ct2018 10.49.03.08										Page	1
Tpipe	Remote Client Session Token	Rtpipe Type	Session Type	Rtpipe Cmds	Msgs Received	Client NACKs	ICON NACKs	Rtpipe CANCELS	Timeout Count	Average TO Value	--- Timeouts --- No Msg Max Msgs
IPIBCT01	AB4B62715EAD2A86	TPIPE	TRAN	1	2	0	0	1	0		
IPIBCT02	AB4B62748C62BA84	TPIPE	TRAN	1	4	0	0	1	0		
IPIBCT03	AB4B6276B78E7C84	SINGLE	TRAN	1	1	0	0	1	0		
	AB4B62748CC25704	SINGLE	TRAN	1	1	0	0	1	0		
	AB4B627327ED5186	SINGLE	TRAN	1	1	0	0	1	0		
IPIBCT04	AB4B624D00DA7384	SGL WAIT	TRAN	1	1	0	0	1	0		
	AB4B625D0653D286	SGL WAIT	TRAN	1	1	0	0	1	0		
	AB4B629D70320284	SGL WAIT	TRAN	1	1	0	0	1	0		
IPIBCT05	AB4B62310C7F5C84	AUTO	TRAN	1	3	0	0	1	0		
IPIBCT06	AB4B62870240FA04	NOAUTO	TRAN	1	3	0	0	1	0		
HWS\$DEF	AB4B628874294C84	TPIPE	TRAN	1	2	0	0	1	0		
REROUTED	AB4B628BD3DF9B04	TPIPE	TRAN	1	2	0	0	1	0		

Tpipe The name of the OTMA tpipe that the resume tpipe receives messages from. If the tpipe name is the same for the next session, the name is not repeated, so a blank value in this field means the tpipe name is the same as the previous one.

Remote Client Session Token

The session key of the client that issued the resume tpipe request.

Rtpipe Type

The type of resume tpipe issued by the client, and the options for how it is to retrieve messages from the target tpipe.

Table 30. Resume Tpipe Types

Rtpipe Type	Meaning
SGL WAIT	Retrieve a single asynchronous message. If no message is available, wait for a message to arrive.
SGL WAIT SYNC	Retrieve a single synchronous message. If no message is available, wait for a message to arrive.
SGL WAIT BOTH	Retrieve a single message, regardless of whether it is synchronous or asynchronous. If no message is available, wait for a message to arrive.

Table 30. Resume Tpipe Types (continued)

Rtpipe Type	Meaning
SINGLE	Retrieve a single asynchronous message. If no messages are available, do not wait.
SINGLE SYNC	Retrieve a single synchronous message. If no messages are available, do not wait.
SGL MSG BOTH	Retrieve a single message, regardless of whether it is asynchronous or synchronous. If no messages are available, do not wait.
AUTO	Retrieve asynchronous messages immediately when they arrive on the tpipe queue. Only asynchronous messages are retrieved.
AUTO SYNC	Retrieve synchronous messages immediately when they arrive on the tpipe queue. Only synchronous messages are retrieved.
AUTO BOTH	Retrieve messages immediately when they arrive on the tpipe queue, regardless of whether the messages are synchronous or asynchronous.
NOAUTO	Retrieve asynchronous messages in the tpipe queue only when the command is issued.
NOAUTO SYNC	Retrieve synchronous messages in the tpipe queue only when the command is issued.
NOAUTO BOTH	Retrieve messages in the tpipe queue only when the command is issued, regardless of whether the messages are synchronous or asynchronous.
TPIPE	This is the basic or default type, which is equivalent to NOAUTO. It retrieves asynchronous messages in the tpipe queue only when the command is issued.
UNKNOWN TYPE	The type of resume tpipe cannot be determined.

Rtpipe Cmds

The number of resume tpipe commands issued by the remote client during the session.

Msgs Received

The total number of messages received during the session.

Client NACKs

For the session, the number of messages received by the resume tpipe to which the remote client responded with a negative acknowledgment (NAK) response.

ICON NACKs

The number of messages received by the resume tpipe where the remote client failed to provide a response so IMS Connect responded for the client with a NAK response. The reason for the client's failure to respond is usually that the client session is no longer available.

Rtpipe CANCELs

The number of times the client sent a cancellation request for a resume tpipe request, that is the number of times a resume tpipe request contained IRM flag IRM_F3_CANCID.

Timeout Count

The number of timeouts received during the life of the session. Rtpipe type and Session Type have a large influence on this value. If a resume tpipe command has a timer value of 'wait forever', this value will always be 0.

Note: A timeout received for an ACK or NAK message is not counted, because a timeout for ACK or NAK is normal.

Average TO Value

If any timeouts occurred, this is the average timeout value for all of those timeouts. Normally, only one timeout value is used for the session. If no timeouts are observed during the session, Average TO Value is blank.

Timeouts No Msg

The number of times that no response was returned before the resume tpipe ended because of a timeout. If no timeouts occurred, Timeouts No Msg is blank.

Timeouts Max Msgs

The maximum number of concurrent messages that were returned by the resume tpipe request before the request ended with a timeout. If no timeouts occurred, Timeouts Max Msgs is blank.

Connect ACK/NAK report

The IMS Connect ACK/NAK report provides a summary of acknowledgement activity for transactions that use Sync Level=CONFIRM. Positive acknowledgement (ACK) and negative acknowledgement (NAK) statistics are reported for each transaction code.

NAK is further broken down as negative acknowledgement from either OTMA (NAK sense code) or from the Client.

The report can optionally be summarized by time interval.

IMS Connect event records

The Connect ACK/NAK report is derived from IMS Connect event records 3D, 41, and 42, and requires IMS Connect Extensions to collect event data at collection level 2, 3 or 4.

If the IMS Connect Extensions collection level is 0 or 1, the report displays the message:

No observations in report period

Table 31. Connect ACK/NAK report: event records processed

Code (hex)	Event description	Collection level
3D	Message Exit called for READ, XMIT, EXER	2
41	Message sent to OTMA	2
42	Message received from OTMA	2

Report options

To specify the report options, select the Resource Usage **ACK/NAK** report in an IMS Connect Report Set.

The command for the Connect ACK/NAK report is:

```
IMSPACEX    ACKN(
             DDNAME(ACKNAK),
             INTERVAL(00:01:00),
             INCL|EXCL(TRANCODE(tran1,tran2,...)),
             INCL|EXCL(USERID(userid1,userid2,...)),
```

```

                                INCL|EXCL(DATASTORE(imsid1,imsid2,...)),
                                INCL|EXCL(CLIENT(clientid1,clientid2,...)),
                                INCL|EXCL(PORT(portnum1,portnum2,...)))
IMSPACEX      EXECUTE

```

Selection Criteria can be specified to filter the input data on one or more of the following:

- Transaction Code
- User ID
- Target Datastore (IMS ID)
- Connect Client ID
- TCP/IP Port Number

The report output is written to the data set specified by the Report Output DDname. The default is ACKNAK.

You can also specify the time interval if you want to summarize the details over time. The default interval is 00:01:00 (1 minute).

Report content

The Connect ACK/NAK report is shown in the following examples.

This report was produced by the command:

```

IMSPACEX      ACKN
IMSPACEX      EXECUTE

```

IMS Performance Analyzer 4.4									
IMS Connect ACK/NAK - DVPCFGDA									
From 15Mar2018 10.48.30.65 To 15Mar2018 12.17.12.19									
Page 1									
Transact	Target	Confirm	----- ACK -----		--- Client NAK ---		--- OTMA NAK ---		
Code	Datastor	Count	Count	Avg Elaps	Count	Avg Elaps	Count	Sense Code	
*CMD_RHQ	IMD3	16	16	1.890	0	0.000	0		
*CMD_RHQ	IMD4	22	22	0.419	0	0.000	0		
*CMD_RTP	IMD3	16	16	0.336	0	0.000	0		
*CMD_RTP	IMD4	18	17	0.367	1	7.388	0		
DSPALLI	IMD3	4	3	270.434	1	275.011	0		
DSPALLI	IMD4	1	0	0.000	1	263.518	0		
DVPTRAN5	IMD3	13	12	1.111.570	1	600.739	0		
DVPTRAN5	IMD4	2	1	379.666	0	0.000	1	24	Previous conversation still in progress
IVTCV	IMD3	79	74	600.214	1	594.968	4	24	Previous conversation still in progress
IVTCV	IMD4	79	77	2.157.328	0	0.000	2	24	Previous conversation still in progress
IVTNO	IMD3	46	24	322.746	22	234.673	0		
IVTNO	IMD4	46	27	291.475	19	292.862	0		
PART	IMD3	2	2	270.814	0	0.000	0		
PART	IMD4	4	4	253.487	0	0.000	0		

Figure 307. Connect ACK/NAK report

The following figure shows another example of the Connect ACK/NAK report, summarized by time. It was produced by the command:

```

IMSPACEX      ACKN(
                DDNAME(ACKNAK),
                INTERVAL(00:30:00))
IMSPACEX      EXECUTE

```

Time 19Apr	Transact Code	Target Datastor	Confirm Count	----- ACK ----- Count Avg Elaps	--- Client NAK --- Count Avg Elaps	--- OTMA NAK --- Count Sense Code
12.00.00	PART	IMD3	1	0 0.000	0 0.000	1 1A Message cancelled due to IMS error
12.30.00	PART	IMD3	3	3 2.641.491	0 0.000	0
13.00.00	*CMD_RHQ	IMD3	10	10 0.491	0 0.000	0
	*CMD_RHQ	IMD4	10	10 0.323	0 0.000	0
	*CMD_RTP	IMD3	8	8 0.293	0 0.000	0
	*CMD_RTP	IMD4	8	8 0.361	0 0.000	0
	DSPALLI	IMD3	1	1 271.069	0 0.000	0
	DSPALLI	IMD4	1	1 217.887	0 0.000	0
	DVPTRANS	IMD3	2	0 0.000	2 255.411	0
	IVTCV	IMD3	12	12 539.974	0 0.000	0
	IVTCV	IMD4	24	24 532.329	0 0.000	0
	IVTNO	IMD3	39	23 295.765	16 283.045	0
	IVTNO	IMD4	40	22 289.355	18 275.520	0
	PART	IMD3	1	1 264.872	0 0.000	0
	PART	IMD4	3	3 262.159	0 0.000	0
13.30.00	*CMD_RTP	IMD4	4	4 0.373	0 0.000	0
14.00.00	*CMD_RHQ	IMD3	10	10 0.395	0 0.000	0
	*CMD_RHQ	IMD4	7	7 0.386	0 0.000	0
	*CMD_RTP	IMD3	20	20 0.361	0 0.000	0
	*CMD_RTP	IMD4	2	2 0.436	0 0.000	0
	IVTNO	IMD3	17	9 285.427	8 279.122	0
	IVTNO	IMD4	21	9 290.922	12 220.995	0
14.30.00	DVPTRANS	IMD3	3	2 417.480	1 596.575	0
	DVPTRANS	IMD4	3	2 409.241	1 596.693	0
15.00.00	*CMD_RHQ	IMD3	4	4 0.395	0 0.000	0
	*CMD_RHQ	IMD4	4	4 45.767	0 0.000	0
	*CMD_RTP	IMD3	6	6 0.358	0 0.000	0
	*CMD_RTP	IMD4	6	6 0.337	0 0.000	0
	DVPTRANS	IMD3	8	6 2.568.341	2 1.631.982	0
	DVPTRANS	IMD4	9	7 895.849	2 1.152.072	0
	ID=EXAMP	IMD3	3	0 0.000	0 0.000	3 1A Message cancelled due to IMS error
	ID=EXAMP	IMD4	3	0 0.000	0 0.000	3 1A Message cancelled due to IMS error

Figure 308. Connect ACK/NAK report, summarized by time

In the report heading, **From** is the time stamp of the first record reported and **To** is the time stamp of the last record reported.

The report contains the following information:

Time Report interval time. Optional, and will not be displayed if INTERVAL is not specified, in which case the data is summarized for the whole of the report period.

Transact Code
Transaction Code.

Target Datastor
The target datastore.

Confirm Count
The total number of Sync Level=CONFIRM transactions.

ACK Count
The total number of transactions that completed with a positive acknowledgement (ACK).

ACK Avg Elaps
The average time for ACK to be received from the Client.

Client NAK Count
The total number of transactions where the client returned a NAK response.

Client NAK Avg Elaps

The average time for NAK to be received from the client.

OTMA NAK Count

The total number of transactions that completed with a negative acknowledgement (NAK) due to a problem in OTMA.

OTMA NAK Sense Code

The sense code returned in the NAK from OTMA. The OTMA sense codes for NAK messages are listed in “OTMA NAK sense codes” on page 622. For more information, refer to the section “OTMA Sense Codes for NAK Messages” in the *IMS Open Transaction Manager Access Guide and Reference*.

Connect Exception Events report

The IMS Connect Exception Events report provides details about events that cause transactions to fail or that signal critical resources are no longer available.

The List report provides a list (in chronological order) of all exception events.

The Summary report provides a recap of each exception event encountered and a count of the number of times it occurred.

IMS Connect event records

The Connect Exception Events report is derived from IMS Connect event records 10, 11, 12, 13, 2D, 3E, 41, 42, 45, 47, 55. The report requires IMS Connect Extensions to collect event data at collection level 3 or 4.

Otherwise, if collection level 0, 1 or 2, the report is produced with just the record types that are available.

Table 32. Connect Exception report: event records processed

Code (hex)	Event description	Collection level
10	Datastore available	0
11	Datastore unavailable	0
12	TMEMBER joins XCF Group	0
13	TMEMBER leaves XCF Group	0
2D	Datastore status	1
3E	Message Exit returned from READ, XMIT, EXER	1
41	Message sent to OTMA	2
42	Message received from OTMA	2
45	OTMA Timeout	1
47	Session Error	1
55	End RRS COMMIT/ABORT	3

Report options

To specify the report options, select the Resource Usage **Exception Events** report in an IMS Connect Report Set.

The command for the Connect Exception Events report is:

```

IMSPACEX      EXCEPT(
                [DDNAME(ddname),]          default EXCEPT
                [LIST,]
                [SUMMARY]
IMSPACEX      EXECUTE

```

The report output is written to the data set specified by the Report Output DDname. The default is EXCEPT.

Request the List report, Summary report, or both. The Summary report is the default.

Report content: List

The following figure shows an example of the Connect Exception Events List report.

The report was produced by the command:

```

IMSPACEX      EXCEPT(
                LIST,
                DDNAME(EXCEPT))
IMSPACEX      EXECUTE

```

IMS Performance Analyzer 4.4						Page	1
IMS Connect Exception List						Start Time	
Report from 14Feb2018 13.16.30.01						Information	
Event Time	System	ID	Description				
13.16.30.010476	HWSDVP3	41	Client send NAK to OTMA	Key=BE5D1498C463BF01	DS=XCFMIMD3	Tpipe=TRRBS001	13.16.28.672849
				RSN=0000			
13.16.30.011067	HWSDVP3	47	Session error	Key=C5E5D5E340404040	Type=LATEMSG		
13.16.30.011078	HWSDVP3	41	Client send NAK to OTMA	Key=C5E5D5E340404040	DS=XCFMIMD3	Tpipe=TRRBS001	
				RSN=0000			
13.16.30.261476	HWSDVP3	45	OTMA time-out	Key=BE5D1498C463BF01	TOV=19		13.16.28.672849
13.16.39.371599	HWSDVP3	41	Client send NAK to OTMA	Key=BE5D14A0B93A7823	DS=XCFMIMD3	Tpipe=TRRBS001	13.16.37.015926
				RSN=0000			
13.16.39.622329	HWSDVP3	45	OTMA time-out	Key=BE5D14A0B93A7823	TOV=19		13.16.37.015926
13.17.03.259086	HWSDVP3	45	OTMA time-out	Key=BE5D14B72642A442	TOV=19		13.17.00.530991
13.17.11.363930	HWSDVP3	45	OTMA time-out	Key=BE5D14BF7DAED723	TOV=19		13.17.09.278995
13.17.37.141184	HWSDVP3	41	Client send NAK to OTMA	Key=BE5D14D8E3EB7E42	DS=XCFMIMD3	Tpipe=TRRBS001	13.17.35.912771
				RSN=0000			
13.17.37.392280	HWSDVP3	45	OTMA time-out	Key=BE5D14D8E3EB7E42	TOV=19		13.17.35.912771
13.17.43.453120	HWSDVP3	41	Client send NAK to OTMA	Key=BE5D14DF0A32D141	DS=XCFMIMD3	Tpipe=TRRBS001	13.17.42.359416
				RSN=0000			
13.17.43.703713	HWSDVP3	45	OTMA time-out	Key=BE5D14DF0A32D141	TOV=19		13.17.42.359416
13.18.05.716687	HWSDVP3	45	OTMA time-out	Key=BE5D14F15AF40203	TOV=19		13.18.01.564537
13.18.23.895207	HWSDVP3	41	Client send NAK to OTMA	Key=BE5D15056879FF61	DS=XCFMIMD3	Tpipe=TRRBS001	13.18.22.591216
				RSN=0000			
13.18.24.145457	HWSDVP3	45	OTMA time-out	Key=BE5D15056879FF61	TOV=19		13.18.22.591216
13.18.31.817110	HWSDVP3	41	Client send NAK to OTMA	Key=BE5D150D124FF621	DS=XCFMIMD3	Tpipe=TRRBS001	13.18.30.627097
				RSN=0000			
13.18.32.067250	HWSDVP3	45	OTMA time-out	Key=BE5D150D124FF621	TOV=19		13.18.30.627097
13.18.44.954398	HWSDVP3	3E	Exit failed	Key=BE5D15174B4AE560	Function=EXER RC=04	RSN=00	13.18.41.346220
13.18.44.960481	HWSDVP3	47	Session error	Key=BE5D15174B4AE560	Type=WRITE		13.18.41.346220
13.18.44.960903	HWSDVP3	41	Client send NAK to OTMA	Key=BE5D15174B4AE560	DS=XCFMIMD3	Tpipe=TRRBS001	13.18.41.346220
				RSN=0000			
13.19.45.825241	HWSDVP3	45	OTMA time-out	Key=BE5D154E89087563	TOV=19		13.19.39.270563
13.21.06.826389	HWSDVP3	41	Client send NAK to OTMA	Key=BE5D15A0F35EF603	DS=XCFMI9D1	Tpipe=TRRBS001	13.21.05.689495
				RSN=0000			
13.21.06.827276	HWSDVP3	47	Session error	Key=C5E5D5E340404040	Type=LATEMSG		
13.21.06.827287	HWSDVP3	41	Client send NAK to OTMA	Key=C5E5D5E340404040	DS=XCFMI9D1	Tpipe=TRRBS001	
				RSN=0000			
13.21.07.076309	HWSDVP3	45	OTMA time-out	Key=BE5D15A0F35EF603	TOV=19		13.21.05.689495
13.21.15.394403	HWSDVP3	41	Client send NAK to OTMA	Key=BE5D15A82FDE5F43	DS=XCFMI9D1	Tpipe=TRRBS001	13.21.13.277607
				RSN=0000			
13.21.15.645619	HWSDVP3	45	OTMA time-out	Key=BE5D15A82FDE5F43	TOV=19		13.21.13.277607
13.21.32.882603	HWSDVP3	45	OTMA time-out	Key=BE5D15B968132220	TOV=19		13.21.31.333207
13.21.37.689221	HWSDVP3	45	OTMA time-out	Key=BE5D15BE4A38BD40	TOV=19		13.21.36.453787

Figure 309. Connect Exception Events List report

In the report heading, **From** is the time stamp of the first record reported on that page.

The report contains the following information:

Event Time

Time that the exception event occurred.

ID, Description

Record ID and description of the exception event. See “Exception events” for the list of IMS Connect exception codes and descriptions.

Information

Information from the exception record identifying the reason for the exception.

Start Time

Time that the transaction started, usually the 3C event, to allow correlation with the Transit Log report.

Report content: Summary

The following figure shows an example of the Connect Exception Events Summary report.

The report was produced by the command:

```
IMSPACEX      EXCEPT(  
                SUMMARY,  
                DDNAME(EXCEPT))  
IMSPACEX      EXECUTE
```

IMS Performance Analyzer 4.4			Page 3	
IMS Connect Exception Summary - HWSVDP3				
From 14Feb2018 13.16.30.01 To 14Feb2018 13.25.22.34				
ID	Description	Total		
11	Datastore Un-Available	3		
13	TMember leaves XCF group	3		
3E	Exit failed - EXER	1		
41	Client send NAK to OTMA	15		
45	OTMA time-out	21		
47	Session error	3		

Figure 310. Connect Exception Events Summary report

The Exception Summary report totals the occurrences the exception events that are detailed in the Exception Event List report. For a description of the exception events, see “Exception events.”

Exception events

The following figure lists the exception codes and description.

- 10 Datastore Available failed
- 11 Datastore Un-Available
- 12 TMember joins XCF group failed
- 13 TMember leaves XCF group
- 2D Datastore status (Severe, Warning, Normal)
- 3E Exit failed (return code \geq 4)
 - READ, XMIT or EXER
- 41 Client sent NAK to OTMA (Client)
- 42 Msg from OTMA response is NAK (OTMA)
 - OTMA NAK Sense Codes:
 - 01 OTMA sign-on not established
 - 02 Client cannot send/receive messages
 - 03 State-data or XCF length error
 - 04 Bad correlator
 - 05 Multi-segment message duplicated
 - 06 Bad XCF return code
 - 07 Maximum (255) clients reached
 - 08 Client-bid security request failed
 - 09 Invalid OTMA command
 - 0A OTMA data message not allowed
 - 0B Invalid message type
 - 0C Unknown response type
 - 0D Nonexistent Tpipe for continuation
 - 0E Unable to create Tpipe
 - 0F Tpipe is stopped
 - 10 No State data
 - 11 Commit message was not to terminate
 - 12 Prefix (4KB) too large
 - 13 Hash table size not set
 - 14 Second client-bid sent, first still active
 - 15 Hash table storage allocation failed
 - 16 Client not active
 - 17 Invalid SYNC level
 - 18 Invalid Tpipe name
 - 19 Invalid Client name
 - 1A Message cancelled due to IMS error
 - 1B IMS is shut down
 - 1C Invalid Commit Mode
 - 1D User data too long (1K)
 - 1E Server user data too long (256)
 - 1F Sequence number mis-match
 - 20 No Application data
 - 21 No Chain flag
 - 22 Tpipe not found
 - 23 Sequence number invalid
 - 24 Previous conversation still in progress
 - 25 RESYNC Protocol violation
 - 26 RESYNC Dequeue failed
 - 27 RESYNC RSN reset failed
 - 2C Invalid Commit Mode
 - 2D SYNC/Commit levels incompatible
 - 2E SYNC level/Context ID incompatible
 - 2F Unable to express context interest
- 45 OTMA time-out
- 47 Session error
- 55 RRS Abort

Figure 311. IMS Connect exception events

OTMA flood control notification

The Connect Exception Events List and Summary reports show OTMA flood control notification (Normal, Warning, Severe).

IMS Performance Analyzer 4.4 IMS Connect Exception List Report from 31Oct2014 10.58.44.49				Page 1
Event Time	System	ID Description	Information	Start Time
10.58.44.491376	RXRS01	2D Datastore status - Normal	Tmember=XCFMIADH DS=IMSA Status=0003	
10.58.44.491414	RXRS01	2D Datastore status - Normal	Tmember=XCFMIADH DS=IMSC Status=0003	
10.58.44.491461	RXRS01	2D Datastore status - Normal	Tmember=XCFMIADH DS=IMS1 Status=0003	
10.58.44.491494	RXRS01	2D Datastore status - Normal	Tmember=XCFMIADH DS=IMSD Status=0003	
10.58.46.393755	RXRS01	47 Session error	Key=C33932C0B0AABF40 Type=READ	10.58.46.393708
10.59.06.258067	RXRS01	47 Session error	Key=C33932D30B06C442 Type=READ	10.59.06.258052
11.08.58.546326	RXRS01	45 OTMA time-out	Key=C3393505A1FE3123 TOV=29	11.08.56.545431
11.09.01.554064	RXRS01	45 OTMA time-out	Key=C33935087FEF3563 TOV=29	11.08.59.551498
11.10.10.706948	RXRS01	45 OTMA time-out	Key=C339354A72EB4D42 TOV=29	11.10.08.706422
11.10.13.712224	RXRS01	45 OTMA time-out	Key=C339354D51301702 TOV=29	11.10.11.711103
11.10.14.717599	RXRS01	2D Datastore status - Warning	Tmember=XCFMIADH DS=IMSC Status=0002	
11.10.16.717683	RXRS01	45 OTMA time-out	Key=C33935502F10CA83 TOV=29	11.10.14.716413
11.10.19.761752	RXRS01	47 Session error	Key=C3393555F3679B20 Type=READ	11.10.19.761740
11.10.19.765351	RXRS01	47 Session error	Key=C3393505A1FE3123 Type=READFAIL	11.10.19.763609
11.17.55.146245	RXRS01	45 OTMA time-out	Key=C33937055FC7C220 TOV=29	11.17.53.144694
11.17.56.152306	RXRS01	2D Datastore status - Severe	Tmember=XCFMIADH DS=IMSC Status=0001	
11.17.58.151722	RXRS01	45 OTMA time-out	Key=C33937083DEB0943 TOV=29	11.17.56.149327
11.17.59.156126	RXRS01	42 Msg from OTMA response is NAK	Key=C339370B1B7D7401 DS=XCFMIADH Tpipe=7901 RSN=0030	11.17.59.155186
11.18.00.161388	RXRS01	42 Msg from OTMA response is NAK	Key=C339370C108CE320 DS=XCFMIADH Tpipe=7901 RSN=0030	11.18.00.159982
11.18.01.167143	RXRS01	42 Msg from OTMA response is NAK	Key=C339370D061D4862 DS=XCFMIADH Tpipe=7901 RSN=0030	11.18.01.166216
11.18.02.171974	RXRS01	42 Msg from OTMA response is NAK	Key=C339370DFBEEFB62 DS=XCFMIADH Tpipe=7901 RSN=0030	11.18.02.171351
11.18.02.173659	RXRS01	47 Session error	Key=C339370EF0DF1941 Type=READ	11.18.02.173646
11.18.02.179455	RXRS01	47 Session error	Key=C339369868312A63 Type=READFAIL	11.18.02.178011

Figure 312. Connect Exception Events List report: OTMA flood control notification

Datastore status is either:

- 3 Normal, available for work
- 2 Warning, partly degraded
- 1 Severe, no work possible
- 0 N/A, no status available

The following Summary report provides a tally of events in the List report.

IMS Performance Analyzer 4.4 IMS Connect Exception Summary - RXRS01 From 31Oct2014 10.58.44.49 To 31Oct2014 11.25.48.75				Page 3
ID Description	Total			
2D Datastore status - Severe	1			
2D Datastore status - Warning	1			
2D Datastore status - Normal	5			
42 Msg from OTMA response is NAK	4			
45 OTMA time-out	67			
47 Session error	479			

Figure 313. Connect Exception Events Summary report: OTMA flood control notification

Connect Gap Analysis report

The Connect Gap Analysis report contains information on periods of time where log records are not being cut, potentially highlighting an external system event that may have caused IMS Connect to slow down.

IMS Connect Gap Analysis records

The Connect Gap Analysis report is derived from all IMS Connect records.

Report options

To specify the report options, select **Gap Analysis** in the **Resource Usage Reports** category in an IMS Connect Report Set.

The command for the Connect Gap Analysis report is:

```
IMSPACEX      GAP(  
               [THRESHOLD(s.thmiju),]          default 5 seconds  
               [DDNAME(ddname),]              default GAPS  
               [FROM(date,time),]  
               [TO(date,time)])
```

The THRESHOLD defines the maximum elapsed time tolerated between records.

The report output is written to the data set specified by the Report Output DDname.

Report content

The IMS Connect Gap Analysis report is shown in the following examples.

This report was produced by the command:

```
IMSPACEX      GAP  
IMSPACEX      EXECUTE
```

IMS Performance Analyzer 4.4
Connect Gap Analysis

Data from: 11.27.44.75 05Jan2014

Page 1

ID	Time	System	Elapsed	File	LSN	Code
01	11.27.44.754378	HWSDVP4		CEX01001	000000000000357	A042
	11.31.03.317055	HWSDVP4	198.562677	CEX01001	000000000000358	A00B
02	11.31.04.452604	HWSDVP4		CEX01001	000000000000393	A048
	11.32.22.513427	HWSDVP4	78.060823	CEX01001	000000000000394	A00B
03	11.32.22.558075	HWSDVP4		CEX01001	000000000000387	A048
	11.32.29.498754	HWSDVP4	6.940679	CEX01001	0000000000003B8	A00B
04	11.32.29.552002	HWSDVP4		CEX01001	0000000000003DB	A048
	11.32.35.353008	HWSDVP4	5.801006	CEX01001	0000000000003DC	A00B
05	11.32.35.940236	HWSDVP4		CEX01001	000000000000417	A048
	11.32.41.496950	HWSDVP4	5.556714	CEX01001	000000000000418	A00B
06	11.32.41.810143	HWSDVP4		CEX01001	00000000000043B	A048
	11.32.48.408659	HWSDVP4	6.598516	CEX01001	00000000000043C	A00B
07	11.32.48.452941	HWSDVP4		CEX01001	00000000000045F	A041
	11.32.56.336764	HWSDVP4	7.883823	CEX01001	000000000000460	A00B
08	11.32.56.923920	HWSDVP4		CEX01001	00000000000049B	A048
	11.33.02.249826	HWSDVP4	5.325906	CEX01001	00000000000049C	A00B
09	11.33.02.542073	HWSDVP4		CEX01001	0000000000004BF	A048
	11.33.08.381770	HWSDVP4	5.839697	CEX01001	0000000000004C0	A00B
10	11.33.08.430478	HWSDVP4		CEX01001	0000000000004E3	A048
	11.33.14.390950	HWSDVP4	5.960472	CEX01001	0000000000004E4	A00B
11	11.33.20.740175	HWSDVP4		CEX01001	000000000000573	A048
	11.33.25.754299	HWSDVP4	5.014124	CEX01001	000000000000574	A00B
12	11.33.26.634734	HWSDVP4		CEX01001	0000000000005C7	A048
	11.34.04.696980	HWSDVP4	38.062246	CEX01001	0000000000005C8	A00B
13	11.34.05.319027	HWSDVP4		CEX01001	0000000000005DE	A048
	11.34.11.104625	HWSDVP4	5.785598	CEX01001	0000000000005DF	A00B
14	11.34.11.363457	HWSDVP4		CEX01001	0000000000005F5	A048
	11.34.46.938543	HWSDVP4	35.575086	CEX01001	0000000000005F6	A00B
15	11.34.55.623323	HWSDVP4		CEX01001	000000000000633	A048
	11.38.51.335787	HWSDVP4	235.712464	CEX01001	000000000000634	A00B
16	11.38.52.240990	HWSDVP4		CEX01001	000000000000660	A048
	11.39.12.909529	HWSDVP4	20.668539	CEX01001	000000000000661	A00B
17	11.39.13.058722	HWSDVP4		CEX01001	00000000000068D	A048
	11.40.57.181321	HWSDVP4	104.122599	CEX01001	00000000000068E	A00B
18	11.40.57.319216	HWSDVP4		CEX01001	0000000000006BA	A048
	11.41.18.684265	HWSDVP4	21.365049	CEX01001	0000000000006BB	A00B
19	11.41.18.821691	HWSDVP4		CEX01001	0000000000006E7	A048
	11.41.58.776159	HWSDVP4	39.954468	CEX01001	0000000000006E8	A00B
20	11.41.58.895777	HWSDVP4		CEX01001	000000000000714	A048
	11.44.54.009340	HWSDVP4	175.113563	CEX01001	000000000000715	A00B
21	11.44.54.010422	HWSDVP4		CEX01001	00000000000071B	A041
	11.46.22.891509	HWSDVP4	88.881087	CEX01001	00000000000071C	A045
22	11.46.22.892020	HWSDVP4		CEX01001	000000000000722	A048
	11.49.15.112911	HWSDVP4	172.220891	CEX01001	000000000000723	A00B
23	11.49.15.113532	HWSDVP4		CEX01001	000000000000729	A041
	11.50.43.993680	HWSDVP4	88.880148	CEX01001	00000000000072A	A045
24	11.50.43.994182	HWSDVP4		CEX01001	000000000000730	A048
	11.52.13.451767	HWSDVP4	89.457585	CEX01001	000000000000731	A011
25	11.52.13.451808	HWSDVP4		CEX01001	000000000000732	A042
	11.52.47.517609	HWSDVP4	34.065801	CEX01001	000000000000733	A042
26	11.52.47.517609	HWSDVP4		CEX01001	000000000000733	A042
	12.00.32.648129	HWSDVP4	465.130520	CEX01001	000000000000734	A011

Figure 314. IMS Connect Gap Analysis report

Connect Trace reports

The Connect Trace reports provide detailed analyses of individual IMS Connect event records. Trace reports are typically used to investigate point in time performance problems because they provide all available information.

To focus on the desired problem area or to minimize the size of the report, specify date/time range and/or Selection Criteria.

Connect Transit Event Trace report

The IMS Connect Trace provides a list of transactions, each with detailed information about every event in the life of that transaction.

At a glance, you can see when a transaction starts, followed by all the events associated with the transaction in the order they occurred.

IMS Connect event records

The Connect Transit Event Trace report is derived from all the message related event records. The report requires IMS Connect Extensions to collect event data at collection level 4.

Otherwise:

- If collection level 3, the report is produced without level 4 fields.
- If collection level 2, the report is produced without level 3 and 4 fields.
- If collection level 0 or 1, the report displays the message:

No observations in report period

For a list of the message related event records, see Chapter 13, “IMS Connect records,” on page 615.

Report options

To specify the report options, select the **Transit Event Trace** report in an IMS Connect Report Set.

The command for the Connect Transit Event Trace report is:

```
IMSPACEX      TRACE(
                [DDNAME(ddname),]          default TRACE
                [INCL(TRANCODE(list))|EXCL(TRANCODE(list)),]
                [INCL(USERID(list))|EXCL(USERID(list)),]
                [INCL(DATASTORE(list))|EXCL(DATASTORE(list)),]
                [INCL(CLIENT(list))|EXCL(CLIENT(list)),]
                [INCL(PORT(list))|EXCL(PORT(list))])
IMSPACEX      EXECUTE
```

Selection Criteria can be specified to filter the input data on one or more of the following:

- Transaction Code
- User ID
- Target Datastore (IMS ID)
- Connect Client ID
- TCP/IP Port Number

The report output is written to the data set specified by the Report Output DDname. The default is TRACE.

Report content

The following fields appear in the report.

Start/+Relative

For the start or resumption of a transaction/command, the starting time of day is reported, in hh.mm.ss.thmiju format. For other transaction events, the elapsed time relative to the start of the transaction is reported, in +h.mm.ss.thmiju format.

Elapsed

The starting event of the transaction/command is identified with *Start*. The elapsed time (in microseconds) since the previous event, in s.thm.iju format. When too much trace data has been collected, IMS PA flushes

(prints) the trace data for the incomplete transaction. The resumption of the transaction is identified with *Resume*.

ID and Description

The record ID and associated description of the event. Refer to the *IMS Connect Extensions for z/OS: User's Guide* for an explanation of Connect events.

Information

Information about the event. This information is recorded in the event record for that event type. Note that identification information about the transaction is not reported until the "3E Message Exit return for READ" event. This is because the Read Message Exit can alter most of the identifying characteristics of the transaction.

For *Start* (the Starting event), additional information is reported:

Key= The Event Key (STCK Token) for the transaction.

Depth=

Port depth. The number of active sockets open on this Port when the transaction started.

Error= This is reported if an error occurred processing the transaction, for example a NAK, bad return code or timeout.

Trace output varies depending on the type of transaction. Some examples follow.

Example 1: Non-conversational transaction with Sync Level=NONE:

This Connect Trace report shows a non-conversational transaction with Sync Level=NONE.

Start/+Relative	Elapsed	ID Description	Information
11.05.05.216870	*Start*	3C Prepare Read Socket	Key=BAEB9BCE665D5380 Depth=1 Port=8801 Sock=1
+0.232473	232.473	49 Read Socket	Port=8801 Sock=1
(2) +0.232862	0.388	49 Read Socket	Port=8801 Sock=1
+0.232951	0.089	3D Message Exit called for READ	Exit=HWSSMPL0
+0.233083	0.131	3E Message Exit return for READ	RC=00 RSN=00 IP=172.17.69.58 DSOrg=IMD4 DSTarg=IMD3 TC=PART
(3) +0.233324	0.241	41 Message sent to OTMA	Commit Mode=0 Synch Level=NONE Socket Type=Transaction
+0.268991	35.666	42 Message received from OTMA	TPipe=8801 MSG=Transaction
(4) +0.269048	0.057	42 Message received from OTMA	TPipe=8801 MSG=Data Sense=0000
+0.269294	0.246	46 De-allocate Session	RSN=COMT
+0.269388	0.094	3D Message Exit called for XMIT	Exit=HWSSMPL0
+0.269504	0.115	3E Message Exit return for XMIT	RC=00 RSN=00
+0.270171	0.666	4A Write Socket	Port=8801 Sock=1
+0.270382	0.211	0C Begin Close Socket	Port=8801 Sock=1
+0.270889	0.506	0D End Close Socket	Port=8801 Sock=1
(5) +0.271035	0.145	48 Trigger event	Trigger=CLOSE

Figure 315. Connect Trace: Non-conversational transaction with Sync Level=NONE

The Transit times for SyncLevel=NONE are:

Read Socket

The elapsed time spent processing Read Socket requests. In this example, Read Socket elapsed time is calculated as:

$$(2) - *Start* = 0.232862 \text{ seconds}$$

Input The elapsed time prior to the transaction message being sent to OTMA for processing. In the example, Input time is calculated as:

(3) - *Start* = 0.233324 seconds

OTMA

The elapsed time OTMA spent processing the transaction message. In the example, OTMA time is calculated as:

(4) - (3) = 0.035724 seconds

Output

The elapsed time after the transaction message has been processed by OTMA to the end Trigger event. In the example, Output time is calculated as:

(5) - (4) = 0.001987 seconds

Response

The total elapsed time spent processing the transaction message, from the starting Read Prepare to the end Trigger event. In the example, Response time is calculated as:

(5) - *Start* = 0.271035 seconds

Example 2: Non-conversational transaction with Sync Level=CONFIRM:

This Connect Trace report shows a non-conversational transaction with Sync Level=CONFIRM.

Start/+Relative	Elapsed	ID Description	Information
11.08.21.065957	*Start*	3C Prepare Read Socket	Key=BAEB9C892D12FF80 Depth=1 Port=8801 Sock=1
(2) +0.000264	0.264	49 Read Socket	Port=8801 Sock=1
+0.000289	0.024	3D Message Exit called for READ	Exit=HWSSMPL0
+0.000507	0.218	3E Message Exit return for READ	RC=00 RSN=00 IP=172.17.69.58 DSOrig=IMD3 DSTarg=IMD4 TC=PART Commit Mode=0 Synch Level=CONFIRM Socket Type=Transaction TPIPE=8801 MSG=Transaction
(3) +0.000684	0.176	41 Message sent to OTMA	TPIPE=8801 MSG=Data Sense=0000
(4) +0.021744	21.060	42 Message received from OTMA	Exit=HWSSMPL0
+0.022091	0.347	3D Message Exit called for XMIT	RC=00 RSN=00
+0.022210	0.118	3E Message Exit return for XMIT	Port=8801 Sock=1
(5) +0.023116	0.906	4A Write Socket	Port=8801 Sock=1
+0.026614	3.497	49 Read Socket	Port=8801 Sock=1
+0.283315	256.701	49 Read Socket	Port=8801 Sock=1
(6) +0.284262	0.946	49 Read Socket	Port=8801 Sock=1
+0.284291	0.029	3D Message Exit called for READ	Exit=HWSSMPL0
+0.284408	0.117	3E Message Exit return for READ	RC=00 RSN=00 IP=172.17.69.58 DSOrig=IMD3 DSTarg=IMD4 TC=PART Commit Mode=0 Synch Level=CONFIRM Socket Type=Transaction TPIPE=8801 MSG=Response RESP=ACK
(7) +0.284674	0.265	41 Message sent to OTMA	TPIPE=8801 MSG=Commit Conf CONFIRM=Committed Sense=0000
(8) +0.287880	3.206	42 Message received from OTMA	RSN=COMT
+0.288124	0.243	46 De-allocate Session	Exit=HWSSMPL0
+0.288158	0.034	3D Message Exit called for XMIT	RC=00 RSN=00
+0.288263	0.104	3E Message Exit return for XMIT	Port=8801 Sock=1
+0.288792	0.529	4A Write Socket	Port=8801 Sock=1
+0.288902	0.110	0C Begin Close Socket	Port=8801 Sock=1
+0.289378	0.475	0D End Close Socket	Port=8801 Sock=1
(9) +0.289409	0.030	48 Trigger event	Trigger=CLOSE

Figure 316. Connect Trace: Non-conversational transaction with Sync Level=CONFIRM

The Transit times for SyncLevel=CONFIRM are:

Read Socket

The elapsed time spent processing Read Socket requests. In this example, Read Socket elapsed time is calculated as:

(2) - *Start* + (6)-(5) = 0.261410 seconds

Input

The elapsed time prior to the transaction message being sent to OTMA for processing. In the example, Input time is calculated as:

(3) - *Start* = 0.000684 seconds

OTMA

The elapsed time OTMA spent processing the transaction message, In the example, OTMA time is calculated as:

$$[(4) - (3)] + [(8) - (7)] = 0.024266 \text{ seconds}$$

Confirm

The elapsed time after the transaction message has been processed by OTMA to the time when OTMA is sent the acknowledgement from the Client. In the example, Confirm time is calculated as:

$$(7) - (4) = 0.262930 \text{ seconds}$$

Output

The elapsed time after the response has been acknowledged by OTMA to the end Trigger event. In the example, Output time is calculated as:

$$(9) - (8) = 0.001529 \text{ seconds}$$

Response

The total elapsed time spent processing the transaction message, from the starting Read Prepare to the end Trigger event. In the example, Response time is calculated as:

$$(9) - *Start* = 0.289409 \text{ seconds}$$

Example 3: Conversational transaction with Sync Level=CONFIRM:

This example shows a Connect Trace report for a conversational transaction with Sync Level=CONFIRM. Each conversation is terminated with a CONV Trigger event. Subsequent transactions within the conversation re-use the same Event Key (STCK Token) until the conversation ends with a CLOSE Trigger event.

Start/+Relative	Elapsed	ID Description	Information
10.48.44.439308	*Start*	3C Prepare Read Socket	Key=BAEB98270EBC5C00 Depth=1 Port=8801 Sock=2
+0.231140	231.140	49 Read Socket	Port=8801 Sock=2
(2) +0.232164	1.023	49 Read Socket	Port=8801 Sock=2
+0.232247	0.082	3D Message Exit called for READ	Exit=HWSSMPL0
+0.232382	0.134	3E Message Exit return for READ	RC=00 RSN=00 IP=172.17.69.58 DSOrg=IMD3 DSTarg=IMD3 TC=DVPTRAN5 Commit Mode=0 Synch Level=CONFIRM Socket Type=Transaction
(3) +0.233365	0.983	41 Message sent to OTMA	TPipe=8801 MSG=Transaction
(4) +0.378869	145.504	42 Message received from OTMA	TPipe=8801 MSG=Data Sense=0000
+0.379405	0.535	3D Message Exit called for XMIT	Exit=HWSSMPL0
+0.392986	13.581	3E Message Exit return for XMIT	RC=00 RSN=00
+0.393705	0.719	4A Write Socket	Port=8801 Sock=2
+0.398958	5.252	49 Read Socket	Port=8801 Sock=2
+0.636919	237.961	49 Read Socket	Port=8801 Sock=2
+0.637439	0.519	49 Read Socket	Port=8801 Sock=2
+0.637520	0.081	3D Message Exit called for READ	Exit=HWSSMPL0
+0.637636	0.115	3E Message Exit return for READ	RC=00 RSN=00 IP=172.17.69.58 DSOrg=IMD3 DSTarg=IMD3 TC=DVPTRAN5 Commit Mode=0 Synch Level=CONFIRM Socket Type=Transaction
+0.638673	1.036	41 Message sent to OTMA	TPipe=8801 MSG=Response RESP=ACK
+0.638705	0.032	48 Trigger event	Trigger=CONV
10.48.48.403977	*Start*	3C Prepare Read Socket	Key=BAEB98270EBC5C00 Depth=1 Port=8801 Sock=2
+0.000357	0.357	49 Read Socket	Port=8801 Sock=2
+0.000385	0.028	3D Message Exit called for READ	Exit=HWSSMPL0
+0.000499	0.114	3E Message Exit return for READ	RC=00 RSN=00 IP=172.17.69.58 DSOrg=IMD3 DSTarg=IMD3 TC=DVPTRAN5 Commit Mode=0 Synch Level=CONFIRM Socket Type=Transaction
+0.000725	0.225	41 Message sent to OTMA	TPipe=8801 MSG=Data
+0.014572	13.847	42 Message received from OTMA	TPipe=8801 MSG=Data Sense=0000
+0.028225	13.652	3D Message Exit called for XMIT	Exit=HWSSMPL0
+0.028351	0.126	3E Message Exit return for XMIT	RC=00 RSN=00
+0.029211	0.859	4A Write Socket	Port=8801 Sock=2
+0.334659	305.448	49 Read Socket	Port=8801 Sock=2
+0.634250	299.591	49 Read Socket	Port=8801 Sock=2
+0.634544	0.293	49 Read Socket	Port=8801 Sock=2
+0.634632	0.088	3D Message Exit called for READ	Exit=HWSSMPL0
+0.634750	0.118	3E Message Exit return for READ	RC=00 RSN=00 IP=172.17.69.58 DSOrg=IMD3 DSTarg=IMD3 TC=DVPTRAN5 Commit Mode=0 Synch Level=CONFIRM Socket Type=Transaction
+0.634991	0.240	41 Message sent to OTMA	TPipe=8801 MSG=Response RESP=ACK
+0.636500	1.509	42 Message received from OTMA	TPipe=8801 MSG=Commit Conf CONFIRM=Committed Sense=0000
+0.636664	0.163	46 De-allocate Session	RSN=COMT
+0.636757	0.093	3D Message Exit called for XMIT	Exit=HWSSMPL0
+0.636860	0.102	3E Message Exit return for XMIT	RC=00 RSN=00
+0.637404	0.543	4A Write Socket	Port=8801 Sock=2
+0.637513	0.109	0C Begin Close Socket	Port=8801 Sock=2
+0.637986	0.472	0D End Close Socket	Port=8801 Sock=2
+0.638017	0.030	48 Trigger event	Trigger=CLOSE

Figure 317. Connect Trace: Conversational transaction with Sync Level=CONFIRM

Example 4: Transaction where Client returned NAK:

This Connect Trace report shows a negative acknowledgement from the Client back to IMS Connect and then back to OTMA.

Start/+Relative	Elapsed	ID Description	Information
10.55.00.374669	*Start*	3C Prepare Read Socket	Key=BAEB998A344C1B80 Error=Client NAK Depth=1 Port=8801 Sock=1
+0.000295	0.295	49 Read Socket	Port=8801 Sock=1
+0.000368	0.072	3D Message Exit called for READ	Exit=HWSSMPL0
+0.000420	0.052	3E Message Exit return for READ	RC=00 RSN=00 IP=172.17.69.58 DSOrig=IMD3 DSTarg=IMD3 TC=IVTCV Commit Mode=0 Synch Level=CONFIRM Socket Type=Transaction TPipe=8801 MSG=Data
+0.000636	0.215	41 Message sent to OTMA	TPipe=8801 MSG=Data Sense=0000
+0.025960	25.324	42 Message received from OTMA	Exit=HWSSMPL0
+0.026227	0.267	3D Message Exit called for XMIT	RC=00 RSN=00
+0.026343	0.115	3E Message Exit return for XMIT	Port=8801 Sock=1
+0.026971	0.627	4A Write Socket	Port=8801 Sock=1
+0.333724	306.753	49 Read Socket	Port=8801 Sock=1
+0.620193	286.468	49 Read Socket	Port=8801 Sock=1
+0.620559	0.366	49 Read Socket	Port=8801 Sock=1
+0.620587	0.027	3D Message Exit called for READ	Exit=HWSSMPL0
+0.620706	0.118	3E Message Exit return for READ	RC=00 RSN=00 IP=172.17.69.58 DSOrig=IMD3 DSTarg=IMD3 TC=IVTCV Commit Mode=0 Synch Level=CONFIRM Socket Type=Transaction
+0.620929	0.223	41 Message sent to OTMA	TPipe=8801 MSG=Response RESP=NAK
+0.620979	0.049	48 Trigger event	Trigger=CONV

Figure 318. Connect Trace: Transaction where Client returned NAK back to Connect then OTMA

Example 5: Transaction where OTMA returned NAK:

This Connect Trace report shows a negative acknowledgement from OTMA due to sense code 0024 (previous conversation still in progress).

Start/+Relative	Elapsed	ID Description	Information
10.48.31.165843	*Start*	3C Prepare Read Socket	Key=BAEB9819E8B6BB80 Error=OTMA NAK Depth=1 Port=8801 Sock=1
+0.000275	0.275	49 Read Socket	Port=8801 Sock=1
+0.000366	0.091	3D Message Exit called for READ	Exit=HWSSMPL0
+0.000414	0.047	3E Message Exit return for READ	RC=00 RSN=00 IP=172.17.69.58 DSOrig=IMD3 DSTarg=IMD4 TC=DVPTRAN5 Commit Mode=0 Synch Level=CONFIRM Socket Type=Transaction TPipe=8801 MSG=Data
+0.000719	0.305	41 Message sent to OTMA	TPipe=8801 RESP=NAK Sense=0024
+0.001408	0.689	42 Message received from OTMA	Exit=HWSSMPL0
+0.001635	0.227	3D Message Exit called for XMIT	RC=00 RSN=00
+0.001741	0.105	3E Message Exit return for XMIT	Port=8801 Sock=1
+0.002251	0.510	4A Write Socket	Port=8801 Sock=1
+0.002344	0.092	0C Begin Close Socket	Port=8801 Sock=1
+0.002715	0.371	0D End Close Socket	Port=8801 Sock=1
+0.002746	0.030	48 Trigger event	Trigger=CLOSE

Figure 319. Connect Trace: Transaction where OTMA returned NAK due to sense code 0024

Example 6: Resume named Tpipe command with timeout:

This Connect Trace report shows a Resume Tpipe with timeout.

Start/+Relative	Elapsed	ID Description	Information
10.10.58.677647	*Start*	3C Prepare Read Socket	Key=BAEB8FB642018240 Depth=1 Port=8801 Sock=2
+0.249148	249.148	49 Read Socket	Port=8801 Sock=2
+0.249456	0.308	49 Read Socket	Port=8801 Sock=2
+0.249530	0.073	3D Message Exit called for READ	Exit=HWSSMPL0
+0.249649	0.118	3E Message Exit return for READ	RC=00 RSN=00 IP=172.17.69.58 DSOrg=IMD4 DSTarg=IMD4 Commit Mode=0 Synch Level=CONFIRM Socket Type=Transaction TPipe=TRBS002 MSG=Command CMD=Resume named TPIPE O/P
+0.249899	0.250	41 Message sent to OTMA	Exit=HWSSMPL0
+0.255023	5.124	3D Message Exit called for XMIT	RC=00 RSN=00
+0.255126	0.103	3E Message Exit return for XMIT	Port=8801 Sock=2
+0.255670	0.543	4A Write Socket	Port=8801 Sock=2
+0.259258	3.588	49 Read Socket	Port=8801 Sock=2
+0.551047	291.789	49 Read Socket	Port=8801 Sock=2
+0.551391	0.343	49 Read Socket	Port=8801 Sock=2
+0.551419	0.028	3D Message Exit called for READ	Exit=HWSSMPL0
+0.551519	0.099	3E Message Exit return for READ	RC=00 RSN=00 IP=172.17.69.58 DSOrg=IMD4 DSTarg=IMD4 Commit Mode=0 Synch Level=CONFIRM Socket Type=Transaction TPipe=TRBS002 MSG=Response RESP=ACK
+0.551755	0.236	41 Message sent to OTMA	Exit=HWSSMPL0
+0.554001	2.245	3D Message Exit called for XMIT	RC=00 RSN=00
+0.554055	0.054	3E Message Exit return for XMIT	Port=8801 Sock=2
+0.554630	0.574	4A Write Socket	Port=8801 Sock=2
+0.558145	3.515	49 Read Socket	Port=8801 Sock=2
+0.862982	304.837	49 Read Socket	Port=8801 Sock=2
+0.863371	0.388	49 Read Socket	Port=8801 Sock=2
+0.863460	0.089	3D Message Exit called for READ	Exit=HWSSMPL0
+0.863516	0.055	3E Message Exit return for READ	RC=00 RSN=00 IP=172.17.69.58 DSOrg=IMD4 DSTarg=IMD4 Commit Mode=0 Synch Level=CONFIRM Socket Type=Transaction TPipe=TRBS002 MSG=Response RESP=ACK
+0.863860	0.344	41 Message sent to OTMA	Exit=HWSSMPL0
+0.867618	3.757	3D Message Exit called for XMIT	RC=00 RSN=00
+0.867737	0.118	3E Message Exit return for XMIT	Port=8801 Sock=2
+0.868241	0.504	4A Write Socket	Port=8801 Sock=2
+0.871990	3.748	49 Read Socket	Port=8801 Sock=2
+1.156950	284.959	49 Read Socket	Port=8801 Sock=2
+1.157240	0.290	49 Read Socket	Port=8801 Sock=2
+1.157313	0.072	3D Message Exit called for READ	Exit=HWSSMPL0
+1.157369	0.056	3E Message Exit return for READ	RC=00 RSN=00 IP=172.17.69.58 DSOrg=IMD4 DSTarg=IMD4 Commit Mode=0 Synch Level=CONFIRM Socket Type=Transaction TPipe=TRBS002 MSG=Response RESP=ACK
+1.157628	0.258	41 Message sent to OTMA	Exit=HWSSMPL0
+1.158987	1.358	3D Message Exit called for XMIT	RC=00 RSN=00
+1.159093	0.106	3E Message Exit return for XMIT	Port=8801 Sock=2
+1.159601	0.508	4A Write Socket	Port=8801 Sock=2
+1.162959	3.357	49 Read Socket	Port=8801 Sock=2
+1.164119	1.160	49 Read Socket	Port=8801 Sock=2
+1.164447	0.327	49 Read Socket	Port=8801 Sock=2
+1.164477	0.030	3D Message Exit called for READ	Exit=HWSSMPL0
+1.164587	0.110	3E Message Exit return for READ	RC=00 RSN=00 IP=172.17.69.58 DSOrg=IMD4 DSTarg=IMD4 Commit Mode=0 Synch Level=CONFIRM Socket Type=Transaction TPipe=TRBS002 MSG=Response RESP=ACK
+1.164810	0.223	41 Message sent to OTMA	
10.10.59.842457	*Resume*	41 Message sent to OTMA	Key=BAEB8FB642018240 Error=Time-out Depth=1 TPIPE=TRBS002 MSG=Response RESP=ACK TOV=19
+1.415173	250.363	45 OTMA time-out	Exit=HWSSMPL0
+1.415288	0.114	3D Message Exit called for XMIT	RC=00 RSN=00
+1.415400	0.111	3E Message Exit return for XMIT	Port=8801 Sock=2
+1.416052	0.652	4A Write Socket	Port=8801 Sock=2
+1.416536	0.483	0D End Close Socket	Port=8801 Sock=2
+1.416628	0.092	48 Trigger event	Trigger=CLOSE

Figure 320. Connect Trace: Resume named Tpipe command with timeout

Part 5. OMEGAMON TRF reporting

The topics in this section describe each of the IMS PA OMEGAMON TRF reports and extracts, their content and sample output. The reports and extracts are discussed in the order in which they are presented in the OMEGAMON TRF Report Set edit panel in the dialog.

Chapter 9. Analyzing OMEGAMON TRF reports and extracts

This topic describes how IMS Problem Investigator (IMS PI) complements IBM Tivoli OMEGAMON XE for IMS on z/OS by reporting transaction accounting statistics collected by the Transaction Reporting Facility (TRF) and written to the IMS Log.

OMEGAMON TRF data

The OMEGAMON Transaction Reporting Facility (TRF) provides detailed transaction accounting by collecting performance and resource utilization data for every IMS transaction.

TRF collects the following data for all transactions within IMS:

1. Transaction response time breakdown, CPU time, and other resource usage statistics
2. Full Function and Fast Path database DL/I call count and elapsed time
3. DB2 database call count and elapsed time

See Chapter 14, “OMEGAMON TRF records,” on page 625 for the list of TRF record types.

Event statistics are collected by OMEGAMON subsystems with the TRF Trace running. You can control the type of data collected (BMP, DBD, DB2, DLI, FP), the destination to which the TRF data is written (LOGS=IMS or SMF, but IMS Performance Analyzer only supports IMS), and the record ID (RECID=160 to 255 decimal, ensuring that it is different to the record ID of other applications that write to the log).

You can then run the TRF post-processor to extract the TRF records from the IMS log data sets. The format of the TRF Extractor output records is mapped by the Tivoli-supplied macro **KI2TRFDS**.

IMS Performance Analyzer supports only TRF Extractor output records.

TRF report categories

The IMS PA dialog presents the menu of TRF reports in a tree structure that groups them by functional category. This allows you to request reports individually or by category.

The categories are:

- Database Usage reports
- Message Queue reports
- Trace reports

There is also a category containing TRF Global Options. This is where you can specify options that apply globally to all or many reports in the TRF Report Set.

Database Usage reports

These reports provide performance statistics to measure IMS and DB2 database activity.

- DLI Call List
- DLI Call Summary
- DB2 Call List
- DB2 Call Summary

Message Queue reports (Form-based)

Form-based reports give you flexibility in message queue reporting. By using Report Forms, you can tailor the format and content of your reports. You can request just the fields of interest, and control the presentation order and format. You can create Form-based extracts and load them into DB2 tables.

The Message Queue reports provide performance detail about every transaction traced by OMEGAMON TRF.

- Message Queue List
- Message Queue Summary

Trace reports

The Record Trace reports format the TRF Extractor records for ease of analysis. The trace provides a list of transactions, each with detailed information about every event in the life of that transaction. At a glance, you can see when a transaction starts, followed by all the events associated with the transaction in the order they occurred.

TRF report reference table

The reference table lists the IMS PA OMEGAMON TRF reports and commands with cross-references to the descriptions and sample outputs.

Most of the discussion in this section assumes the reports are specified using the dialog which is the primary mechanism for specifying reports. Alternatively, you can request reports using batch commands. The dialog can generate the JCL and batch commands for you, or you can code them independently of the dialog. For more information on using the batch commands, refer to the “OMEGAMON TRF batch interface” in the *IMS Performance Analyzer for z/OS: User's Guide*.

Table 33. TRF reports: Batch commands and output examples

Report name	IMSPATRF command	Example
Database Usage reports		
“DLI Call List report” on page 575	DLICALL(LIST)	Figure 321 on page 576
		Figure 322 on page 577
“DLI Call Summary report” on page 578	DLICALL(SUMMARY)	Figure 323 on page 580
“DB2 Call List report” on page 581	DB2CALL(LIST)	Figure 324 on page 582
“DB2 Call Summary report” on page 583	DB2CALL(SUMMARY)	Figure 325 on page 584
Form-based Message Queue reports		
“Form-based Message Queue List report” on page 584	LIST(...,FIELDS(...))	Figure 326 on page 586

Table 33. TRF reports: Batch commands and output examples (continued)

Report name	IMSPATRF command	Example
"Form-based Message Queue Summary report" on page 586	SUMMARY(...,FIELDS(...))	Figure 327 on page 588
Trace reports		
"TRF Record Trace report" on page 588	TRACE	"Report content" on page 589

TRF Database Usage reports

OMEGAMON TRF Database Usage reports provide performance statistics to measure IMS and DB2 database activity.

DLI Call List report

The OMEGAMON TRF DLI Call List report provides a list of IMS Database calls. At a glance, you can see when a transaction starts, followed by all the database calls associated with the transaction in the order they occurred.

There is one record for each database call. A single transaction could have numerous records.

The report provides statistics on DL/I call elapsed time for both Fast Path and Full Function databases.

Report options

To specify the report options, select the Database Usage **DLI Call List** report in a TRF Report Set.

The command for the DLI Call List report is:

```
IMSPATRF      DLICALL(LIST,
                  [DDNAME(ddname),]          default DLICALL
                  [INCL(TRANCODE(list))|EXCL(TRANCODE(list)),]
                  [INCL(USERID(list))|EXCL(USERID(list)),]
                  [INCL(IMSID(list))|EXCL(IMSID(list)),]
                  [INCL(PROGRAM(list))|EXCL(PROGRAM(list)),]
                  [INCL(DATABASE(list))|EXCL(DATABASE(list))])
IMSPATRF      EXECUTE
```

Selection Criteria can be specified to filter the input data on one or more of the following:

- Transaction Code
- User ID
- IMS Subsystem ID
- Program
- Database (DBD)

Report content

This is an example of the TRF DLI Call List report.

The report in the following figure provides DL/I call statistics for TRF records 13, 15 or 16 (DL/I Detail, MSDB Detail, DEDB Detail). Note that Average, Minimum and Maximum Elapsed are left blank as each detail record relates to one DLI call.

IMS Performance Analyzer 4.4 OMEGAMON TRF DLI Call List											
Extractor output from 02Aug2011 13.07.09.9											
										Page	1
Time	Trancode	Database	Program	PST	Func Code	Call Count	Total	Average	Minimum	Maximum	DLI CPU Recovery Time Token
13.07.09.9	CEXTCONV	DI21PART	CEXTPGM	4	GHU	1	0.000498				0.000208 IADE/0000019100000000
13.07.09.9	CEXTCONV	DI21PART	CEXTPGM	4	REPL	1	0.000195				0.000140 IADE/0000019100000000
13.07.09.9	CEXTCONV	DI21PART	CEXTPGM	4	GHU	1	0.000227				0.000039 IADE/0000019100000000
13.07.09.9	CEXTCONV	DI21PART	CEXTPGM	4	DLET	1	0.000177				0.000132 IADE/0000019100000000
13.07.09.9	CEXTCONV	DI21PART	CEXTPGM	4	ISRT	1	0.000129				0.000129 IADE/0000019100000000
13.07.11.1	CEXTCONV	DI21PART	CEXTPGM	4	GHU	1	0.000465				0.000208 IADE/0000019100000001
13.07.11.1	CEXTCONV	DI21PART	CEXTPGM	4	REPL	1	0.000143				0.000135 IADE/0000019100000001
13.07.11.1	CEXTCONV	DI21PART	CEXTPGM	4	GHU	1	0.000028				0.000027 IADE/0000019100000001
13.07.11.1	CEXTCONV	DI21PART	CEXTPGM	4	DLET	1	0.000155				0.000154 IADE/0000019100000001
13.07.11.1	CEXTCONV	DI21PART	CEXTPGM	4	ISRT	1	0.000197				0.000162 IADE/0000019100000001
13.07.12.2	CEXTCONV	DI21PART	CEXTPGM	4	GHU	1	0.000511				0.000164 IADE/0000019100000002
13.07.12.2	CEXTCONV	DI21PART	CEXTPGM	4	REPL	1	0.000097				0.000097 IADE/0000019100000002
13.07.12.2	CEXTCONV	DI21PART	CEXTPGM	4	GHU	1	0.000025				0.000024 IADE/0000019100000002
13.07.12.2	CEXTCONV	DI21PART	CEXTPGM	4	DLET	1	0.000117				0.000116 IADE/0000019100000002
13.07.12.2	CEXTCONV	DI21PART	CEXTPGM	4	ISRT	1	0.000128				0.000128 IADE/0000019100000002
13.07.13.2	CEXTCONV	DI21PART	CEXTPGM	4	GHU	1	0.000544				0.000168 IADE/0000019100000003
13.07.13.2	CEXTCONV	DI21PART	CEXTPGM	4	REPL	1	0.000094				0.000093 IADE/0000019100000003
13.07.13.2	CEXTCONV	DI21PART	CEXTPGM	4	GHU	1	0.000025				0.000024 IADE/0000019100000003
13.07.13.2	CEXTCONV	DI21PART	CEXTPGM	4	DLET	1	0.000119				0.000119 IADE/0000019100000003
13.07.13.2	CEXTCONV	DI21PART	CEXTPGM	4	ISRT	1	0.000120				0.000120 IADE/0000019100000003
13.07.14.3	CEXSConv	DI21PART	CEXSPGM	4	GHU	1	0.000445				0.000187 IADE/0000019200000000
13.07.14.3	CEXSConv	DI21PART	CEXSPGM	4	REPL	1	0.000097				0.000096 IADE/0000019200000000
13.07.14.3	CEXSConv	DI21PART	CEXSPGM	4	GHU	1	0.000026				0.000026 IADE/0000019200000000
13.07.14.3	CEXSConv	DI21PART	CEXSPGM	4	DLET	1	0.000155				0.000154 IADE/0000019200000000
13.07.14.3	CEXSConv	DI21PART	CEXSPGM	4	ISRT	1	0.000126				0.000125 IADE/0000019200000000
13.07.15.3	CEXTCONV	DI21PART	CEXTPGM	4	GHU	1	0.000475				0.000189 IADE/0000019300000000
13.07.15.3	CEXTCONV	DI21PART	CEXTPGM	4	REPL	1	0.000098				0.000097 IADE/0000019300000000
13.07.15.3	CEXTCONV	DI21PART	CEXTPGM	4	GHU	1	0.000025				0.000025 IADE/0000019300000000
13.07.15.3	CEXTCONV	DI21PART	CEXTPGM	4	DLET	1	0.000209				0.000121 IADE/0000019300000000
13.07.15.3	CEXTCONV	DI21PART	CEXTPGM	4	ISRT	1	0.000127				0.000127 IADE/0000019300000000
:											

Figure 321. TRF DLI Call List report: DL/I, MSDB, DEDB Detail

The report in the following figure provides DL/I call statistics for TRF records 18 or 19 (DL/I Summary, MSDB/DEDB Summary).

IMS Performance Analyzer 4.4 OMEGAMON TRF DLI Call List											
Extractor output from 10Aug2011 12.12.23.7											
Time	Trancode	Database	Program	PST	Func Code	Call Count	DLI Total	Elapsed Average	Time Minimum	Maximum	Page 1 DLI CPU Recovery Time Token
12.12.23.7	CEXTCONV	DI21PART	CEXTPGM	5	ISRT	1	0.000129	0.000129			
					REPL	1	0.056660	0.056660			
					DLET	1	0.000220	0.000220			
					GHU	2	0.032347	0.016173			
					Total	5	0.089356	0.017871	0.000062	0.056660	0.043164 IADE/0000025F00000000
12.18.19.6	CEXTCONV	DI21PART	CEXTPGM	5	ISRT	1	0.000353	0.000353			
					REPL	1	0.000118	0.000118			
					DLET	1	0.000188	0.000188			
					GHU	2	0.000569	0.000284			
					Total	5	0.001228	0.000245	0.000032	0.000537	0.000710 IADE/0000026200000000
12.18.20.7	CEXTCONV	DI21PART	CEXTPGM	5	ISRT	1	0.000137	0.000137			
					REPL	1	0.000766	0.000766			
					DLET	1	0.000182	0.000182			
					GHU	2	0.002056	0.001028			
					Total	5	0.003141	0.000628	0.000049	0.002007	0.000776 IADE/0000026200000001
12.18.21.8	CEXTCONV	DI21PART	CEXTPGM	5	ISRT	1	0.000375	0.000375			
					REPL	1	0.000239	0.000239			
					DLET	1	0.000159	0.000159			
					GHU	2	0.000674	0.000337			
					Total	5	0.001447	0.000289	0.000033	0.000641	0.000750 IADE/0000026200000002
12.18.22.8	CEXTCONV	DI21PART	CEXTPGM	5	ISRT	1	0.000126	0.000126			
					REPL	1	0.000336	0.000336			
					DLET	1	0.000135	0.000135			
					GHU	2	0.002068	0.001034			
					Total	5	0.002665	0.000533	0.000042	0.002026	0.000677 IADE/0000026200000003
12.18.23.9	CEXSConv	DI21PART	CEXSPGM	5	ISRT	1	0.000160	0.000160			
					REPL	1	0.000203	0.000203			
					DLET	1	0.000233	0.000233			
					GHU	2	0.000721	0.000360			
					Total	5	0.001317	0.000263	0.000052	0.000669	0.000770 IADE/0000026300000000
12.18.25.1	CEXTCONV	DI21PART	CEXTPGM	5	ISRT	1	0.000129	0.000129			
					REPL	1	0.000100	0.000100			
					DLET	1	0.000169	0.000169			
					GHU	2	0.000487	0.000243			
					Total	5	0.000885	0.000177	0.000032	0.000455	0.000571 IADE/0000026400000000
12.18.26.2	CEXSConv	DI21PART	CEXSPGM	5	ISRT	1	0.000138	0.000138			
					REPL	1	0.000201	0.000201			
					DLET	1	0.000133	0.000133			
					GHU	2	0.002512	0.001256			
					Total	5	0.002984	0.000596	0.000033	0.002479	0.000634 IADE/0000026500000000
12.18.27.2	CEXTCONV	DI21PART	CEXTPGM	5	ISRT	1	0.000129	0.000129			
					REPL	1	0.000179	0.000179			
					DLET	1	0.000129	0.000129			
					GHU	2	0.000529	0.000264			
					Total	5	0.000966	0.000193	0.000033	0.000496	0.000610 IADE/0000026600000000
12.18.28.3	CEXTCONV	DI21PART	CEXTPGM	5	ISRT	1	0.000127	0.000127			
					REPL	1	0.000237	0.000237			
					DLET	1	0.000147	0.000147			
					GHU	2	0.002563	0.001281			
					Total	5	0.003074	0.000614	0.000038	0.002525	0.000657 IADE/0000026600000001
:											

Figure 322. TRF DLI Call List report: DL/I, MSDB, DEDB Summary

The fields are:

Time The time the DLI record was cut by OMEGAMON TRF.

Trancode
The name of the transaction that issued the call.

Database
The name of the database that the call was issued for.

Program
The program that processed the transaction.

PST The region in which the program ran.

Func Code

The DLI function code. For List reports from Summary records, and Summary reports, a Total line is included.

Call Count

The number of DLI calls covered by this record.

Total Elapsed

Time in seconds (microsecond precision).

Average Elapsed

Time in seconds (microsecond precision).

Minimum Elapsed

Time in seconds (microsecond precision).

Maximum Elapsed

Time in seconds (microsecond precision).

DLI CPU Time

CPU time for DLI call.

Recovery Token

Used for correlation with MSG records (Transactions).

DLI Call Summary report

The OMEGAMON TRF DLI Call Summary report provides a summary of IMS Database calls.

Data can be ordered by one or two sort keys including Time of Day, Transaction Code, User ID, IMS Subsystem ID, Program (PSB) name, and Database (DBD) name.

Report options

To specify the report options, select the Database Usage **DLI Call Summary** report in a TRF Report Set.

The command for the DLI Call Summary report is:

```
IMSPATRF      DLICALL(SUMMARY,
                  [BY(order1)|
                   BY(order1,order2),]          default BY(TRANCODE)
                  [DDNAME(ddname),]              default DLISUMM1,DLISUMM2,...
                  [INTERVAL(hh:mm:ss),]          default 00:01:00 (1 minute)
                  [INCL(TRANCODE(list))|EXCL(TRANCODE(list)),]
                  [INCL(USERID(list))|EXCL(USERID(list)),]
                  [INCL(IMSID(list))|EXCL(IMSID(list)),]
                  [INCL(PROGRAM(list))|EXCL(PROGRAM(list)),]
                  [INCL(DATABASE(list))|EXCL(DATABASE(list))])
IMSPATRF      EXECUTE
```

You can request multiple DLI Call Summary reports in the one job. The default DDname is DLISUMMx where x is 1 to 5. The sort order of each report is according to the order of the fields in the BY operand. The sort fields are the first one or two columns of the report, and can be any one or two of the following fields:

TRANCODE

Transaction Code (default)

USERID User ID**PROGRAM**

Program (PSB)

IMSID IMS Subsystem ID
TIME Time Interval
DATABASE
Database (DBD)

Selection Criteria can be specified to filter the input data on one or more of the following:

- Transaction Code
- User ID
- IMS Subsystem ID
- Program
- Database

For each report, you can also specify the time interval if you have requested that the report be summarized by TIME. The default interval is 00:01:00 (1 minute).

Report content

This is an example of the TRF DLI Call Summary report. It provides statistics on DL/I call elapsed time for both Fast Path and Full Function databases, summarized by Trancode (the default).

IMS Performance Analyzer 4.4
OMEGAMON TRF DLI Call Summary

Extractor output from 02Aug2011 13.07.09.9 to 02Aug2011 13.14.51.9										Page	1
Trancode	Func Code	Call Count	----- DLI -----	Elapsed Time -----	----- DLI -----	CPU -----	----- DLI -----	----- CPU -----	--- Calls per ---		
			Total	Average	Minimum	Maximum	Total	Average	Second	Minute	
ADDINV	ISRT	4	0.006187	0.001546	0.000542	0.003037	0.001659	0.000414	0.0	0.5	
	Total	4	0.006187	0.001546	0.000542	0.003037	0.001659	0.000414	0.0	0.5	
ADDPART	ISRT	6	0.002836	0.000472	0.000144	0.001044	0.001472	0.000245	0.0	0.8	
	Total	6	0.002836	0.000472	0.000144	0.001044	0.001472	0.000245	0.0	0.8	
CEXSCONV	ISRT	6	0.000850	0.000141	0.000122	0.000182	0.000761	0.000126	0.0	0.8	
	REPL	6	0.000571	0.000095	0.000093	0.000098	0.000567	0.000094	0.0	0.8	
	DLET	6	0.001205	0.000200	0.000119	0.000488	0.000789	0.000131	0.0	0.8	
	GHU	12	0.002966	0.000247	0.000025	0.000514	0.001246	0.000103	0.0	1.6	
	Total	30	0.005592	0.000186	0.000025	0.000514	0.003363	0.000112	0.1	3.9	
CEXSNONC	ISRT	3	0.000611	0.000203	0.000188	0.000225	0.000415	0.000138	0.0	0.4	
	REPL	3	0.000466	0.000155	0.000133	0.000172	0.000328	0.000109	0.0	0.4	
	DLET	3	0.000383	0.000127	0.000118	0.000145	0.000380	0.000126	0.0	0.4	
	GHU	6	0.001724	0.000287	0.000027	0.000722	0.000796	0.000132	0.0	0.8	
	Total	15	0.003184	0.000212	0.000027	0.000722	0.001919	0.000127	0.0	1.9	
CEXTCONV	ISRT	12	0.001826	0.000152	0.000120	0.000244	0.001544	0.000128	0.0	1.6	
	REPL	12	0.001499	0.000124	0.000094	0.000260	0.001255	0.000104	0.0	1.6	
	DLET	12	0.001878	0.000156	0.000117	0.000209	0.001553	0.000129	0.0	1.6	
	GHU	24	0.007098	0.000295	0.000025	0.000684	0.002514	0.000104	0.1	3.1	
	Total	60	0.012301	0.000205	0.000025	0.000684	0.006866	0.000114	0.1	7.8	
CEXTNONC	ISRT	7	0.001113	0.000159	0.000125	0.000232	0.000951	0.000135	0.0	0.9	
	REPL	7	0.000737	0.000105	0.000094	0.000149	0.000672	0.000096	0.0	0.9	
	DLET	7	0.006387	0.000912	0.000121	0.005272	0.000971	0.000138	0.0	0.9	
	GHU	14	0.003624	0.000258	0.000025	0.000624	0.001421	0.000101	0.0	1.8	
	Total	35	0.011861	0.000338	0.000025	0.005272	0.004015	0.000114	0.1	4.5	
DLETINV	DLET	4	0.000458	0.000114	0.000079	0.000171	0.000418	0.000104	0.0	0.5	
	GHU	4	0.004542	0.001135	0.000432	0.002065	0.001146	0.000286	0.0	0.5	
	Total	8	0.005000	0.000625	0.000079	0.002065	0.001564	0.000195	0.0	1.0	
DLETPART	DLET	3	0.000506	0.000168	0.000155	0.000194	0.000463	0.000154	0.0	0.4	
	GU	3	0.002609	0.000869	0.000482	0.001394	0.000715	0.000238	0.0	0.4	
	GHU	3	0.000089	0.000029	0.000026	0.000035	0.000087	0.000029	0.0	0.4	
	GNP	3	0.000491	0.000163	0.000037	0.000403	0.000143	0.000047	0.0	0.4	
	Total	12	0.003695	0.000307	0.000026	0.001394	0.001408	0.000117	0.0	1.6	
DSPALLI	GU	4	0.004750	0.001187	0.000419	0.001994	0.001052	0.000263	0.0	0.5	
	GNP	15	0.024997	0.001666	0.000009	0.022433	0.000849	0.000056	0.0	1.9	
	Total	19	0.029747	0.001565	0.000009	0.022433	0.001901	0.000100	0.0	2.5	
DSPINV	GU	8	0.009700	0.001212	0.000427	0.001942	0.002159	0.000269	0.0	1.0	
	GN	8	0.005931	0.000741	0.000031	0.003344	0.000927	0.000115	0.0	1.0	
	GNP	15	0.000431	0.000028	0.000009	0.000051	0.000421	0.000028	0.0	1.9	
	Total	31	0.016062	0.000518	0.000009	0.003344	0.003507	0.000113	0.1	4.0	
IVTCV	ISRT	6	0.003227	0.000537	0.000480	0.000700	0.001573	0.000262	0.0	0.8	
	REPL	2	0.000123	0.000061	0.000061	0.000062	0.000121	0.000060	0.0	0.3	
	DLET	6	0.001250	0.000208	0.000180	0.000284	0.000955	0.000159	0.0	0.8	
	GU	8	0.004531	0.000566	0.000393	0.001158	0.001472	0.000184	0.0	1.0	
	GHU	8	0.003426	0.000428	0.000389	0.000509	0.001372	0.000171	0.0	1.0	
	Total	30	0.012557	0.000418	0.000061	0.001158	0.005493	0.000183	0.1	3.9	
IVTCX	ISRT	6	0.003856	0.000642	0.000484	0.001282	0.001600	0.000266	0.0	0.8	
	REPL	2	0.000154	0.000077	0.000067	0.000087	0.000153	0.000076	0.0	0.3	
	DLET	6	0.000997	0.000166	0.000163	0.000172	0.000984	0.000164	0.0	0.8	
	GU	8	0.004369	0.000546	0.000423	0.001081	0.001428	0.000178	0.0	1.0	
	GHU	8	0.003484	0.000435	0.000394	0.000477	0.001357	0.000169	0.0	1.0	
	Total	30	0.012860	0.000428	0.000067	0.001282	0.005522	0.000184	0.1	3.9	
IVTFD	ISRT	3	0.019183	0.006394	0.000844	0.017493	0.000545	0.000181	0.0	0.4	
	REPL	1	0.000013	0.000013	0.000013	0.000013	0.000013	0.000013	0.0	0.1	
	DLET	3	0.000035	0.000011	0.000011	0.000012	0.000033	0.000011	0.0	0.4	
	GU	4	0.003163	0.000790	0.000662	0.000900	0.000672	0.000168	0.0	0.5	
	GHU	4	0.003521	0.000880	0.000809	0.000987	0.000721	0.000180	0.0	0.5	
	Total	15	0.025915	0.001727	0.000011	0.017493	0.001984	0.000132	0.0	1.9	
IVTFM	REPL	2	0.000015	0.000007	0.000007	0.000008	0.000014	0.000007	0.0	0.3	
	GU	6	0.000075	0.000012	0.000012	0.000014	0.000069	0.000011	0.0	0.8	
	GHU	2	0.000024	0.000012	0.000012	0.000012	0.000023	0.000011	0.0	0.3	
	Total	10	0.000114	0.000011	0.000007	0.000014	0.000106	0.000010	0.0	1.3	
:											

DB2 Call List report

For IMS DB/DC or DCCTL environments (not DBCTL), the OMEGAMON TRF DB2 Call List report provides a list of DB2 SQL calls. At a glance, you can see when a transaction starts, followed by all the DB2 SQL calls associated with the transaction in the order they occurred.

There is one record for each SQL call. A single transaction could have numerous records.

Report options

To specify the report options, select the Database Usage **DB2 Call List** report in a TRF Report Set.

The command for the DB2 Call List report is:

```
IMSPATRF      DB2CALL(LIST,
                  [DDNAME(ddname),]          default DB2CALL
                  [INCL(TRANCODE(list))|EXCL(TRANCODE(list)),]
                  [INCL(USERID(list))|EXCL(USERID(list)),]
                  [INCL(IMSID(list))|EXCL(IMSID(list)),]
                  [INCL(PROGRAM(list))|EXCL(PROGRAM(list)),]
                  [INCL(ESSID(list))|EXCL(ESSID(list))])
IMSPATRF      EXECUTE
```

Selection Criteria can be specified to filter the input data on one or more of the following:

- Transaction Code
- User ID
- IMS Subsystem ID
- Program
- DB2 Subsystem ID (ESSID)

Report content

This report provides statistics on calls to DB2 subsystems.

IMS Performance Analyzer 4.4 OMEGAMON TRF DB2 Call List										
Extractor output from 02Aug2011 13.07.09.9										
Time	Trancode	Program	DB2 PST SSID	Call ----- DB2 Elapsed Time -----				In DB2 CPU time	Recovery Token	Page 1
				Count	Total	Average	Minimum	Maximum		
13.07.09.9	CEXTCONV	CEXTPGM	4 DBP1	14	0.117890	0.008420	0.000155	0.105708	0.007751	IADE/0000019100000000
13.07.11.1	CEXTCONV	CEXTPGM	4 DBP1	14	0.004756	0.000339	0.000127	0.001055	0.004548	IADE/0000019100000001
13.07.12.2	CEXTCONV	CEXTPGM	4 DBP1	14	0.005949	0.000424	0.000120	0.003054	0.003826	IADE/0000019100000002
13.07.13.2	CEXTCONV	CEXTPGM	4 DBP1	14	0.008077	0.000576	0.000121	0.004723	0.004623	IADE/0000019100000003
13.07.14.3	CEXSConv	CEXSPGM	4 DBP1	14	0.005498	0.000392	0.000083	0.002493	0.003269	IADE/0000019200000000
13.07.15.3	CEXTCONV	CEXTPGM	4 DBP1	14	0.004352	0.000310	0.000085	0.001608	0.003616	IADE/0000019300000000
13.07.16.4	CEXSConv	CEXSPGM	4 DBP1	14	0.006908	0.000493	0.000084	0.004102	0.004452	IADE/0000019400000000
13.07.17.5	CEXTCONV	CEXTPGM	4 DBP1	14	0.006121	0.000437	0.000083	0.003439	0.004056	IADE/0000019500000000
13.07.18.5	CEXTCONV	CEXTPGM	4 DBP1	14	0.005809	0.000414	0.000085	0.003349	0.003793	IADE/0000019500000001
13.07.19.5	CEXTCONV	CEXTPGM	4 DBP1	14	0.006029	0.000430	0.000085	0.003411	0.003543	IADE/0000019500000002
13.07.23.7	CEXSConv	CEXSPGM	4 DBP1	14	0.008644	0.000617	0.000123	0.005070	0.004806	IADE/0000019700000000
13.07.24.7	CEXSConv	CEXSPGM	4 DBP1	14	0.005824	0.000416	0.000122	0.002881	0.003860	IADE/0000019700000001
13.07.25.8	CEXSConv	CEXSPGM	4 DBP1	14	0.005523	0.000394	0.000121	0.002714	0.003838	IADE/0000019700000002
13.07.26.8	CEXTCONV	CEXTPGM	4 DBP1	14	0.006604	0.000471	0.000084	0.003755	0.004089	IADE/0000019800000000
13.07.27.9	CEXSConv	CEXSPGM	4 DBP1	14	0.007838	0.000559	0.000085	0.004989	0.005991	IADE/0000019900000000
13.07.28.9	CEXTCONV	CEXTPGM	4 DBP1	14	0.005509	0.000393	0.000085	0.002824	0.003222	IADE/0000019A00000000
13.07.30.0	CEXTCONV	CEXTPGM	4 DBP1	14	0.004985	0.000356	0.000084	0.002545	0.002052	IADE/0000019A00000001
13.07.31.0	CEXTCONV	CEXTPGM	4 DBP1	14	0.005746	0.000410	0.000085	0.003014	0.005487	IADE/0000019A00000002
13.08.13.2	CEXTN0NC	CEXTPGM	4 DBP1	14	0.003680	0.000262	0.000083	0.000972	0.003267	IADE/0000019B00000000
13.08.14.2	CEXTN0NC	CEXTPGM	4 DBP1	14	0.007601	0.000542	0.000084	0.005180	0.003701	IADE/0000019B00000001
13.08.15.2	CEXTN0NC	CEXTPGM	4 DBP1	14	0.004840	0.000345	0.000087	0.002450	0.003737	IADE/0000019B00000002
13.08.16.3	CEXTN0NC	CEXTPGM	4 DBP1	14	0.005258	0.000375	0.000085	0.002425	0.003060	IADE/0000019B00000003
13.08.17.3	CEXSNOnc	CEXSPGM	4 DBP1	14	0.006882	0.000491	0.000084	0.003742	0.004606	IADE/0000019C00000000
13.08.18.4	CEXTN0NC	CEXTPGM	4 DBP1	14	0.006969	0.000497	0.000084	0.004359	0.005338	IADE/0000019D00000000
13.08.19.4	CEXSNOnc	CEXSPGM	4 DBP1	14	0.007102	0.000507	0.000085	0.003894	0.004165	IADE/0000019E00000000
13.08.20.5	CEXTN0NC	CEXTPGM	4 DBP1	14	0.008545	0.000610	0.000084	0.005845	0.006085	IADE/0000019F00000000
13.08.21.5	CEXSNOnc	CEXSPGM	4 DBP1	14	0.007143	0.000510	0.000086	0.004286	0.004853	IADE/000001A000000000
13.08.22.6	CEXTN0NC	CEXTPGM	4 DBP1	14	0.005555	0.000396	0.000083	0.002881	0.004989	IADE/000001A100000000
13.13.59.5	MQATREQ1	MQDTPGM	4 DBP1	14	0.006041	0.000431	0.000084	0.002349	0.003431	IADE/0000020700000000
13.14.02.3	MQATREQ1	MQDTPGM	4 DBP1	14	0.007490	0.000535	0.000083	0.004592	0.002926	IADE/0000020B00000000

Figure 324. TRF DB2 Call List report

The report fields are:

Time The time the DB2 record was cut by OMEGAMON TRF.

Trancode
The name of the transaction that issued the call.

Program
The program that processed the transaction.

PST The region in which the program ran.

DB2 SSID
The DB2 subsystem that processed the calls.

Call Count
The number of DB2 calls covered by this record.

Total Elapsed
Time in seconds (microsecond precision).

Average Elapsed
Time in seconds (microsecond precision).

Minimum Elapsed
Time in seconds (microsecond precision).

Maximum Elapsed
Time in seconds (microsecond precision).

In DB2 CPU time
CPU time spent in DB2.

Recovery Token

Used for correlation with MSG records (Transactions).

DB2 Call Summary report

The OMEGAMON TRF DB2 Call Summary report provides a summary of DB2 SQL calls. A transaction will have one summary record per correlation ID.

Data can be ordered by one or two sort keys including Time of Day, Transaction Code, User ID, IMS Subsystem ID, Program (PSB) name, and DB2 Subsystem ID.

Report options

To specify the report options, select the Database Usage **DB2 Call Summary** report in a TRF Report Set.

The command for the DB2 Call Summary report is:

```
IMSPATRF      DB2CALL(SUMMARY,
                [BY(order1)|
                BY(order1,order2),]          default BY(TRANCODE)
                [DDNAME(ddname),]            default DB2SUMM1,DB2SUMM2,...
                [INTERVAL(hh:mm:ss),]        default 00:01:00 (1 minute)
                [INCL(TRANCODE(list))|EXCL(TRANCODE(list)),]
                [INCL(USERID(list))|EXCL(USERID(list)),]
                [INCL(IMSID(list))|EXCL(IMSID(list)),]
                [INCL(PROGRAM(list))|EXCL(PROGRAM(list)),]
                [INCL(ESSID(list))|EXCL(ESSID(list))])
IMSPATRF      EXECUTE
```

You can request multiple DB2 Call Summary reports in the one job. The default DDname is DB2SUMMx where x is a unique suffix incrementing from 1. The sort order of each report is according to the order of the fields in the BY operand. The sort fields are the first one or two columns of the report, and can be any one or two of the following fields:

TRANCODE

Transaction Code (default)

USERID User ID

PROGRAM

Program (PSB)

IMSID IMS Subsystem ID

TIME Time Interval

DB2ID DB2 Subsystem ID

Selection Criteria can be specified to filter the input data on one or more of the following:

- Transaction Code
- User ID
- IMS Subsystem ID
- Program
- DB2 Subsystem ID (ESSID)

For each report, you can also specify the time interval if you have requested that the report be summarized by TIME. The default interval is 00:01:00 (1 minute).

Report content

This is an example of the TRF DB2 Call Summary report. It provides statistics on calls to DB2 subsystems, summarized by Trancode (the default).

IMS Performance Analyzer 4.4 OMEGAMON TRF DB2 Call Summary									
Trancode	Call Count	Extractor output from 02Aug2011 13.07.09.9 to 02Aug2011 13.14.02.3				DB2 CPU		Calls per	
		----- Total	----- Average	----- Minimum	----- Maximum	--- Total	--- Average	--- Second	--- Minute
CEXS CONV	84	0.040235	0.000478	0.000083	0.005070	0.026216	0.000312	0.2	12.2
CEXS NONC	42	0.021127	0.000503	0.000084	0.004286	0.013624	0.000324	0.1	6.1
CEXT CONV	168	0.181827	0.001082	0.000083	0.105708	0.050606	0.000301	0.4	24.4
CEXT NONC	98	0.042448	0.000433	0.000083	0.005845	0.030177	0.000307	0.2	14.3
MQATREQ1	28	0.013531	0.000483	0.000083	0.004592	0.006357	0.000227	0.1	4.1
Total	420	0.299168	0.000712	0.000083	0.105708	0.126980	0.000302	1.0	61.1

Figure 325. TRF DB2 Call Summary report

TRF Message Queue reports (Form-based)

Form-based reports give you flexibility in message queue reporting. The TRF Message Queue reports provide performance detail about every transaction processed by OMEGAMON TRF extract records.

By using Report Forms, you can tailor the format and content of your reports. You can request just the fields of interest, and control the presentation order and format. You can create Form-based extracts and load them into DB2 tables.

Form-based Message Queue List report

The OMEGAMON TRF Form-based Message Queue List is a detailed list of message queue records. You can request multiple reports and extracts in a single run. They enable comprehensive, flexible analysis of message queue information giving you a good insight into different facets of response tuning.

You can tailor the format and content of the reports and extracts by specifying Report Forms, the data Precision, what Digit Grouping to use, and the Selection Criteria for filtering the input records. Additional extract options are delimiters, field labels, and whether to format numeric fields for DB2 or spreadsheet analysis.

Report options

To specify the report options, select the Message Queue **List** report in a TRF Report Set.

The format of the operand to request the Message Queue List report or extract is:

```

IMSPATRF    LIST(
             [DDNAME(ddname),]          default LISTnnnn
             [FROM(date,time),]
             [TO(date,time),]
             [EXTRACT(ddname),]          default LISXnnnn
             [PRECISION(n),]            default 3
             [GROUP|NOGROUP|SECGROUP,]
             [INCL(TRANCODE(list))|EXCL(TRANCODE(list)),]
             [INCL(USERID(list))|EXCL(USERID(list)),]
             [INCL(IMSID(list))|EXCL(IMSID(list)),]
             [INCL(PROGRAM(list))|EXCL(PROGRAM(list)),]
             [DELIMIT(field-delimiter)|NODELIMIT,]    default , (comma)
             [LABELS|NOLABELS,]
             [FLOAT|NOFLOAT,]
             FIELDS(field1[(options)],...)
IMSPATRF    EXECUTE

```

Selection Criteria can be specified to filter the input data on one or more of the following:

- Transaction Code
- User ID
- IMS Subsystem ID
- Program

Report content (default)

This is an example of the default format of the TRF Message Queue List report.

The default Message Queue List report can be requested with the following command:

```

IMSPATRF    LIST
IMSPATRF    EXECUTE

```

This produces the same result as the following command in which you can see the defaults explicitly specified:

```

IMSPATRF    LIST(
             DDNAME(LIST0001),
             SECGROUP,
             PRECISION(6),
             FIELDS(LTERM,
                   TRANCODE,
                   PROGRAM,
                   PSTID,
                   CLASS,
                   STARTIMS(TIME),
                   CPUTIME,
                   USERID,
                   INPUTQ,
                   PROCESS,
                   OUTPUTQ,
                   TOTALTM,
                   RESPIMS,
                   RECTOKEN))
IMSPATRF    EXECUTE

```

IMS Performance Analyzer 4.4
List Report

LIST0001 Printed at 15:52:00 19Aug2014

Data from 13.07.09 02Aug2011

Page 1

Input LTERM	Trancode	Program	PST	Cls	IMS Tran Start	CPU Time Userid	InputQ Time	Process Time	OutputQ Time	Total IMS Time	IMS Resp Time	Recovery Token
IP12	CEXTCONV	CEXTPGM	4	5	13.07.09.996120	0.013594 IP12	0.008417	0.171631	0.000052	0.180048	0.180100	0000019100000000
IP12	CEXTCONV	CEXTPGM	4	5	13.07.11.181090	0.007572 IP12	0.001370	0.038055	0.000056	0.039425	0.039481	0000019100000001
IP12	CEXTCONV	CEXTPGM	4	5	13.07.12.223657	0.006486 IP12	0.007487	0.033031	0.000058	0.040518	0.040576	0000019100000002
IP12	CEXTCONV	CEXTPGM	4	5	13.07.13.269219	0.006826 IP12	0.005927	0.023965	0.000084	0.029892	0.029976	0000019100000003
IP12	CEXTCONV	CEXTPGM	4	5	13.07.14.302566	0.001741 IP12	0.004586	0.000740	0.000000	0.005326	0.005326	0000019100000004
IP12	CEXSCONV	CEXSPGM	4	15	13.07.14.302566	0.009849 IP12	0.027788	0.045463	0.000074	0.073251	0.073325	0000019200000000
IP12	CEXSCONV	CEXSPGM	4	15	13.07.15.381800	0.001770 IP12	0.002859	0.000780	0.000000	0.003639	0.003639	0000019200000001
IP12	CEXTCONV	CEXTPGM	4	5	13.07.15.381800	0.006889 IP12	0.037906	0.028423	0.000050	0.066329	0.066379	0000019300000000
IP12	CEXTCONV	CEXTPGM	4	5	13.07.16.452893	0.001673 IP12	0.005670	0.000619	0.000000	0.006289	0.006289	0000019300000001
IP12	CEXSCONV	CEXSPGM	4	15	13.07.16.452893	0.007590 IP12	0.011650	0.038698	0.000060	0.050348	0.050408	0000019400000000
IP12	CEXSCONV	CEXSPGM	4	15	13.07.17.508562	0.001809 IP12	0.007438	0.000661	0.000000	0.008099	0.008099	0000019400000001
IP12	CEXTCONV	CEXTPGM	4	5	13.07.17.508562	0.007380 IP12	0.015786	0.029399	0.000048	0.045185	0.045233	0000019500000000
IP12	CEXTCONV	CEXTPGM	4	5	13.07.18.558267	0.006754 IP12	0.004855	0.018043	0.000049	0.022898	0.022947	0000019500000001
IP12	CEXTCONV	CEXTPGM	4	5	13.07.19.584393	0.030246 IP12	0.010282	0.374668	0.000000	0.384950	0.384950	0000019500000002
IP12	CEXSCONV	CEXSPGM	4	15	13.07.23.724374	0.010184 IP12	0.005727	0.063656	0.000061	0.069383	0.069444	0000019700000000
IP12	CEXSCONV	CEXSPGM	4	15	13.07.24.796934	0.006770 IP12	0.004318	0.018891	0.000062	0.023209	0.023271	0000019700000001

Figure 326. TRF Form-based Message Queue List report (default)

Refer to Chapter 16, “Glossary of Report Form field names,” on page 629 for the field names, descriptions, and column headings. Field descriptions are also available from the dialog using option 10 **Report Forms**. Edit or view a form, then enter line action **H** for help information on any field. The field help information is also available from the form field prompt list.

Form-based Message Queue Summary report

The OMEGAMON TRF Form-based Message Queue Summary provides a summary of transaction performance. You can request multiple reports and extracts in a single run. They enable comprehensive, flexible analysis of message queue information giving you a good insight into different facets of response tuning.

You can tailor the format and content of the reports and extracts by specifying Report Forms, the Time Interval for summarizing activity over time, the Totals Level to include the grand total and optional sub-totals, the data Precision, what Digit Grouping to use, and the Selection Criteria for filtering the input records. Additional extract options are delimiters, field labels, and whether to format numeric fields for DB2 or spreadsheet analysis.

Report options

To specify the report options, select the Message Queue **Summary** report in a TRF Report Set.

The format of the operand to request the Message Queue Summary report or extract is:

```

IMSPATRF    SUMMARY(
              [DDNAME(ddname),]          default SUMMnnnn
              [FROM(date,time),]
              [TO(date,time),]
              [INTERVAL(hh:mm:ss),]      default 00:01:00
              [EXTRACT(ddname),]          default SUMXnnnn
              [PRECISION(n),]             default 3
              [NOGROUP|GROUP|SECGROUP,]
              [TOTALS(n)|NOTOTALS,]      default 0
              [INCL(TRANCODE(list))|EXCL(TRANCODE(list)),]
              [INCL(USERID(list))|EXCL(USERID(list)),]
              [INCL(IMSID(list))|EXCL(IMSID(list)),]
              [INCL(PROGRAM(list))|EXCL(PROGRAM(list)),]
              [DELIMIT(field-delimiter)|NODELIMIT,] default , (comma)
              [LABELS|NOLABELS,]
              [FLOAT|NOFLOAT,]
              FIELDS(fieldI[(options)],...))
IMSPATRF    EXECUTE

```

The level of summarization can be varied depending on the number of key fields. You can specify up to 8 key fields to summarize and sort by, and you can request up to 7 levels of sub-totaling. For an illustration, see Figure 33 on page 96.

Selection Criteria can be specified to filter the input data on one or more of the following:

- Transaction Code
- User ID
- IMS Subsystem ID
- Program

Report content (default)

This is an example of the default format of the TRF Message Queue Summary report.

The default Message Queue Summary report can be requested with the following command:

```

IMSPATRF    SUMMARY
IMSPATRF    EXECUTE

```

This produces the same result as the following command in which you can see the defaults explicitly specified:

```

IMSPATRF    SUMMARY(
              DDNAME(SUMM0001),
              SECGROUP,
              TOTALS(0),
              INTERVAL(00:01:00),
              PRECISION(6),
              FIELDS(TRANCODE(ASCEND),
                    TRANCNT,
                    INPUTQ(AVE),
                    PROCESS(AVE),
                    OUTPUTQ(AVE),
                    TOTALTM(AVE),
                    INPUTQ(90),
                    PROCESS(90),
                    OUTPUTQ(90),
                    TOTALTM(90),
                    CPUTIME(AVE)))
IMSPATRF    EXECUTE

```

IMS Performance Analyzer 4.4
Summary Report

SUMM0001 Printed at 09:05:01 20Aug2014 Data from 11.33.51 10Aug2011 to 12.29.39 10Aug2011

Trancode	Tran Count	Avg InputQ Time	Avg Process Time	Avg OutputQ Time	Avg Total IMS Time	90% InputQ Time	90% Process Time	90% OutputQ Time	90% Total IMS Time	Avg CPU Time
ADDINV	5	0.011794	0.054951	0.000010	0.066745	0.015452	0.115812	0.000039	0.126005	0.006567
ADDPART	4	0.009356	0.023101	0.000032	0.032457	0.011033	0.031653	0.000072	0.040665	0.006501
CEXSCONV	20	0.016656	0.031056	0.000030	0.047712	0.069603	0.102363	0.000123	0.140619	0.007041
CEXSNONC	11	232.3186	0.016412	0.000045	232.3350	1220.070	0.033082	0.000184	1220.092	0.006606
CEXTCONV	31	7.847595	0.063589	0.000030	7.911184	63.80615	0.200713	0.000088	63.95365	0.009720
CEXTNONC	18	0.007546	0.051059	0.000030	0.058605	0.013290	0.178184	0.000083	0.187094	0.010306
DLETINV	4	0.008251	0.081115	0.000074	0.089366	0.010784	0.231641	0.000123	0.241650	0.006991
DLETPART	3	0.012347	0.020673	0.000000	0.033020	0.014386	0.021700	0.000000	0.035012	0.007013
DSPALLI	4	0.007495	0.079063	0.000028	0.086557	0.010190	0.222015	0.000055	0.232102	0.007880
DSPINV	8	0.009555	0.021692	0.000000	0.031247	0.011915	0.023806	0.000000	0.035162	0.007842
IVTCV	36	0.008925	0.042566	0.000017	0.051491	0.017962	0.141444	0.000048	0.151776	0.002856
IVTCX	36	0.008966	0.054680	0.000014	0.063646	0.014805	0.162882	0.000044	0.172002	0.009264
IVTFD	11	0.000000	0.069182	0.000000	0.069182	0.000000	0.252120	0.000000	0.252120	0.002944
IVTFM	8	0.000000	0.000250	0.000000	0.000250	0.000000	0.000843	0.000000	0.000843	0.003039
IVTNO	17	0.007342	0.039422	0.000057	0.046764	0.010976	0.132991	0.000087	0.140118	0.002189
IVTNV	11	0.009699	0.014501	0.000072	0.024200	0.014727	0.023180	0.000094	0.035704	0.001889
MQATREQ1	4	0.007969	0.359919	0.000061	0.367888	0.010365	0.419400	0.000066	0.428685	0.036241
PART	9	0.011140	0.022654	0.000012	0.033795	0.015292	0.038613	0.000043	0.052486	0.005691
Total	240	11.66887	0.048635	0.000027	11.71751	224.0045	0.162660	0.000084	224.0544	0.006873

Figure 327. TRF Form-based Message Queue Summary report (default)

Refer to the Chapter 16, “Glossary of Report Form field names,” on page 629 for the field names, descriptions, and column headings. Field descriptions are also available from the dialog using option 10 **Report Forms**. Edit or view a form, then enter line action H for help information on any field. The field help is also available from the form field prompt list.

TRF Trace reports

The Trace reports provide detailed analyses of OMEGAMON TRF Extractor output records. These reports provide detailed information about every event in the life of a transaction.

TRF Record Trace report

The OMEGAMON TRF Trace provides a list of transactions, each with detailed information about every event in the life of that transaction. At a glance, you can see when a transaction starts, followed by all the events associated with the transaction in the order they occurred.

Report options

To specify the report options, select the Trace Reports **Record Trace** in a TRF Report Set.

The command for the TRF Record Trace report is:

```
IMSPATRF      TRACE(
               [DDNAME(ddname),]          default TRACE
               [INCL(TRANCODE(list))|EXCL(TRANCODE(list)),]
               [INCL(USERID(list))|EXCL(USERID(list)),]
               [INCL(IMSID(list))|EXCL(IMSID(list)),]
               [INCL(PROGRAM(list))|EXCL(PROGRAM(list)),]
               [INCL(CODE(list))|EXCL(CODE(list))])
IMSPATRF      EXECUTE
```

Selection Criteria can be specified to filter the input data on one or more of the following:

- Transaction Code
- User ID
- IMS Subsystem ID
- Program
- Record Codes

Report content

Record trace reports format input records using Tivoli-supplied macro **K12TRFDS**.

TRF 10: MSG

IMS Performance Analyzer 4.4 IMS OMEGAMON TRF Records			
Extractor output from 02Aug2011 13.08.17.3			Page 47
Time hh.mm.ss.thmij	Trancode	Type	
13.08.17.363337	CEXSNONC	10	Transaction: message send/receive or program schedule/process/end
			Input LTERM IPI2 Region type MPP
			Job name IADEMP3 Step name REGION
			PSB name CEXSPGM Userid IPI2
			IMS name IADE IMS version 1010
			Class 15 PST Id 4
			SMF system id FTS1 Recovery token IADE/0000019C00000000
			Pseudo-Abend/SCC/User-Abend (/ /) VTAM input node VAPIPI2B
			Private storage below 16M 90,112 SRB time 0.000064
			Private storage above 16M 184,320 CPU time 0.008490
			Input message length 15 Message arrival 2011-08-02 13.08.17.363337
			Output message length 30 Processing start 2011-08-02 13.08.17.387256
			Processing end 2011-08-02 13.08.17.418673
			Input queue time 1 0.023919
			Input queue time 2 0.020124
			Program execution time 0.031417
			Output queue time 0.000057
			Alternate local output Q time 0.000057
			Alternate CQS output time 0.010656
			VSO reads from dataspace 0 CQS output time 0.010656
			VSO reads from DASD to dataspace 0 Internal application response time 0.051541
			VSO updates to dataspace 0 Total response time 0.055336

Figure 328. Trace report: TRF 10 – MSG

TRF 11: MSGOUT

IMS Performance Analyzer 4.4 IMS OMEGAMON TRF Records			
Extractor output from 02Aug2011 13.04.49.6			Page 1
Time hh.mm.ss.thmij	Trancode	Type	
13.07.09.900000	CEXTCONV	11	Message sent to alternate TP PCB by another transaction
			Input LTERM IPI2 Region type MPP
			Job name - Step name -
			PSB name CEXTPGM Userid IPI2
			IMS name IADE IMS version -
			Class 5 PST Id 4
			Output CNT name
			SMF system id - Recovery token (IMSID/OASN) /00000191
			CQS output time 0.009372 Local output queue time 1.004796
			Output queue time 1.004796

Figure 329. Trace report: TRF 11 – MSGOUT

TRF 12: DFS554A Message

```

                                     IMS Performance Analyzer 4.4
                                     IMS OMEGAMON TRF records
                                     Extractor output from 10Aug2011 12.18.29.3

---- Time -----
hh.mm.ss.thmiju  Trancode  Ty
pe
-----
12.18.29.600000  -----  12  Transaction abend message
                                DFS554A IADEMPP3 00005 REGION  CEXTPGM (1) CEXTCONV 000,4001 PSB SMB  2011

```

Figure 330. Trace report: TRF 12 – DFS554A Message

TRF 13: DLI Detail

```

                                     IMS Performance Analyzer 4.4
                                     IMS OMEGAMON TRF Records
                                     Extractor output from 02Aug2011 13.07.09.9
                                     Page      2

---- Time -----
hh.mm.ss.thmiju  Trancode  Ty
pe
-----
13.07.09.900000  CEXTCONV  13  DLI detail
                                Input LTERM          IPI2          Region type          MPP
                                Job name              IADEMPP3         Step name          REGION
                                PSB name              CEXTPGM         Userid            IPI2
                                IMS name              IADE            IMS version        1010
                                Class                  5              PST Id            4
                                DBD used by this transaction  DI21PART        DLI function and return code  GHU ( )
                                DLI call time (UTC-STCK)  05.07.10.033504 Recovery token      IADE/0000019100000000
                                DLI return time (UTC-STCK) 05.07.10.034002 DLI call CPU time   0.000208
                                DLI call elapsed time      0.000498

```

Figure 331. Trace report: TRF 13 – DLI Detail

TRF 15: MSDB Detail

```

                                     IMS Performance Analyzer 4.4
                                     IMS OMEGAMON TRF Records
                                     Extractor output from 02Aug2011 13.11.53.2
                                     Page    106

---- Time -----
hh.mm.ss.thmiju  Trancode  Ty
pe
-----
13.11.52.100000  IVTFM      15  Fast Path detail - MSDB
                                Input LTERM          IPI2          Region type          IFP
                                Job name              IADEIFP2         Step name          IFP
                                PSB name              DFSIVP5         Userid            IPI2
                                IMS name              IADE            IMS version        1010
                                Class                  -              PST Id            1
                                DBD used by this transaction  IVPDB4         DLI function and return code  GU ( )
                                DLI call time (UTC-STCK)  05.11.52.188500 Recovery token      IADE/0000019000000000
                                DLI return time (UTC-STCK) 05.11.52.188512 DLI call CPU time   0.000011
                                DLI call elapsed time      0.000012

```

Figure 332. Trace report: TRF 15 – MSDB Detail

TRF 16: DEDB Detail

IMS Performance Analyzer 4.4						
IMS OMEGAMON TRF Records						
Extractor output from 02Aug2011 13.11.26.3					Page	97
Time	Trancode	Type				
hh.mm.ss.thmij		pe				
13.11.27.300000	IVTFD	16	Fast Path detail - DEDB			
			Input LTERM	IPI2	Region type	IFP
			Job name	IADEIFP1	Step name	IFP
			PSB name	DFSIVP4	Userid	IPI2
			IMS name	IADE	IMS version	1010
			Class	-	PST Id	5
			DBD used by this transaction	IVPDB3	DLI function and return code	ISRT()
			DLI call time (UTC-STCK)	05.11.27.372386	Recovery token	IADE/0000018F00000001
			DLI return time (UTC-STCK)	05.11.27.389879	DLI call CPU time	0.000198
			DLI call elapsed time	0.017493		

Figure 333. Trace report: TRF 16 – DEDB Detail

TRF 17: DLI Summary

IMS Performance Analyzer 4.4									
IMS OMEGAMON TRF Records									
Extractor output from 10Aug2011 12.20.04.9							Page	39	
Time	Trancode	Type							
hh.mm.ss.thmij		pe							
12.20.04.900000	IVTCV	17	DLI summary						
			Input LTERM	IPI2	Region type			MPP	
			Job name	IADEMP2	Step name			REGION	
			PSB name	DFSIVP3	Userid			IPI2	
			IMS name	IADE	IMS version			1010	
			Class	4	PST Id			1	
			DBD used by this transaction	IVPDB2	Recovery token		IADE/0000027400000000		
			Elapsed time of shortest call	0.027946	Total CPU time - all calls			0.000276	
			Elapsed time of longest call	0.027946	Total elapsed time - all calls			0.027946	
			Number of calls	1					

Figure 334. Trace report: TRF 17 – DLI Summary

TRF 18: DB2 Summary

IMS Performance Analyzer 4.4								
IMS OMEGAMON TRF Records								
Extractor output from 02Aug2011 13.08.13.2							Page	41
Time	Trancode	Type						
hh.mm.ss.thmij		pe						
13.08.13.200000	CEXTNOC	18	DB2 summary					
			Input LTERM	IPI2	Region type		MPP	
			Job name	IADEMP3	Step name		REGION	
			PSB name	CEXTPGM	Userid		IPI2	
			IMS name	IADE	IMS version		1010	
			Class	5	PST Id		4	
			DB2 subsystem name	DBP1	Recovery token	IADE/0000019B00000000		
			Elapsed time of shortest call	0.000083	Total CPU time - all calls		0.003267	
			Elapsed time of longest call	0.000972	Total elapsed time - all calls		0.003680	
			Number of calls	14				

Figure 335. Trace report: TRF 18 – DB2 Summary

TRF 19: Fast Path Summary

IMS Performance Analyzer 4.4
IMS OMEGAMON TRF records
Extractor output from 23May2007 11.13.56.5

Time	Trancode	Type				
hh.mm.ss.thmij		pe				
11.13.56.500000		19	Fast Path summary			
			Input LTERM	FUNTRM96	Region type	IFP
			Job name	I9DEIFP1	Step name	IFP
			PSB name	DFSIVP4	Userid	FUNTRM96
			IMS name	I9DE	IMS version	910
			Class	-	PST Id	2
			DBD used by this transaction	IVPDB3		
			Recovery token	I9DE/0000008A00000000		
			Number of calls	22	Elapsed time of quickest call	0.000011
			Elapsed time of longest call	0.551918	Total elapsed time - all calls	1.163206
			Number of ISRT calls	6	Total elapsed time - ISRT	0.537359
			Number of REPL calls	2	Total elapsed time - REPL	0.000025
			Number of DLET calls	1	Total elapsed time - DLET	0.000011
			Number of GU calls	10	Total elapsed time - GU	0.619590
			Number of GHU calls	3	Total elapsed time - GHU	0.006221

Figure 336. Trace report: TRF 19 – Fast Path Summary

Part 6. OMEGAMON ATF reporting

The topics in this section describe each of the IMS PA OMEGAMON ATF reports and extracts, their content and sample output. The reports and extracts are discussed in the order in which they are presented in the OMEGAMON ATF Report Set edit panel in the dialog.

Chapter 10. Analyzing OMEGAMON ATF reports and extracts

This topic describes how IMS Performance Analyzer (IMS PA) complements IBM Tivoli OMEGAMON XE for IMS on z/OS version 4.2 or later by reporting transaction and application-level accounting statistics written to a VSAM KSDS journal by the Application Trace Facility (ATF).

OMEGAMON ATF data

OMEGAMON Application Tracing Facility (ATF) complements the summary-level transaction data collected by the Transaction Reporting Facility (TRF).

OMEGAMON ATF provides the following data:

- Application-level detailed monitoring:
 - DLI calls, including SSA, KFBA and IO area.
 - DB2 calls.
- DLI call times and CPU utilization (in each IMS region).

See Chapter 15, “OMEGAMON ATF records,” on page 627 for the list of ATF record codes.

The analysis of the data collected by ATF can be used to:

- Identify transaction response-time components.
- Fine-tune applications.
- Understand how application programs operate.

OMEGAMON and IMS PA VSAM record counts will be different.

Note:

1. For IMS Performance Analyzer reporting, it is recommended to use the journals when ATF is offline (and not actively recording) or copy the journals to offline data sets before processing.
2. If reporting ATF data from a system that is earlier than OMEGAMON version 4.2, then new fields such as DL/I CPU Time will be displayed as zeroes.
3. A transaction consists of many ATF events: DLI and DB2 calls, terminating with a summary X'04' record. The IMS PA Transaction Exception extract counts each ATF event as a record. Therefore the extract record count will differ from the ATF transaction count. For more information, see “Extract record processing” on page 606.

ATF report categories

The IMS PA ATF reports have a similar look-and-feel to the OMEGAMON online reports, providing a three-level progression for analysis: List, Summary, and Trace. The dialog presents the menu of ATF reports in a tree structure grouped by category so you can request them individually or by category.

The ATF report categories are:

- Transaction Transit reports (List and Summary)
- Trace reports
- Extracts (Exception transactions)

There is also a category containing ATF Global Options. This is where you can specify options that apply globally to all or many reports in the ATF Report Set.

Transaction Transit reports

These reports provide transaction and application-level accounting.

- The Transit List report provides a list of all transaction event data in chronological sequence
- The Transit Summary report provides a statistical analysis of transaction activity

Trace reports

The Record Trace reports provides three levels of detail for application-level analysis of DLI and external subsystem (DB2 SQL and MQ adapter) calls.

Exception Transaction extract

The Exception Transaction extract is an ATF data reduction process creating a data set of transactions that generated an exception (ABEND or long response time).

There are two types of data set. You can choose to extract to either or both types:

- ATF Journal, a pre-allocated KSDS
- REPRO file, a sequential data set for archival purposes which you can later load into an empty ATF journal for reporting

ATF report reference table

The reference table lists the IMS PA OMEGAMON ATF reports and commands with cross-references to the descriptions and sample outputs.

You can request reports using the dialog or batch commands. The dialog generates the JCL and batch commands for you, but you can edit the JCL before submit. For more information on using the batch commands, refer to the “OMEGAMON ATF batch interface” in the *IMS Performance Analyzer for z/OS: User's Guide*.

Table 34. ATF reports and extracts: Batch commands and output examples

Report name	IMSPAATF command	Examples
Transaction Transit reports		
“ATF Transit List report” on page 597	LIST	Figure 337 on page 598
“ATF Transit Summary report” on page 598	SUMMARY	Figure 338 on page 599
Trace reports		
“ATF Record Trace report” on page 599	TRACE	Figure 339 on page 601
		Figure 340 on page 602
		Figure 343 on page 605
Extracts		
“ATF Exception Transaction extract” on page 605	EXTRACT	

ATF Transaction Transit reports

The OMEGAMON ATF Transaction Transit reports category provides List and Summary reports.

ATF Transit List report

The OMEGAMON ATF Transit List report provides a chronological list of transactions with their processing and CPU times.

Report options

To specify the report options, select the Transaction Transit **List** report in an ATF Report Set.

The command for the Transit List report is:

```
IMSPAATF      LIST(
                [DDNAME(ddname),]          default LIST0001
                [FROM(date,time),]
                [TO(date,time),]
                [INCL(TRANCODE(list))|EXCL(TRANCODE(list)),]
                [INCL(USERID(list))|EXCL(USERID(list)),]
                [INCL(IMSID(list))|EXCL(IMSID(list)),]
                [INCL(PROGRAM(list))|EXCL(PROGRAM(list))])
IMSPAATF      EXECUTE
```

Selection Criteria can be specified to filter the input data on one or more of the following:

- Transaction Code
- User ID
- IMS Subsystem ID
- Program

Report content

This figure shows an example of the Transit List report.

LIST0001 Printed at 14:04:43 27Oct2010

Data from 12.05.01 27Oct2010

Page 1

IMS Tran Start	Trancode	Program	Jobname	Input LTERM	Process Time	CPU Time	ABEND Code
12.05.01.094681	DSPINV	DFSSAM03	IBDEMPP1	FUNTRM41	0.290048	0.007813	
12.05.55.847813	IVTCV	DFSIVP3	IBDEMPP1	FUNTRM41	0.416449	0.008217	
12.06.15.207983	IVTCV	DFSIVP3	IBDEMPP1	FUNTRM41	0.133001	0.005581	
12.06.56.567761	DISPLAY	DFSIVP1	IBDEMPP1	FUNTRM41	0.653030	0.013570	
12.07.13.762978	ADD	DFSIVP1	IBDEMPP1	FUNTRM41	0.164273	0.002998	
12.07.35.250405	DISPLAY	DFSIVP1	IBDEMPP1	FUNTRM41	0.157897	0.001975	
12.09.24.657806	DISPLAY	DFSIVP2	IBDEMPP1	FUNTRM41	0.247746	0.002241	
12.09.42.891409	CEXTN0NC	CEXTPGM	IBDEMPP4	FUNTRM41	3.394723	0.014987	U4000
12.10.21.078193	CEXSN0NC	CEXSPGM	IBDEMPP4	FUNTRM41	0.286949	0.016621	
12.15.27.021295	CEXSN0NC	CEXSPGM	IBDEMPP4	FUNTRM39	0.106380	0.023404	
12.16.45.935145	CEXSN0NC	CEXSPGM	IBDEMPP4	FUNTRM39	2.308009	0.012155	U4000
12.17.13.709648	CEXTCONV	CEXTPGM	IBDEMPP4	FUNTRM41	1.729248	0.016654	U4000
12.35.53.872232	CEXSCONV	CEXSPGM	IBDEMPP4	FUNTRM39	0.176930	0.024432	
12.36.29.635937	MQATREQ1	MQDTPGM	IBDEMPP4	FUNTRM41	2.887385	0.098537	
12.36.58.279161	MQATREQ1	MQDTPGM	IBDEMPP4	FUNTRM41	0.486872	0.046504	
12.37.04.927522	MQATREQ1	MQDTPGM	IBDEMPP4	FUNTRM41	1.277220	0.108216	
12.37.14.527659	MQATREQ1	MQDTPGM	IBDEMPP4	FUNTRM41	2.098478	0.216920	
12.37.28.379524	MQATREQ1	MQDTPGM	IBDEMPP4	FUNTRM41	4.101409	0.432593	

Figure 337. ATF Transit List report

For field descriptions, refer to OMEGAMON XE for IMS *Application Trace Facility Reference*.

ATF Transit Summary report

The OMEGAMON ATF Transit Summary report provides a statistical analysis of transaction activity with average and maximum processing and CPU times, and number of abends.

The report can be requested with or without totals.

Report options

To specify the report options, select the Transaction Transit **Summary** report in an ATF Report Set.

The command for the Transit Summary report is:

```
IMSPAATF      SUMMARY(
                [TOTALS(0)|NOTOTALS,]          default TOTALS(0)
                [DDNAME(ddname),]              default SUMM0001
                [FROM(date,time),]
                [TO(date,time),]
                [INCL(TRANCODE(list))|EXCL(TRANCODE(list)),]
                [INCL(USERID(list))|EXCL(USERID(list)),]
                [INCL(IMSID(list))|EXCL(IMSID(list)),]
                [INCL(PROGRAM(list))|EXCL(PROGRAM(list))])
IMSPAATF      EXECUTE
```

Selection Criteria can be specified to filter the input data on one or more of the following:

- Transaction Code
- User ID
- IMS Subsystem ID
- Program

Also specify the summarization level:

- TOTALS(0) for grand total, no subtotals. This is the default.
- NOTOTALS for no totals.

Report content

This figure shows an example of the Transit Summary report.

IMS Performance Analyzer 4.4 OMEGAMON ATF Summary Report						
SUMM0001 Printed at 14:07:00 27Oct2010			Data from 12.09.42 27Oct2010 to 12.37.28 27Oct2010			Page 1
Trancode	Tran Count	Avg Process Time	Max Process Time	Avg CPU Time	Max CPU Time	Abend Count
CEXSNONC	1	2.308009	2.308009	0.012155	0.012155	1
CEXTCONV	1	1.729248	1.729248	0.016654	0.016654	1
CEXTNONC	1	3.394723	3.394723	0.014987	0.014987	1
MQATREQ1	4	2.591123	4.101409	0.214067	0.432593	0
Total	7	2.542353	4.101409	0.128580	0.432593	3

Figure 338. ATF Transit Summary report

The report provides summary statistics for each transaction in the List report.

ATF Trace reports

The OMEGAMON ATF Trace reports category contains the Record Trace report.

ATF Record Trace report

The OMEGAMON ATF Trace provides detailed application DLI, DB2, and MQ call analysis for selected transactions.

There are three levels of trace that provide an increasing level of detail:

1. Trace Overview
2. Trace Detail
3. Trace Detail (Expanded)

Report options

To specify the report options, select the Trace Reports **Record Trace** in an ATF Report Set.

The command for the ATF Record Trace report is:

```
IMSPAATF    TRACE(
              [LEVEL(1|2|3),]           default 1
              [DDNAME(ddname),]         default TRACE001
              [MONITOR,]                 applies only to level 2 or 3
              [INCL(TRANCODE(list))|EXCL(TRANCODE(list)),]
              [INCL(USERID(list))|EXCL(USERID(list)),]
              [INCL(IMSID(list))|EXCL(IMSID(list)),]
              [INCL(PROGRAM(list))|EXCL(PROGRAM(list))])
IMSPAATF    EXECUTE
```

Important parameters for this command are:

LEVEL

Select which level to report:

LEVEL(1) - Overview: Reports each transaction with summary statistics by event type.

LEVEL(2) - Detail: Reports each transaction with detail statistics for each event type.

LEVEL(3) - Detail (Expanded): Contains LEVEL(2) details plus formatted data areas for DLI calls and statement numbers for DB2 calls.

MONITOR

With the MONITOR option specified, trace level 2 and 3 OMEGAMON ATF Trace reports contain:

- Fast Path (type X'03') and Full Function (type X'06) monitor event records.
- The Event CPU/AccumCPU column, providing the CPU time consumed by the execution of the event, and the transaction CPU time up to the completion of the event respectively.
- The level column (L) reporting the level of the monitor event. Non-monitor event types are reported as 0.
- For IBM MQ events, the MQ function name and type, program name, as well as the queue manager and queue name.
- For DB2 SQL events, the program name and statement number (Stmt#).
- Additional transaction identification and performance characteristics.

The MONITOR option does not apply to trace level 1 reports.

INCL/EXCL

Specify Selection Criteria to filter the report based on one or more of the following:

- Transaction Code
- User ID
- IMS Subsystem ID
- Program

ATF Trace Level 1: Overview

The ATF Trace level 1 “overview” report provides a chronological list of transactions, displaying for each transaction a statistical analysis of application call activity, showing call type and count, as well as total, average, and maximum call elapsed times.

```

=====
Transaction . . . . CEXTCONV   Date-Time . . . . 2014-07-12-12.02.01.755895
PSB . . . . . CEXTPGM   Logical Terminal . . IPI2      Transaction Class . 005
Jobname . . . . . IADEMP3    Region ID . . . . 0001      Region Type . . . . MPP
UserID . . . . . IPI2      Quick Schedule . . NO      Primed Message . . . NO
Abend Code . . . . .      Current SPA Size . . 00050    Message Source . . . TERM
Elapsed Time . . . . 0.059019 Total CPU Time . . . 0.008028   Dependent Region CPU 0.008028
DLI CPU Time . . . . 0.001635 DB2 CPU Time . . . . 0.004144   MQ CPU Time . . . . 0.000000
Control Region CPU . 0.000000 DLISAS Region CPU . 0.000000   Other Regions CPU . 0.000000
Elapsed time DL/I . 0.003498 Elapsed time DB2 . . 0.012978 Elapsed time MQ . . 0.000000
=====

```

Event	Type	Count	----- Elapsed Time -----			----- CPU Time -----		
			Total	Average	Maximum	Total	Average	Maximum
DLI CALL (TM)	GU	1	0.001206	0.001206	0.001206	0.000335	0.000335	0.000335
DLI CALL (TM)	GN	1	0.000035	0.000035	0.000035	0.000035	0.000035	0.000035
DLI CALL (DB)	GHU	2	0.000911	0.000455	0.000849	0.000439	0.000219	0.000378
DLI CALL (DB)	REPL	1	0.000297	0.000297	0.000297	0.000254	0.000254	0.000254
DLI CALL (DB)	DLET	1	0.000187	0.000187	0.000187	0.000187	0.000187	0.000187
DLI CALL (DB)	ISRT	1	0.000513	0.000513	0.000513	0.000244	0.000244	0.000244
DB2 SQL	OPEN	1	0.000341	0.000341	0.000341	0.000275	0.000275	0.000275
DB2 SQL	FETCH	14	0.003650	0.000260	0.002485	0.001580	0.000112	0.000643
DB2 SQL	UPDATE	1	0.000323	0.000323	0.000323	0.000323	0.000323	0.000323
DB2 SQL	CLOSE	1	0.000134	0.000134	0.000134	0.000091	0.000091	0.000091
DB2 SQL	DELETE	1	0.000597	0.000597	0.000597	0.000515	0.000515	0.000515
DB2 SQL	INSERT	1	0.000405	0.000405	0.000405	0.000368	0.000368	0.000368
DLI CALL (TM)	ISRT	2	0.000351	0.000175	0.000240	0.000142	0.000071	0.000103

```

=====
Transaction . . . . CEXTCONV   Date-Time . . . . 2014-07-12-12.02.02.812080
PSB . . . . . CEXTPGM   Logical Terminal . . IPI2      Transaction Class . 005
Jobname . . . . . IADEMP3    Region ID . . . . 0001      Region Type . . . . MPP
UserID . . . . . IPI2      Quick Schedule . . NO      Primed Message . . . NO
Abend Code . . . . .      Current SPA Size . . 00050    Message Source . . . TERM
Elapsed Time . . . . 0.307739 Total CPU Time . . . 0.006851   Dependent Region CPU 0.006851
DLI CPU Time . . . . 0.001017 DB2 CPU Time . . . . 0.003763   MQ CPU Time . . . . 0.000000
Control Region CPU . 0.000000 DLISAS Region CPU . 0.000000   Other Regions CPU . 0.000000
Elapsed time DL/I . 0.002384 Elapsed time DB2 . . 0.012642 Elapsed time MQ . . 0.000000
=====

```

Event	Type	Count	----- Elapsed Time -----			----- CPU Time -----		
			Total	Average	Maximum	Total	Average	Maximum
DLI CALL (TM)	GU	1	0.000847	0.000847	0.000847	0.000026	0.000026	0.000026
DLI CALL (TM)	GN	1	0.000033	0.000033	0.000033	0.000033	0.000033	0.000033
DLI CALL (DB)	GHU	2	0.000828	0.000414	0.000770	0.000363	0.000181	0.000305
DLI CALL (DB)	REPL	1	0.000168	0.000168	0.000168	0.000168	0.000168	0.000168
DLI CALL (DB)	DLET	1	0.000155	0.000155	0.000155	0.000154	0.000154	0.000154
DLI CALL (DB)	ISRT	1	0.000158	0.000158	0.000158	0.000158	0.000158	0.000158
DB2 SQL	OPEN	1	0.000306	0.000306	0.000306	0.000306	0.000306	0.000306
DB2 SQL	FETCH	14	0.005648	0.000403	0.004753	0.001486	0.000106	0.000635
DB2 SQL	UPDATE	1	0.000336	0.000336	0.000336	0.000317	0.000317	0.000317
DB2 SQL	CLOSE	1	0.000064	0.000064	0.000064	0.000064	0.000064	0.000064
DB2 SQL	DELETE	1	0.000434	0.000434	0.000434	0.000372	0.000372	0.000372
DB2 SQL	INSERT	1	0.000450	0.000450	0.000450	0.000375	0.000375	0.000375
DLI CALL (TM)	ISRT	2	0.000196	0.000098	0.000106	0.000117	0.000058	0.000089

Figure 339. OMEGAMON ATF Trace Level 1: Overview

ATF Trace Level 2: Detail

The ATF Trace level 2 “detail” report provides a chronological list of transactions, displaying for each transaction the application calls made by the transaction, showing call type and options, resources used, elapsed time, and return code.

IMS Performance Analyzer 4.4
IMS OMEGAMON ATF Records

OMEGAMON ATF Trace Level 2 from 10Aug2014 12.25.18.7

```
=====
Transaction . . . . MQATREQ1   Date-Time . . . . 2014-08-10-12.25.18.730110
Jobname . . . . . IADEMPP3    Region ID . . . . 0005      Region Type . . . . MPP
Elapsed Time . . . . 0.346502  Total CPU Time . . . 0.034430  Dependent Region CPU 0.034430
DLI CPU Time . . . . 0.003504  DB2 CPU Time . . . . 0.011106  MQ CPU Time . . . . 0.002525
Control Region CPU . 0.000000  DLISAS Region CPU . 0.000000  Other Regions CPU . 0.000000
Elapsed time DL/I . 0.023492  Elapsed time DB2 . . 0.024732  Elapsed time MQ . . 0.257480
=====
```

Time hh.mm.ss.thmiju	Relative ss.thmiju	Duration ss.thmiju	CPU Time	Description	Resources	Function Verb	Ret Code	Event
12.25.18.730110	0	0.346502	0.000000	SUMMARY COMPLETION				1
12.25.18.736803	+ 0.006693	0.000010	0.000008	DLI CALL (TM)	I/O PCB	GU		2
12.25.18.736838	+ 0.006728	0.000694	0.000345	DLI CALL (DB)	DI21PART PARTROOT	GHU		3
12.25.18.737558	+ 0.007447	0.000126	0.000126	DLI CALL (DB)	DI21PART PARTROOT	REPL		4
12.25.18.737701	+ 0.007590	0.000155	0.000072	DLI CALL (DB)	DI21PART PARTROOT	GHU		5
12.25.18.737873	+ 0.007762	0.000151	0.000151	DLI CALL (DB)	DI21PART PARTROOT	DLET		6
12.25.18.738039	+ 0.007928	0.000152	0.000152	DLI CALL (DB)	DI21PART PARTROOT	ISRT		7
12.25.18.739910	+ 0.009799	0.000651	0.000632	ESS SIGNON	DBP1			8
12.25.18.740613	+ 0.010502	0.005701	0.004914	ESS CREATE THREAD	DBP1			9
12.25.18.746364	+ 0.016253	0.000433	0.000390	DB2 SQL	DBP1	OPEN	+000	10
12.25.18.746952	+ 0.016842	0.002871	0.001600	DB2 SQL	DBP1	FETCH	+000	11
12.25.18.749964	+ 0.019853	0.000092	0.000092	DB2 SQL	DBP1	FETCH	+000	12
12.25.18.750182	+ 0.020072	0.000065	0.000065	DB2 SQL	DBP1	FETCH	+000	13
12.25.18.750429	+ 0.020319	0.000101	0.000100	DB2 SQL	DBP1	FETCH	+000	14
12.25.18.750661	+ 0.020551	0.000065	0.000065	DB2 SQL	DBP1	FETCH	+000	15
12.25.18.750891	+ 0.020780	0.000078	0.000078	DB2 SQL	DBP1	FETCH	+000	16
12.25.18.751093	+ 0.020983	0.000064	0.000064	DB2 SQL	DBP1	FETCH	+000	17
12.25.18.751260	+ 0.021150	0.000069	0.000067	DB2 SQL	DBP1	FETCH	+000	18
12.25.18.751450	+ 0.021340	0.000098	0.000077	DB2 SQL	DBP1	FETCH	+000	19
12.25.18.751666	+ 0.021556	0.001545	0.000726	DB2 SQL	DBP1	UPDATE	+000	20
12.25.18.753360	+ 0.023250	0.000064	0.000064	DB2 SQL	DBP1	CLOSE	+000	21
12.25.18.753528	+ 0.023417	0.001190	0.000528	DB2 SQL	DBP1	DELETE	+000	22
12.25.18.754859	+ 0.024749	0.001332	0.000575	DB2 SQL	DBP1	INSERT	+000	23
12.25.18.780598	+ 0.050488	0.000149	0.000110	ESS SIGNON	CSQ6			24
12.25.18.780812	+ 0.050701	0.000282	0.000248	ESS CREATE THREAD	CSQ6			25
12.25.18.781136	+ 0.051026	0.000023	0.000023	MQ CALL	CSQ6	CONN	00000000	26
12.25.18.781392	+ 0.051281	0.000264	0.000264	MQ CALL	CSQ6	OPEN	00000000	27
12.25.18.781761	+ 0.051650	0.002328	0.000521	MQ CALL	CSQ6	GET	00000000	28
12.25.18.784188	+ 0.054077	0.251098	0.000136	MQ CALL	CSQ6	GET	00000002	29
12.25.19.035524	+ 0.305414	0.000230	0.000184	MQ CALL	CSQ6	CLOS	00000000	30
12.25.19.035841	+ 0.305730	0.000198	0.000198	MQ CALL	CSQ6	OPEN	00000000	31
12.25.19.036150	+ 0.306039	0.002587	0.000526	MQ CALL	CSQ6	PUT	00000000	32
12.25.19.038842	+ 0.308731	0.000083	0.000083	MQ CALL	CSQ6	CLOS	00000000	33
12.25.19.049987	+ 0.319877	0.000238	0.000232	MQ CALL	CSQ6	DISC	00000000	34
12.25.19.050369	+ 0.320258	0.000110	0.000110	DLI CALL (TM)	I/O PCB	ISRT		35
12.25.19.050614	+ 0.320503	0.000746	0.000056	DLI CALL (DB)	DI21PART	STAT		36
12.25.19.051614	+ 0.321504	0.000025	0.000025	DLI CALL (DB)	DI21PART	STAT		37
12.25.19.051808	+ 0.321698	0.000021	0.000021	DLI CALL (DB)	DI21PART	STAT	GE	38
12.25.19.053468	+ 0.323357	0.001978	0.000322	ESS COMMIT PH.1	DBP1			39
12.25.19.055475	+ 0.325365	0.000080	0.000080	ESS COMMIT PH.1	CSQ6			40
12.25.19.064837	+ 0.334727	0.003848	0.000747	ESS TERM THREAD	DBP1			41
12.25.19.068726	+ 0.338615	0.004407	0.004407	ESS TERM THREAD	CSQ6			42
12.25.19.051892	+ 0.321782	0.021302	0.002438	DLI CALL (TM)		ASRT		43

Figure 340. OMEGAMON ATF Trace Level 2: Detail

IMS Performance Analyzer 4.4
IMS OMEGAMON ATF Records

OMEGAMON ATF Trace Level 2 from 10Aug2014 12.25.18.7

=====										
Transaction	MQATREQ1	Date-Time	2014-08-10-12.25.18.730110							
PSB	MQDTPGM	Logical Terminal . .	IPI2	Transaction Class .	006					
Jobname	IADEMP3	Region ID	0005	Region Type	MPP					
UserID	IPI2	Quick Schedule . . .	NO	Primed Message . . .	YES					
Abend Code		Current SPA Size . .	N/A	Message Source . . .	TERM					
Elapsed Time	0.346502	Total CPU Time . . .	0.034430	Dependent Region CPU	0.034430					
DLI CPU Time	0.003504	DB2 CPU Time	0.011106	MQ CPU Time	0.002525					
Control Region CPU .	0.000000	DLISAS Region CPU .	0.000000	Other Regions CPU .	0.000000					
Elapsed time DL/I .	0.023492	Elapsed time DB2 . .	0.024732	Elapsed time MQ . .	0.257480					
=====										
Time hh.mm.ss.thmiju	Relative ss.thmiju	Duration ss.thmiju	Event CPU /AccumCPU	Description	L	Resources	Function Verb	Ret Code	Stmt#	Event
12.25.18.730110	0	0.346502	0.000000	SUMMARY COMPLETION	-					1
12.25.18.732095	+ 0.001984	0.000000	0.000000	MPP SCHEDULING START	0					2
			0.000390							
12.25.18.736803	+ 0.006693	0.000010	0.000008	DLI CALL (TM)	0	I/O PCB	GU			3
			0.002056							
12.25.18.736838	+ 0.006728	0.000694	0.000345	DLI CALL (DB)	0	DI21PART PARTROOT	GHU			4
			0.000369							
12.25.18.737558	+ 0.007447	0.000126	0.000126	DLI CALL (DB)	0	DI21PART PARTROOT	REPL			5
			0.000151							
12.25.18.737701	+ 0.007590	0.000155	0.000072	DLI CALL (DB)	0	DI21PART PARTROOT	GHU			6
			0.000088							
12.25.18.737873	+ 0.007762	0.000151	0.000151	DLI CALL (DB)	0	DI21PART PARTROOT	DLET			7
			0.000167							
12.25.18.738039	+ 0.007928	0.000152	0.000152	DLI CALL (DB)	0	DI21PART PARTROOT	ISRT			8
			0.000166							
12.25.18.739910	+ 0.009799	0.000651	0.000632	ESS SIGNON	0	DBP1				9
			0.001866							
12.25.18.740613	+ 0.010502	0.005701	0.004914	ESS CREATE THREAD	0	DBP1				10
			0.004965							
12.25.18.746364	+ 0.016253	0.000433	0.000390	DB2 SQL	0	DBP1 MQDTPGM	OPEN	+000	00835	11
			0.000437							
12.25.18.746952	+ 0.016842	0.002871	0.001600	DB2 SQL	0	DBP1 MQDTPGM	FETCH	+000	00837	12
			0.001737							
12.25.18.749964	+ 0.019853	0.000092	0.000092	DB2 SQL	0	DBP1 MQDTPGM	FETCH	+000	00837	13
			0.000230							
12.25.18.750182	+ 0.020072	0.000065	0.000065	DB2 SQL	0	DBP1 MQDTPGM	FETCH	+000	00837	14
			0.000168							
12.25.18.750429	+ 0.020319	0.000101	0.000100	DB2 SQL	0	DBP1 MQDTPGM	FETCH	+000	00837	15
			0.000243							
12.25.18.750661	+ 0.020551	0.000065	0.000065	DB2 SQL	0	DBP1 MQDTPGM	FETCH	+000	00837	16
			0.000172							
12.25.18.750891	+ 0.020780	0.000078	0.000078	DB2 SQL	0	DBP1 MQDTPGM	FETCH	+000	00837	17
			0.000207							
12.25.18.751093	+ 0.020983	0.000064	0.000064	DB2 SQL	0	DBP1 MQDTPGM	FETCH	+000	00837	18
			0.000166							
12.25.18.751260	+ 0.021150	0.000069	0.000067	DB2 SQL	0	DBP1 MQDTPGM	FETCH	+000	00837	19
			0.000170							
12.25.18.751450	+ 0.021340	0.000098	0.000077	DB2 SQL	0	DBP1 MQDTPGM	FETCH	+000	00837	20
			0.000198							
12.25.18.751666	+ 0.021556	0.001545	0.000726	DB2 SQL	0	DBP1 MQDTPGM	UPDATE	+000	00858	21
			0.000843							
12.25.18.753360	+ 0.023250	0.000064	0.000064	DB2 SQL	0	DBP1 MQDTPGM	CLOSE	+000	00863	22
			0.000210							
12.25.18.753528	+ 0.023417	0.001190	0.000528	DB2 SQL	0	DBP1 MQDTPGM	DELETE	+000	00884	23
			0.000629							
12.25.18.754859	+ 0.024749	0.001332	0.000575	DB2 SQL	0	DBP1 MQDTPGM	INSERT	+000	00899	24
			0.000695							

Figure 341. OMEGAMON ATF Trace Level 2: Detail with MONITOR (part 1 of 2)

12.25.18.780598	+	0.050488	0.000149	0.000110	ESS SIGNON	0	CSQ6					25
				0.007028								
12.25.18.780812	+	0.050701	0.000282	0.000248	ESS CREATE THREAD	0	CSQ6					26
				0.000310								
12.25.18.781136	+	0.051026	0.000023	0.000023	MQ CALL	0	CSQ6	MQDTPGM	MQCONN	00000000		27
				0.000063	QMGr : CSQ6							
12.25.18.781392	+	0.051281	0.000264	0.000264	MQ CALL	0	CSQ6	MQDTPGM	MQOPEN	00000000		28
				0.000480	QMGr : CSQ6			Qname : MQB_REQ_Q				
12.25.18.781761	+	0.051650	0.002328	0.000521	MQ CALL	0	CSQ6	MQDTPGM	MQGET	00000000		29
				0.000604	QMGr : CSQ6			Qname : MQB_REQ_Q				
12.25.18.784188	+	0.054077	0.251098	0.000136	MQ CALL	0	CSQ6	MQDTPGM	MQGET	00000002		30
				0.000233	QMGr : CSQ6			Qname : MQB_REQ_Q				
12.25.19.035524	+	0.305414	0.000230	0.000184	MQ CALL	0	CSQ6	MQDTPGM	MQCLOS	00000000		31
				0.000342	QMGr : CSQ6			Qname : MQB_REQ_Q				
12.25.19.035841	+	0.305730	0.000198	0.000198	MQ CALL	0	CSQ6	MQDTPGM	MQOPEN	00000000		32
				0.000283	QMGr : CSQ6			Qname : MQB_REQ_Q				
12.25.19.036150	+	0.306039	0.002587	0.000526	MQ CALL	0	CSQ6	MQDTPGM	MQPUT	00000000		33
				0.000616	QMGr : CSQ6			Qname : MQB_REQ_Q				
12.25.19.038842	+	0.308731	0.000083	0.000083	MQ CALL	0	CSQ6	MQDTPGM	MQCLOS	00000000		34
				0.000185	QMGr : CSQ6			Qname : MQB_REQ_Q				
12.25.19.049987	+	0.319877	0.000238	0.000232	MQ CALL	0	CSQ6	MQDTPGM	MQDISC	00000000		35
				0.004010	QMGr : CSQ6							
12.25.19.050369	+	0.320258	0.000110	0.000110	DLI CALL (TM)	0		I/O PCB	ISRT			36
				0.000248								
12.25.19.050614	+	0.320503	0.000746	0.000056	DLI CALL (DB)	0	DI21PART		STAT			37
				0.000173								
12.25.19.051614	+	0.321504	0.000025	0.000025	DLI CALL (DB)	0	DI21PART		STAT			38
				0.000278								
12.25.19.051808	+	0.321698	0.000021	0.000021	DLI CALL (DB)	0	DI21PART		STAT	GE		39
				0.000168								
12.25.19.053468	+	0.323357	0.001978	0.000322	ESS COMMIT PH.1	0	DBP1					40
				0.000441								
12.25.19.055475	+	0.325365	0.000080	0.000080	ESS COMMIT PH.1	0	CSQ6					41
				0.000106								
12.25.19.055679	+	0.325568	0.000830	0.000000	VSAM IWAIT START	1	DI21PART					42
				0.000137								
12.25.19.064837	+	0.334727	0.003848	0.000747	ESS TERM THREAD	0	DBP1					43
				0.001368								
12.25.19.068726	+	0.338615	0.004407	0.004407	ESS TERM THREAD	0	CSQ6					44
				0.000387								
12.25.19.051892	+	0.321782	0.021302	0.002438	DLI CALL (TM)	0			ASRT			45
12.25.19.073841	+	0.343730	0.000000	0.000000	MPP TERM START	0						46
				0.000192								
12.25.19.073894	+	0.343783	0.001569	0.000000	MPP SCHEDULING START	0						47
				0.000261								

Figure 342. OMEGAMON ATF Trace Level 2: Detail with MONITOR (part 2 of 2)

ATF Trace Level 3: Detail (Expanded)

The ATF Trace level 3 “expanded detail” report provides a chronological list of transactions, displaying for each transaction the application calls made by the transaction (same as level 2). In addition, detailed information about each call is provided: Segment Search Arguments, Key Feedback Area, and IO area.

=====										
Transaction	CEXTCONV	Date-Time	2014-07-12-12.02.01.755895							
PSB	CEXTPGM	Logical Terminal . .	IPI2	Transaction Class .	005					
Jobname	IADEMP3	Region ID	0001	Region Type	MPP					
UserID	IPI2	Quick Schedule . . .	NO	Primed Message . . .	NO					
Abend Code		Current SPA Size . .	00050	Message Source . . .	TERM					
Elapsed Time	0.059019	Total CPU Time . . .	0.008028	Dependent Region CPU	0.008028					
DLI CPU Time	0.001635	DB2 CPU Time	0.004144	MQ CPU Time	0.000000					
Control Region CPU .	0.000000	DLISAS Region CPU .	0.000000	Other Regions CPU .	0.000000					
Elapsed time DL/I .	0.003498	Elapsed time DB2 . .	0.012978	Elapsed time MQ . .	0.000000					
=====										
Time hh.mm.ss.thmiju	Relative ss.thmiju	Duration ss.thmiju	Event CPU /AccumCPU	Description	L	Resources	Function Verb	Ret Code	Stmt#	Event
12.02.01.755895	0	0.059019	0.000000	SUMMARY COMPLETION	-					1
12.02.01.755895	+ 0.000000	0.001206	0.000335 0.000335	DLI CALL (TM)	0	I/O PCB	GU			2

IOArea :	+0000 00320700	0001C3C5	E7E3C3D6	D5E50000 00000000 00000000 00000000 00000000 00000000			*.....CEXTCONV.....*			
	+0020 00000000	00000000	00000000	00000000 00000000 00000000 00000000 00000000 00000000			*.....*			
	+0040 00000000	00000000	00000000				*.....*			

12.02.01.757133	+ 0.001237	0.000035	0.000035 0.000066	DLI CALL (TM)	0	I/O PCB	GN			3

IOArea :	+0000 00080000	C5C3C8D6	E7E3C3D6	D5E50000 00000000 00000000 00000000 00000000 00000000			*....ECHOXTCONV.....*			
	+0020 00000000	00000000	00000000	00000000 00000000 00000000 00000000 00000000 00000000			*.....*			
	+0040 00000000	00000000	00000000				*.....*			

12.02.01.757220	+ 0.001324	0.000849	0.000378 0.000428	DLI CALL (DB)	0	DI21PART PARTROOT	GHU			4

KFBA :	+0000 C3C5E740	E3C5E2E3	40D2C5E8	40000000 00			*CEX TEST KEY			*
IOArea :	+0000 C3C5E740	E3C5E2E3	40D2C5E8	40000000 0040F2F0 F1F14BF0 F74BF1F2 4040F0F3			*CEX TEST KEY 2014.07.12 03*			
	+0020 7AF5F47A	F3F20000	00000000	00000000 00000000 00000000 00000000 00000000 00000000			*:54:32.....*			
	+0040 00000000	00000000	00000000				*.....*			
=====										

Figure 343. OMEGAMON ATF Trace Level 3: Detail (Expanded) with MONITOR option

ATF extracts

The Exception Transaction Extract file contains exception records extracted from the OMEGAMON ATF journals based on two criteria, ABEND and long response time.

IMS PA extracts all the records (such as DLI, DB2, MQ) associated with an exception transaction, even though the exception is not determined until the final summary record is read. It does this by queuing records based on their IMS recovery token.

ATF Exception Transaction extract

The Exception Transaction Extract is an ATF data reduction process. It creates a new ATF journal data set that contains only those records associated with transactions that generated an exception.

Extract options

To request an ATF extract, select the **Exception Transaction** Extract in the ATF Report Set and specify options.

The command to request the Exception Transaction extract is:

```
IMSPAATF  [ABEND,]  
           [ELAPSE(ssss)]    default 1.00 second  
IMSPAATF  EXTRACT(  
           [JOURNAL,]        DDname ATFOUT1  
           [REPRO])          DDname ATFOUT2  
*                                     DDname ATFRECAP for Recap report  
IMSPAATF  EXECUTE
```

Note:

1. Reports can be run during the extract process, and they will honor the exception criteria ABEND and ELAPSE(ssss).
2. If no exception criteria are specified, an error message is issued and the extract does not proceed.

Exception criteria: Records are selected for the ATF Exception Transaction extract based on either or both of the following exception criteria:

ABEND

A transaction has abended when either ATRPSA (pseudo abend code) or ATRABCD (system or user abend code) is non-zero in the type 04 summary record.

Elapsed time

A transaction exceeds the elapsed time threshold based on the contents of ATRELAPS (Elapsed time of event) in the type 04 summary record.

Extract record format

You can extract to two types of data set, either a VSAM data set or sequential file, or both.

- **ATF Journal.** A VSAM KSDS that must be pre-allocated using the same attributes as a normal OMEGAMON ATF journal. IMS Performance Analyzer and IMS Problem Investigator can report against the data set without any functional change.
The extract job assigns the ATF Extract Journal to DDname ATFOUT1.
- **REPRO file.** A sequential data set. Typically, this is a GDG. It is suitable for longer term archive. Then when required, you can IDCAMS REPRO the file into an empty ATF Journal for reporting.
The extract job assigns the ATF Extract REPRO file to DDname ATFOUT2.

Extract record processing

OMEGAMON and IMS PA VSAM record counts will be different.

IMS PA counts each ATF event as a record. See Chapter 15, “OMEGAMON ATF records,” on page 627 for the list of ATF events.

The OMEGAMON and IMS PA journal VSAM records have a maximum length of 32 kB. However, OMEGAMON and IMS PA buffer ATF events in VSAM records very differently.

Consider transactions T1, T2, and T3 that run at the same time. OMEGAMON writes events to buffers as they occur in real time:


```

0-----32K
Record 1: T1.05 T2.05 T3.05 T2.03 T1.82 .... T3.82
Record 2: T2.01 T2.03 T3.82 T3.01 T1.01 .... T2.03
Record 3: T3.01 T2.04 T1.01 T3.04 T1.04 .... T4.05

```

Now assume that T1 and T3 are exceptions. IMS PA accumulates all the events for every transaction and waits for the 04 summary record to determine whether the transaction is an exception or not.

If the transaction is an exception then all the events for that transaction are written into a single record as follows:

```

0-----<32K
Record 1: T1.05 T1.82 T1.01 T1.01 T1.04
Record 2: T3.05 T3.82 T3.82 T3.01 T3.01 T3.04
0-----<32K

```

Recap report

A Recap report is written to DDname **ATFRECAP** showing how many exceptions occurred.

Part 7. Reference

The topics in this section provide reference information for IMS Performance Analyzer.

Chapter 11. IMS Log records

The IMS log type consists of log codes for IMS log records. Not all log codes are applicable to all releases of IMS.

The log code of an IMS record matches the IMS log record type and, if applicable, subtype. For a list of IMS log record types and subtypes, see the information about IMS log records used to analyze IMS problems in *IMS Diagnosis*.

Notes for specific log codes:

CA01 IMS transaction index.

CA20 IMS Connect transaction index.

Chapter 12. Monitor records

IMS Performance Analyzer uses 1-byte hexadecimal codes to identify the monitor records that it processes.

Table 35. Monitor records processed by IMS PA

Record code (hex)	Description
01	System Configuration
02	BMP Scheduling start
03	BMP Scheduling end
04	BMP Termination start
05	BMP Termination end
06	IFP Scheduling start
07	IFP Scheduling end
08	IFP Termination start
09	IFP Termination end
10	MPP Scheduling start
11	MPP Scheduling end
12	Dependent Region start
13	MPP Termination start
14	BMP/MPP/IFP Scheduling IWAIT start
15	Scheduler IWAIT end
16	PSB Block Loader IWAIT start
17	PSB Block Loader IWAIT end
18	DMB Block Loader IWAIT start
19	DMB Block Loader IWAIT end
20	Storage IWAIT start
21	Storage IWAIT end
22	Database I/O IWAIT start
23	Database I/O IWAIT end
24	VSAM I/O IWAIT start
25	VSAM I/O IWAIT end
26	QMGR I/O IWAIT start
27	QMGR I/O IWAIT end
28	HSAM I/O IWAIT start
29	HSAM I/O IWAIT end
30	Format Buffer Pool IWAIT start
31	Format Buffer Pool IWAIT end
32	MFS Directory IWAIT start
33	MFS Directory IWAIT end
36	MFS Block IWAIT start
37	MFS Block IWAIT end
38	IFP Message IWAIT start
39	IFP Message IWAIT end
40	Communications start
41	Communications end
42	Transaction Originator
43	Fast Path Buffer Activities
44	MSC Message Enqueue
45	MSC Message Dequeue
46	TP Paging Request

Table 35. Monitor records processed by IMS PA (continued)

Record code (hex)	Description
47	BALG Dequeued
48	External Subsystem Call start
49	External Subsystem Call end
50	Checkpoint start
51	Checkpoint end
52	Write restart IWAIT start
53	Write restart IWAIT end
54	QMGR SNAPQ IWAIT start
55	QMGR SNAPQ IWAIT end
56	MSDB Write IWAIT
57	DEDB Read IWAIT
58	IRC10 start (FP Call)
59	IRC10 end (FP Call)
60	DL/I call start
61	DL/I call end
62	DLA start (DB)
63	DLA end (DB)
64	DLA start (Message)
65	DLA end (Message)
66	PI Enqueue IWAIT start
67	PI Enqueue IWAIT end
68	DEDB Lock IWAIT start
69	DEDB Lock IWAIT end
70	MFS Prefetch start
71	MFS Prefetch end
72	DEDB OTHREAD IWAIT
73	VSO CF Write IWAIT
74	PSB Block Loaded from 64-bit Storage Pool start
75	PSB Block Loaded from 64-bit Storage Pool end
76	DMB Block Loaded from 64-bit Storage Pool start
77	DMB Block Loaded from 64-bit Storage Pool end
78	Synchronous Callout start
79	Synchronous Callout end
80	Intent Failure
82	Pool Space Failure
83	FP Deadlock Detected
84	VSO Area Castout start
85	VSO Area Castout end
86	FF Deadlock Detected
87	OTHRREAD Activities
88	VSO Preload start
89	VSO Preload end
90	Monitor start
91	Monitor end
94	VSO CF Read IWAIT
95	FP Lock Activity
98	User SLOG
AA	Pseudo End of File

Chapter 13. IMS Connect records

IMS Connect Extensions collects event records with details of incoming transaction requests as IMS Connect processes them.

Event records recorded by IMS Connect Extensions

Event records are collected continuously as messages are processed by IMS Connect. An event record consists of an event number and data associated with the event.

Event numbers can be X'00' - X'FF' (decimal 0 - 255) and the associated data varies depending on the event number. The event number is appended to the record prefix.

Connect status event records

The following table lists all single event records. The Collection level determines whether the event record is written to the Journal.

Table 36. Connect status event records

Code (Hex)	Code (Dec)	Event description	Collection level
00	00	Control record	0
01	01	IMS Connect region initialization	0
02	02	IMS Connect region has completed termination	0
03	03	A support task (TCB) has been created	1
04	04	A support task (TCB) is terminating	1
05	05	Begin INIT API	4
06	06	End INIT API	4
07	07	Begin Bind Socket	4
08	08	End Bind Socket	4
09	09	Listen on socket	4
0A	10	Begin Accept Socket	4
0B	11	End Accept Socket	3
0E	14	Begin Message Exit INIT	1
10	16	IMS datastore becomes available	0
11	17	IMS datastore becomes unavailable	0
12	18	An IMS TMEMBER joins the XCF group	0
13	19	An IMS TMEMBER leaves the XCF group	0
14	20	Begin SCI Registration	4
15	21	End SCI Registration	1
16	22	Begin SCI De-registration	4
17	23	End SCI De-registration	1
18	24	Recorder trace DCB has been opened	1

Table 36. Connect status event records (continued)

Code (Hex)	Code (Dec)	Event description	Collection level
19	25	Recorder trace DCB pre-close	1
1A	26	User message exit return from INIT	1
1B	27	User message exit return from TERM	1
1C	28	Begin Secure Environment Open	1
1D	29	End Secure Environment Open	1
20	32	Begin Secure Environment Close	1
21	33	End Secure Environment Close	1
22	34	Begin Local Port Setup	3
23	35	End Local Port Setup	3
24	36	Begin RRS Connect	1
25	37	End RRS Connect	1
26	38	List In-doubt Context	1
27	39	Begin RRS Disconnect	1
28	40	End RRS Disconnect	1
29	41	Begin ODBM Registration	1
2A	42	End ODBM Registration	1
2B	43	Begin ODBM De-registration	1
2C	44	End ODBM De-registration	1
2D	45	Datastore Status Update	1
2E	46	Return From Port Exit INIT Call	1
2F	47	Return From Port Exit TERM Call	1
30	48	Begin ODBM Routing Exit INIT	1
31	49	End ODBM Routing Exit INIT	1
32	50	Begin ODBM Routing Exit TERM	1
33	51	End ODBM Routing Exit TERM	1
34	52	XML Adapter INIT Call Begin	1
35	53	XML Adapter INIT Call End	1
36	54	XML Adapter TERM Call Begin	1
37	55	XML Adapter TERM Call End	1
38	56	OM Registration	1
39	57	OM Deregistration	1
A7	167	Internal Command Event	0

Workload-related event records

The following tables list all event records relating to message-related events, Open Database events, and IMS-to-IMS, and IMS-to-CICS TCP/IP communications.

Table 37. Workload-related event records

Code (Hex)	Code (Dec)	Event description	Collection level
0C	12	Begin Close Socket	4
0D	13	End Close Socket	3
3C	60	Prepare for socket read	2
3D	61	User message exit entered for READ, XMIT, EXER, or RXML	2
3E	62	User message exit return for READ, XMIT, EXER, or RXML	1
3F	63	Begin SAF security request	3
40	64	End SAF security request	3
41	65	Message sent to OTMA	2
42	66	Message received from OTMA	2
43	67	Message sent to SCI	2
44	68	Message received from SCI	2
45	69	OTMA Timeout	1
46	70	Deallocate Request	3
47	71	Session Error. This event is called when an unrecoverable error has been encountered and the session is being aborted	1
48	72	Trigger event. This is the end-of-frame event recorded by IMS Connect when a multi-event process has completed	2
49	73	Read socket	3
4A	74	Write socket	3
4B	75	Local Client Connect	3
4C	76	Local Message Send	3
4D	77	Local Message Receive	3
4E	78	Local Message Send-then-Receive	3
4F	79	Local Disconnect	3
50	80	Begin Create Context	4
51	81	End Create Context	3
52	82	Begin RRS Prepare	4
53	83	End RRS Prepare	3
54	84	Begin RRS Commit/Abort	4
55	85	End RRS Commit/Abort	3
56	86	Begin Secure Environment Select	3
57	87	End Secure Environment Select	3
58	88	Hold compensation queue	1
59	89	Port Edit Exit Called	2
5A	90	Port Edit Exit Returned	1
5B	91	DRDA [®] Command is Issued	2
5C	92	DRDA Command is Sent	2
5D	93	An Allocate PSB Command is Received	2
5E	94	An Allocate PSB Command is Sent	2

Table 37. Workload-related event records (continued)

Code (Hex)	Code (Dec)	Event description	Collection level
5F	95	A Deallocate PSB Command is Received	2
60	96	A Deallocate PSB Command is Sent	2
61	97	ODBM Routing Exit Entered	3
62	98	ODBM Routing Exit Returned	3
63	99	ODBM Security Exit Entered	3
64	100	ODBM Security Exit Returned	3
65	101	RRS Parent UR Token Creation Begins	3
66	102	RRS Parent UR Token Creation Ends	3
69	105	Message is Sent to ODBM	3
6A	106	Message is Received from ODBM	3
6B	107	RRS Delegate Commit Agent UR Begins	3
6C	108	RRS Delegate Commit Agent UR Ends	3
6D	109	XML Adapter CALL Begin	1
6E	110	XML Adapter CALL End	1
6F	111	XML Converter CALL Begin	1
70	112	XML Converter CALL End	1
71	113	Connected to Remote IMS Connect	3
72	114	Disconnected from Remote IMS Connect	3
73	115	Start Remote Thread for Partner ICON	3
74	116	Message Received for Remote ALTPCB	3
75	117	ALTPCB Message Sent to Remote Partner	3
76	118	ALTPCB Message Received from Remote Partner	3
77	119	Message Sent to OTMA for ALTPCB	3
78	120	MSC Message Received from MSC	3
79	121	MSC Message Sent to Partner IMS Connect	3
7A	122	MSC Message Received from Partner IMS Connect	3
7B	123	MSC Message Sent to MSC	3
7C	124	Connection to Partner IMS Connect Time-out	3
7D	125	Start of a session	3
7E	126	Trigger end of a session	3
80	128	IMS Performance Analyzer Automatic Trigger	1
81	129	IMS Performance Analyzer Exception Event	1
82	130	Event Collection Status	1

Table 38. Extended event records for event number 255

Code (Hex)	Code (Dec)	Extended event number and event description	Collection level
FF	255	256 Socket connected on RMTICICS	1
		257 Socket disconnected from RMTICICS	
		258 IMS Connect refreshed a cached RACF user ID after receiving a type 71 Event Notification Facility (ENF) notification	
		259 IMS Connect sent a health status report to Work Load Manager (WLM)	
		2050 Communication thread started for a RMTICICS connection	
		2051 ISC message received from IMS	
		2052 ISC message sent to IMS	
		2053 ISC message received on RMTICICS socket connection	
		2054 ISC message sent on RMTICICS socket connection	
		2055 ISC message received on CICSPORT socket connection	
		2056 ISC message sent on CICSPORT socket connection	

Recorder trace records

Recorder trace data produced by IMS Connect is converted to event record format by the IMS Connect Extensions Recorder trace utilities.

Table 39. Recorder trace event records produced by IMS Connect

Code (Hex)	Code (Dec)	Event description	Collection level
A0	160	HWS Recorder Base Section Trace	Not applicable
A1	161	HWS Recorder IPB Section Trace	Not applicable
A2	162	HWS Recorder OPB Section Trace	Not applicable

IMS Connect trace records

IMS Connect trace event records are produced when the Tracing Level has been set for the system.

Table 40. IMS Connect trace event records

Code (Hex)	Code (Dec)	Event description	Collection level
A3	163	Event Collection OTMA Trace	1
A4	164	Event Collection IRM Trace	1
A5	165	Event Recording RSM Message Trace	1
A6	166	Event Recording EXIT Output Message Trace	1

Table 40. IMS Connect trace event records (continued)

Code (Hex)	Code (Dec)	Event description	Collection level
A9	169	RXML Trace for XML Adapter	1
AA	170	ODBM trace record	1
AC	172	IMS Performance Analyzer Command and Response 1	1

1 Event record 172 (X'AC') is a special type of event record that is used to represent an IMS Performance Analyzer command being issued. For example, this event record is recorded when the ROUTE command for DRAIN or RESUME is issued. It includes the ROUTE command as well as details of actions taken on behalf of the ROUTE command such as AUTORESUME processing. If the ROUTE DRAIN or ROUTE RESTORE command targets a routing list, one "request" record and one "response" record is created for the routing list, as well as one "both" record for each datastore in the routing list. The response record for the routing list will contain the highest return code and reason code for all of the datastore records.

User data logging record

The Event Recording User Data Logging record is produced when user data is submitted to the journal for logging.

Table 41. User data logging event record

Code (Hex)	Code (Dec)	Event description	Collection level
AB	171	Event Recording User Data Logging	1

Event types

There are two types of event records processed by IMS Performance Analyzer, Connect Status Events and Message Related Events.

Connect Status Event

A Connect Status Event identifies a change in the status of your IMS Connect environment. For example, a resource (Datastore, TMEMBER) becoming available or unavailable, or a Socket becoming accepted for input by a Port task. Connect Status events are typically not related to the processing of input messages, but can affect their processing. Connect Status Event records are identified by a constant Event Key, **EVNT**.

Message Related Event

A Message Related Event identifies an event in the processing of an input message (transaction). Message Related Event records have a STCK token Event Key. Each incoming message is assigned a unique Event Key and every event associated with the processing of the message has the same Event Key. In this way, all events involved in the processing of an input message can be "connected" to obtain a complete picture of the life cycle of the message.

Collection levels

The number and type of event records collected by IMS Connect Extensions varies depending on the Collection level specified for the IMS Connect system.

- 0 Minimum level. Collects start up and shut down events along with some error events. This is the default.
- 1 Accounting level. Collects Return from Exit events, OTMA timeout and session error events. This level provides accounting information in terms of the number of messages by Transaction, User Exit, and so on.
- 2 Transit time reporting. Collects the minimum number of records to run simple transit time reports.
- 3 Comprehensive performance analysis. Collects all TCP/IP read and write events which provides for analysis of TCP/IP activity.
- 4 Maximum level. Collects all event records.

Required event records for IMS PA reports

For IMS Connect Extensions to collect IMS Connect event data for reporting, you need to ensure that IMS Connect Extensions Event Collection is active and that you specify a Collection Level that is appropriate to the type of reports that you want to produce.

The following figure summarizes how the IMS Connect Extensions Collection Level affects the IMS PA reports.

Connect Report =====	----- Collection Level -----				
	0	1	2	3	4
Transaction Transit Reports					
Analysis	no	no	yes *a	yes	yes
Log	no	no	yes *a	yes	yes
Extract	no	no	yes *b	yes	yes
Resource Usage Reports					
Port Usage	no	no	yes *c	yes	yes
Resume Tpipe	no	no	yes	yes	yes
ACK/NAK	no	no	yes	yes	yes
Exception Events	yes *d	yes *d	yes *d	yes *d	yes *d
Gap Analysis	yes *d	yes *d	yes *d	yes *d	yes *d
Trace Reports					
Transit Event Trace	no	no	yes *d	yes *d	yes

Note:

"no" indicates that the report is not produced when run against data collected at this level; message "No observations in report period" is printed

"yes" indicates that the report is produced when run against data collected at this level, however:

*a Input READ Socket (record 49) and SAF fields (records 3F, 40) are 0

*b Input READ Socket (49), SAF (3F, 40) and Acknowledgement (49, 4A) fields are 0

*c WRITE (4A) Count and Length fields are zero, and
 READ Count and Length fields contain only Prepare READ Socket (3C) since READ Socket (49) is 0

*d Only the event records that are collected at that level are listed in the report

Figure 344. IMS Connect reports: IMS Connect Extensions Collection Level cross-reference

OTMA NAK sense codes

This list describes the sense codes that accompany OTMA negative acknowledgement (NAK) messages in type 42 records.

01 OTMA sign-on not established
02 Client cannot send/receive messages
03 State-data or XCF length error
04 Bad correlator
05 Multi-segment message duplicated
06 Bad XCF return code
07 Maximum (255) clients reached
08 Client-bid security request failed
09 Invalid OTMA command
0A OTMA data message not allowed
0B Invalid message type
0C Unknown response type
0D Nonexistent Tpipe for continuation
0E Unable to create Tpipe
0F Tpipe is stopped
10 No State data
11 Commit message was not to terminate
12 Prefix (4KB) too large
13 Hash table size not set
14 Second client-bid sent, first still active
15 Hash table storage allocation failed
16 Client not active
17 Invalid SYNC level
18 Invalid Tpipe name
19 Invalid Client name
1A Message cancelled due to IMS error
1B IMS is shut down
1C Invalid Commit Mode
1D User data too long (1K)
1E Server user data too long (256)
1F Sequence number mis-match
20 No Application data
21 No Chain flag
22 Tpipe not found
23 Sequence number invalid
24 Previous conversation still in progress
25 RESYNC Protocol violation
26 RESYNC Dequeue failed
27 RESYNC RSN reset failed
28 Resume tpipe request rejected
29 Total number of tpipes exceeded MAXTP limit
2A Delivery of OTMA message to remote IMS system failed
2B Late or invalid ACK/NAK sent to OTMA
2C Invalid Commit Mode
2D SYNC/Commit levels incompatible
2E SYNC level/Context ID incompatible
2F Unable to express context interest
30 Number of input messages waiting to be processed exceeds maximum number allowed
31 OTMA cannot accept new transactions or commands due to a /STOP TMEMBER command
33 Security violation while processing a resume tpipe request
34 Input transaction expired and therefore cancelled
35 Response message invalid, or failed to process synchronous callout request
36 Invalid message length as sum of parts is greater than XCF message length
37 Client's MULTIRTP value differs from that of super member group of tmember

Figure 345. OTMA NAK sense codes

For more information, refer to the section “OTMA Sense Codes for NAK Messages” in the *IMS Open Transaction Manager Access Guide and Reference*.

Typical event flow with Sync Level NONE

The typical event flow of an incoming transaction with Sync Level NONE is shown in the following example.

3C Prepare Read Socket	<== Incoming message from client
49 Read Socket	
3D Message Exit called for READ	
3E Message Exit return for READ	
41 Message sent to OTMA	<== Sent to OTMA for processing
42 Message received from OTMA	
3D Message Exit called for XMIT	
3E Message Exit return for XMIT	
4A Write Socket	<== Response sent back to client
0C Begin Close Socket	<== Non-persistent Socket is closed
0D End Close Socket	
48 Trigger event CLOS	<== Connect has finished processing message

Figure 346. IMS Connect event records: typical event flow with Sync Level NONE

Typical event flow with Sync Level CONFIRM

The typical event flow of an incoming transaction with Sync Level CONFIRM is shown in the following example.

3C Prepare Read Socket	<== Incoming message from client
49 Read Socket	
3D Message Exit called for READ	
3E Message Exit return for READ	
41 Message sent to OTMA	<== Sent to OTMA for processing
42 Message received from OTMA	
3D Message Exit called for XMIT	
3E Message Exit return for XMIT	
4A Write Socket	<== Response sent back to client
49 Read Socket	<== ACK received from Client
3D Message Exit called for READ	
3E Message Exit return for READ	
41 Message sent to OTMA	<== ACK sent to OTMA
42 Message received from OTMA	
46 De-allocate Session	
3D Message Exit called for XMIT	
3E Message Exit return for XMIT	
4A Write Socket	<== Response sent back to client
0C Begin Close Socket	<== Non-persistent Socket is closed
0D End Close Socket	
48 Trigger event CLOS	<== Connect has finished processing message

Figure 347. IMS Connect event records: typical event flow with Sync Level CONFIRM

Chapter 14. OMEGAMON TRF records

Transaction performance and resource utilization statistics are collected by OMEGAMON subsystems with the Transaction Reporting Facility (TRF) Trace running.

IMS Performance Analyzer processes TRF records extracted from the IMS Log by running the Transaction Reporting Facility post-processor.

The following table lists the TRF Extractor output records that are used in IMS Performance Analyzer reporting.

Table 42. OMEGAMON TRF Extractor records processed by IMS PA

Record code (hex)	Description
10	Transaction Message
11	Output Message
12	IMS System Message
13	Database Detail
15	MSDB Detail
16	DEDB Detail
17	Database Summary
18	DB2 Summary
19	Fast Path Database Summary

Chapter 15. OMEGAMON ATF records

IMS Performance Analyzer uses 1-byte hexadecimal codes to identify the ATF records that it processes.

Table 43. OMEGAMON ATF records processed by IMS PA

Record code (hex)	Description
01	DLI
03	Fast Path
04	Summary completion
05	DLI IOPCB detail
06	Full Function
82	DB2
87	Generic External Subsystem
88	IBM MQ
F1	Transaction end

Chapter 16. Glossary of Report Form field names

This glossary lists all the fields available to Form-based transit and OMEGAMON TRF message queue reporting.

The fields are listed alphabetically ignoring embedded spaces (in column headings).

The field name is that used in the Report Forms dialog. It is also the default DB2 column name used when exporting a Form-based extract to DB2. The default DB2 table name is the Report Form name.

The field name is also used in the FIELDS operand in the batch report commands as follows:

```
IMSPALOG LIST(...,FIELDS(field1,...))
IMSPACEX LIST(...,FIELDS(field1,...))
IMSPATRF LIST(...,FIELDS(field1,...))
IMSPALOG SUMMARY(...,FIELDS(field1,...))
IMSPACEX SUMMARY(...,FIELDS(field1,...))
IMSPATRF SUMMARY(...,FIELDS(field1,...))
```

Other details provided for each field are:

- Short and long description.
- Source of the field: IMS, IMS Connect, or TRF.
- Column heading used for reports and extracts.
- Where applicable, the corresponding global field in IMS Problem Investigator.

For an explanation of other terms and abbreviations used in this book, refer to the index, the IMS Glossary, or to the following web page:

<http://www.ibm.com/software/globalization/terminology>

A

ABEND Code

See COMPCODE

ABENDCNT

For Form-based summary reporting only, the number of abending transactions that were accumulated in the key range. *See also* TRANCNT.

Source: IMS and ATF

Column heading: Abend Count

ACKREAD

Acknowledgement read socket time. The total elapsed time for all read Socket Events issued after the response from OTMA has been sent to the client. This is the time taken to read the acknowledgement from the client.

Source: IMS Connect

Column heading: ReadSock Ack Time

APPC APPC indicator. Indicates whether the transaction originated from APPC. Reported values are:

APPC Implicit APPC using the IMS message queue
CPIC Explicit CPI-CI APPC using program schedule and APPC verbs
blank Transaction is not APPC

Source: IMS

Column heading: APPC

Applictg Grp Name

See APPLNAME

APPLNAME

Application grouping name provided by the Transaction Substitution exit.

Source: IMS

Column heading: Applictg Grp Name

ApplResp Time(R0)

See R0TIME

ASIO Waits

See FPASIOWT

ASYNCRd-Ahead

See FPASIORA

B

BALG Q Count

See FPBALGCT

BMPCHKID

The BMP user checkpoint id.

Column heading: BMP Chkpt ID

BMPCHKPT

The number of checkpoints issued by the BMP, or the unit of work.

See also BMPSYNCP

Column heading: BMP Chkpt Ct

BMPSYNCP

The number of syncpoints issued by the BMP, or the unit of work.

See also BMPCHKPT

Column heading: BMP Sync Cnt

C

CEXcm Level

See COMPLVLC

CI Lock WAITS

See FPCILWT

CICSAPPL

CICS generic APPLID.

For CICS-DBCTL only, the generic APPLID of the CICS region that scheduled this thread.

The APPLID is extracted from the first 8 characters of the IMS recovery token.

CICSTASK

CICS task number. For CICS-DBCTL only, the task number of the CICS transaction that scheduled this DBCTL thread.

In CICS Performance Analyzer, the associated CMF field is TRANNUM DFHTASK P031 and is reported using field name TASKNO.

You can use the CICS task number to match transactions in the CICS and IMS reports.

The CICS transaction name and task number are available in the IMS 08 log record. For details, see the IMS-supplied macro SDFSMAC(DFSLOG08).

Source: IMS

Column heading: CICS Task ID

CLASS

Transaction Class. Transaction class as specified in the TRANSACT macro MSGTYPE parameter.

Source: IMS and TRF

Column heading: Cls

CLIAck

Client acknowledgement indicator. Indicates how the IMS Connect transaction client acknowledged the transaction results from IMS. Reported values are:

ACK Client positively acknowledged (ACK)

NAK Client negatively acknowledged (NAK)

blank Transaction was not Synch Level=CONFIRM

Source: IMS Connect

Column heading: Cli ACK

CLIENTID

Client ID. IMS Connect Client ID.

Source: IMS Connect

Column heading: Client ID

IMS Problem Investigator global field: ClientID

Cls See CLASS

CM0DELAY

OTMA Commit Mode 0 (Commit-Then-Send) client ACK time. For OTMA Commit Mode 0 transactions only, the time it takes the client to acknowledge the response back to IMS. The elapsed time is calculated from when the output message is sent (Comms 31) to when the client acknowledgement is received and dequeued (36). This is a part of transaction processing time and can include the following:

- XCF overhead
- OTMA client (Connect) processing overhead and wait for client acknowledgement

Source: IMS

Column heading: CM0Delay Time

CM1DELAY

OTMA Commit Mode 1 (Send-Then-Commit) delay time. For OTMA Commit Mode 1 transactions only, the delay in processing after the output

message has been sent to OTMA. The delay elapsed time is from when the output message is sent (03/31) to when the transaction commences syncpoint processing (5610). This delay is a part of transaction processing time and can include the following:

- XCF overhead
- For Synch Level=CONFIRM only, OTMA client (Connect) processing overhead and wait for client acknowledgement

Source: IMS

Column heading: CM1Delay Time

COMMITMD

Commit mode. IMS Connect Commit mode. Reported values are:

- 0** Commit mode 0, also called Commit-Then-Send
- 1** Commit mode 1, also called Send-Then-Commit
- blank** Not an IMS Connect transaction

Source: IMS Connect

Column heading: Commit mode

Commit SDEP CIs

See FPSDEPCI

Commit SDEP Seg

See FPSDEPSG

COMPCODE

Completion Code. Transaction abend completion code.

Source: IMS and TRF

Column heading: ABEND Code

COMPLVL

IMS transaction completion level. IMS PA assigns a completion level to every transaction. Form-based reporting can specify a minimum completion level, instructing IMS PA to report only those transactions that have reached this level of completion. The IMS transaction completion levels are:

- 0** IMS message is a message switch or generated output message, not a transaction. Use Completion level 0 to analyze all message queue activity, not when transaction transit information is required.
- 1** Transaction input message enqueued onto the IMS message queue. Use Completion level 1 to analyze transaction message queue activity, not when transaction transit information is required.
- 2** Transaction has started processing in the dependent region but has not completed processing. Only input queue time is available for reporting.
- 3** Transaction has finished processing in the dependent region but has not sent the output message to the destination LTERM. Input queue and processing times are available for reporting.
- 4** Transaction has ended but resource utilization statistics (from the type 07 application termination record) are not available, possibly due to WFI processing (schedule not ended). Input queue, processing, output queue and total times are available for reporting.
- 5** Transaction has ended and resource utilization statistics (from the type 07 application termination record) are available, and are *approximations* only. Type 07 application termination record

statistics are apportioned equally amongst all transactions processed by the program schedule. All application statistics fields are available for reporting.

- 6 Transaction has ended and accurate resource utilization statistics are available. For Unit-of-Recovery (UOR) transactions, resource utilization statistics are derived from the type 56FA transaction-level accounting record. This record provides accurate and reliable information for each Unit-of-Recovery (UOR). Resource statistics for transactions reported over the entire schedule are taken from the type 07 record. This includes DBCTL, ODBM, and non-message driven BMP transactions.

All application statistics fields are available for reporting.

Source: IMS

Column heading: Comp Level

COMPLVLC

Connect transaction completion level. IMS Connect transaction completion level. IMS PA assigns a completion level to every transaction. Form-based reporting can specify a minimum completion level, instructing IMS PA to report only those transactions that have reached this level of completion. The Connect transaction completion levels are:

- 0 IMS Connect non-transactional message initialized. Use Completion level 0 to analyze all activity.
- 1 IMS Connect transactional message initialized. Use Completion level 1 to analyze messages rejected by the message exit.
- 2 IMS Connect Message sent to OTMA for processing.
- 3 IMS Connect Message received from OTMA. This level may also indicate an OTMA timeout or error.
- 4 Transaction has completed Connect processing.

Source: IMS Connect

Column heading: CEXcm Level

CONFIRM

Client Confirm time. For Sync Level CONFIRM transactions only, the elapsed time from when OTMA completed processing the input message to when the ACK response from the client is sent back to OTMA.

Source: IMS Connect

Column heading: Confirm Time

CONFOTMA

OTMA ACK processing time. For Sync Level CONFIRM transactions, the time Connect waits for the ACK transaction to be processed by IMS and send the response back.

Source: IMS Connect

Column heading: OTMAconf Time

Conn RTp Time

See OUTRTCON

Connect Logon Token

See CONNLTK

Connect System

See HWSID

CONNLTOK

Connect Logon token. IMS Connect logon token.

Source: IMS and IMS Connect

Column heading: Connect Logon Token

IMS Problem Investigator global field: LogToken

CONNOTOK

Connect Resume-Tpipe Orig Message logon token. IMS Connect logon token of the originating input message taken from the first IMS Connect event 58 (IMS Hold Queue Compensation) record encountered in the IMS Connect transaction.

Source: IMS Connect

Column heading: Resume Tpipe Orig Msg Token

CON Resp Time

See RESPCON

CON Tran Start

See STARTCON

Conv *See* CONVERS

CONVERS

Conversational transaction indicator. Indicates whether a transaction is conversational as defined in the TRANSACT macro SPA parameter.

Reported values are:

C Conversational

N Non-conversational

blank Not a message queue transaction

Source: IMS

Column heading: Conv

CPUSU

Program execution CPU time reported in service units. The service unit normalizes the reporting of CPU time to allow for performance comparisons between, for example, an older processor and a newer processor in terms of CPU effort. CPU service unit reporting is only available in Form-based transit reports.

The CPUSU is calculated as CPUTIME * conversion factor. When IMS PA is running on the same system that generated the IMS log input file, the conversion factor can be calculated at run-time. Otherwise the conversion factor must be supplied to IMS PA in the command input as IMSPALOG SYSTEM(*name*,*Vvrm*,*factor*).

The conversion factor for each IMS system should be specified in your batch JCL:

1. Use the IPICPUSU REXX EXEC located in the SIPIEXEC library to calculate the conversion factor and generate the batch command:
* IBM IMS Performance Analyzer: CPU time to Service Units conversion
*
* SYSID: XYZ1
*
* CPU VV --ID-- Model Speed Specialty
* 0 00 039A37 2818 1.000
* 1 00 039A37 2818 1.000
* 2 00 039A37 2818 1.000 zIIP

```

*
* Adjustment values: RMCTADJC=718 RMCTCPU=4097
*
* Formula: SUSEC = 1000000 / (RMCTADJC * 256 / RMCTCPU)
* Result : 1 CPU second = 22289.563 Service Units
*
* The following IMSPA batch command will convert CPU time to SUs:
  IMSPALOG SYSTEM(name,Vvrm,22289.563)

```

You can specify a conversion factor of CURRENT to instruct IMS PA to calculate the conversion factor at run time, based on the processor where IMS PA is executing. If you do not specify a conversion factor, IMS PA will use CURRENT.

2. Specify the command generated by step 1 in your batch JCL, for example:

```

//IMSPA JOB (ACCOUNT),'NAME'
//*
//IMSPA EXEC PGM=IPIMAIN,PARM='V151'
//STEPLIB DD DISP=SHR,DSN=IMSPA.V4R4M0.SIPILINK
//SYSPRINT DD SYSOUT=*
//LOLD1001 DD DISP=SHR,DSN=IMS.OLD1.SLDS
//LNEW1001 DD DISP=SHR,DSN=IMS.NEW1.SLDS
//IPIOPTS DD *
* IMS System Definitions
  IMSPALOG SYSTEM(OLD1,V141,14637.212)
  IMSPALOG SYSTEM(NEW1,V151,22289.563)
/*
//IPICMD DD *
  IMSPALOG LIST(SECGROUP,FIELDS(...,CPUSU,...))
  IMSPALOG SUMMARY(SECGROUP,FIELDS(...,CPUSU,...))
  IMSPALOG EXECUTE
/*

```

You must execute this REXX on the same system that created the IMS log file. The command generated by this REXX is then input into the IMS PA batch process.

Note: There is no provision for specialty processors.

Source: IMS and TRF

Column heading: CPUSU

CPUTIME

Program execution CPU time, approximation only at completion level 5, accurate at completion level 6.

At completion level 5 resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times.

At completion level 6, resource usage metrics for Unit-of-Recovery (UOR) transactions are obtained from the type 56FA transaction accounting record. Metrics for transactions reported over the entire schedule are obtained from the type 07 record. This includes DBCTL, ODBM and non-message driven BMP transactions (with BMPSYNC(NO)).

For Fast Path transactions, CPU time is available only at completion level 6 from the 56FA record.

See also DBGETS and DBUPDATS. Source: IMS and TRF.

Column heading: CPU Time

CPUZAAP

zAAP/zIIP execution time.

D

DATABASE

The DBD name of the database used by the transaction.

DATABASE is the list of databases updated by the transaction (derived from the x'50' full function and the x'5950' fast path data base update records) and read (checkpointed in the type x'18 log record).

A transaction can update more than one database. In this case there will be additional report lines for each database used by the transaction.

Source: IMS

Column heading: Database DBD Name

Database DBD Name

See DATABASE

DB AccM

See DBACMETH

DB Lock Time

See LOCKTIME

DB Org Type

See DBORGTYP

DBACMETH

Database access method. Reported values are:

CHKP BMP user checkpoint. CHKP is an indicator that the database has been read by the BMP.

DEDB Fast path data entry database

ESDS Entry-sequenced data set (VSAM)

KSDS Key-sequenced data set (VSAM)

OSAM

Overflow sequential access method

A transaction can update more than one database. In this case there will be additional report lines for each database used by the transaction.

Recommendation: When requesting this field, also include the DATABASE field in the form. This will identify the database to which this field applies.

Source: IMS

Column heading: DB AccM

DBBLKDEL

The number of block deletes for the database.

A transaction can update more than one database. In this case there will be additional report lines for each database used by the transaction.

Recommendation: When requesting this field, also include the DATABASE field in the form. This will identify the database to which this field applies.

Source: IMS

Column heading: DB Block Deletes

DBBLKINS

The number of block inserts for the database.

A transaction can update more than one database. In this case there will be additional report lines for each database used by the transaction.

Recommendation: When requesting this field, also include the DATABASE field in the form. This will identify the database to which this field applies.

Source: IMS

Column heading: DB Block Inserts

DBBLKREP

The number of block replaces for the database.

A transaction can update more than one database. In this case there will be additional report lines for each database used by the transaction.

Recommendation: When requesting this field, also include the DATABASE field in the form. This will identify the database to which this field applies.

Source: IMS

Column heading: DB Block Replaces

DBBLKUPD

The number of block updates for the database.

A transaction can update more than one database. In this case there will be additional report lines for each database used by the transaction.

Recommendation: When requesting this field, also include the DATABASE field in the form. This will identify the database to which this field applies.

Source: IMS

Column heading: DB Block Updates

DBCALLS

DB call count. Full function database call count, approximation only at completion level 5, accurate at completion level 6. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record (IMS V10+).

Source: IMS

Column heading: DB Call Count

DBCTLPRE

The elapsed time between the start of the CICS transaction and the IMS PSB being scheduled and ready to process DLI calls.

For programs that issue the EXEC DLI SCHEDULE at the start of processing, this measurement can provide an estimate of the time for a DBCTL thread to become available, and for IMS to schedule it.

This time is calculated as 08 suffix STCK - IMS recovery token STCK.

For CICS-DBCTL, the IMS recovery token is generated by CICS, and consists of two parts:

1. CICS APPLID
2. Unique recovery UOW identifier (STCK value recorded in CMF field RMUOWID DFHTASK T132)

DBDLET

Database DLET call count. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record (IMS V10+).

Source: IMS

Column heading: DB DLET Count

DBGETS

DB get call count. Full function database get call count, approximation only at completion level 5, accurate at completion level 6. Get calls are GU, GN, GNP, GHU, GHN, GHNP. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record (IMS V10+).

Source: IMS

Column heading: DB Get Count

DBGHN

Database Get Hold Next (GHN) call count. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record (IMS V10+).

Source: IMS

Column heading: DB GHN Count

DBGHNP

Database Get Hold Next within Parent (GHNP) call count. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record (IMS V10+).

Source: IMS

Column heading: DB GHNP Count

DBGHU

Database Get Hold Unique (GHU) call count. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing

times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record (IMS V10+).

Source: IMS

Column heading: DB GHU Count

DBGN

Database Get Next (GN) call count. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record (IMS V10+).

Source: IMS

Column heading: DB GN Count

DBGNP

Database Get Next within Parent (GNP) call count. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record (IMS V10+).

Source: IMS

Column heading: DB GNP Count

DBGNS

Total database GN, GNP, GHN, and GHNP calls. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record (IMS V10+).

Source: IMS

Column heading: DB GNx Count

DBGU

Database Get Unique (GU) call count. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record (IMS V10+).

Source: IMS

Column heading: DB GU Count

DBGUS

Total database GU and GHU calls. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record (IMS V10+).

Source: IMS

Column heading: DB GUx Count

DBIOCALL

Only available for IMS V10+. Total OSAM and VSAM database IO count, approximation only at completion level 5, accurate at completion level 6. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: Total IO Count

DBIOTIME

Only available for IMS V10+. Database IO elapsed time, approximation only at completion level 5, accurate at completion level 6. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: DB IO Time

DBISRT

Database ISRT call count. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record (IMS V10+).

Source: IMS

Column heading: DB ISRT Count

DBORGTYP

Database organization type.

A transaction can update more than one database. In this case there will be additional report lines for each database used by the transaction.

Recommendation: When requesting this field, also include the DATABASE field in the form. This will identify the database to which this field applies.

Source: IMS

Column heading: DB Org Type

DBREPL

Database REPL call count. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record (IMS V10+).

Source: IMS

Column heading: DB REPL Count

DBUPDATS

DB update call count. Full function database update call count, approximation only at completion level 5, accurate at completion level 6. Update calls are ISRT, DLET, REPL. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record (IMS V10+).

Source: IMS

Column heading: DB Updat Count

DBUPRATE

The number of updates per second to the database.

A transaction can update more than one database. In this case there will be additional report lines for each database used by the transaction.

Recommendation: When requesting this field, also include the DATABASE field in the form. This will identify the database to which this field applies.

Source: IMS

Column heading: Updates/Second

DBWAITS

DB wait count. Full function database wait count, approximation only at completion level 5, accurate at completion level 6. Waits can be for Test enqueues, Queue commands, Update and enqueues, Exclusive enqueues. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record (IMS V10+).

Source: IMS

Column heading: DB Wait Count

DB2CPU

DB2 CPU time.

Source: TRF

Column heading: DB2 CPU Time

DCCALLS

DC message queue call count, approximation only at completion level 5, accurate at completion level 6. DC calls are GU, GN, ISRT, PURGE. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record (IMS V10+).

Source: IMS

Column heading: DC Call Count

DCGN

Message queue Get Next (GN) call count. At completion level 5, resource usage metrics are obtained from the type 07 application termination record.

Statistics are apportioned equally among all transactions that executed under that schedule, regardless of their actual processing times. Therefore they are approximations only.

At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record, which provides accurate statistics for individual transactions.

Source: IMS

Column heading: DB GN call count

DCGU

Message queue Get Unique (GU) call count. At completion level 5, resource usage metrics are obtained from the type 07 application termination record. Statistics are apportioned equally among all transactions that executed under that schedule, regardless of their actual processing times. Therefore they are approximations only.

At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record, which provides accurate statistics for individual transactions.

Source: IMS

Column heading: DB GU call count

DCISRT

Message queue Insert (ISRT) call count. At completion level 5, resource usage metrics are obtained from the type 07 application termination record. Statistics are apportioned equally among all transactions that executed under that schedule, regardless of their actual processing times. Therefore they are approximations only.

At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record, which provides accurate statistics for individual transactions.

Source: IMS

Column heading: DC ISRT call count

DCPURG

Message queue Purge (PURG) call count. At completion level 5, resource usage metrics are obtained from the type 07 application termination record. Statistics are apportioned equally among all transactions that executed under that schedule, regardless of their actual processing times. Therefore they are approximations only.

At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record, which provides accurate statistics for individual transactions.

Source: IMS

Column heading: DC PURG call count

DDNAME

Input log DDname. The name specified in the JCL for the log containing the start record (usually X'01') for this transaction.

Source: IMS

Column heading: IMS log DD name

DEDBAREA

The DEDB area name of the database.

A transaction can update more than one database. In this case there will be additional report lines for each database used by the transaction.

Recommendation: When requesting this field, also include the DATABASE field in the form. This will identify the database to which this field applies.

Source: IMS

Column heading: DEDB Area

DEDB Get Count

See FPDEGET

DEDB Put Count

See FPDEPUT

Dest Tmember

See TMEMBERD

DLAYOTMA

OTMA delay time. The delay attributable to OTMA for an IMS Connect transaction. This elapsed time is a combination of two times:

1. From when IMS connect sends the transaction message to OTMA, to when the message is enqueued onto the IMS message queue.
2. From when the IMS transaction sends the response back to OTMA, to when IMS Connect receives the response back.

OTMA delay time can only be calculated when IMS Connect and IMS log data is merged. This is because both IMS Connect Extensions and IMS log records are required to calculate the elapsed time delay.

Source: IMS Connect

Column heading: OTMADlay Time

E**ESAFCALL**

Total ESAF call count, approximation only at completion level 5, accurate at completion level 6. Available from IMS V10. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: ESAFcall Count

ESAFCCON

The time of day when the external subsystem completed Commit Continue processing during the transaction syncpoint.

A transaction can use more than one external subsystem (for example, DB2 and the IBM MQ adapter). In this case there will be additional report lines for each subsystem used by the transaction.

Recommendation: When requesting this field, also include the ESAFNAME field in the form. This will identify the subsystem to which this field applies.

Source: IMS

Column heading: Commit Cont Completed

ESAFCOMT

The elapsed time it took for the external subsystem to complete Commit processing during the transaction syncpoint.

A transaction can use more than one external subsystem (for example, DB2 and the IBM MQ adapter). In this case there will be additional report lines for each subsystem used by the transaction.

Recommendation: When requesting this field, also include the ESAFNAME field in the form. This will identify the subsystem to which this field applies.

Source: IMS

Column heading: Commit Time

ESAFNAME

The name of the external subsystem used by the transaction.

A transaction can use more than one external subsystem (for example, DB2 and the IBM MQ adapter). In this case there will be additional report lines for each subsystem used by the transaction.

Source: IMS

Column heading: External Sub-Sys

ESAFPRE

The time of day when the external subsystem started Commit Prepare processing during the transaction syncpoint.

A transaction can use more than one external subsystem (for example, DB2 and the IBM MQ adapter). In this case there will be additional report lines for each subsystem used by the transaction.

Recommendation: When requesting this field, also include the ESAFNAME field in the form. This will identify the subsystem to which this field applies.

Source: IMS

Column heading: Commit Prep Started

EXITNAME

The user message exit name for an IMS Connect transaction. This exit name is extracted from the first "message exit returned from READ" event record (log code 3E) for the transaction.

Source: IMS Connect

Column heading: Exit Name

F

FAILED

Transaction failure indicator. The reason for an IMS or Connect transaction failure. Reported values are:

blank Transaction did not fail.

ABEND

Transaction abend (abnormal end of task).

CANCEL

Transaction cancelled.

REJECT

Transaction rejected.

SESSION

Connect transaction failed due to a session error.

SF=? Fast Path Syncpoint Failure, code = ?

Source: IMS, Connect, and TRF

Column heading: Failure Reason

Failure Reason

See FAILED

FFDB50

The number of full-function database update (type 50) log records cut by this transaction.

FLD Call Count

See FPFLD

FP SyncP Count

See FPSYNCCCT

FPASIORA

Fast Path ASYNC Read-aheads. The number of UOW asynchronous read-aheads by HSSP or the High Speed DEDB Direct Reorganization utility in a transaction (one unit of work).

Source: IMS

Column heading: ASYNC Rd-Ahead

FPASIOWT

Fast Path Waits for ASIO. The number of UOW asynchronous read-aheads to complete by HSSP or the High Speed DEDB Direct Reorganization utility in a transaction (one unit of work). This number should be either zero or one.

Source: IMS

Column heading: ASIO Waits

FPBALGCT

Fast Path BALG Queue Count at Syncpoint. The number of transactions in the balancing group (BALG) queue when this transaction entered sync point processing.

Source: IMS

Column heading: BALG Q Count

FPBFOTHR

Fast Path Buffers sent to OTHREAD. The number of Fast Path buffers sent to OTHREAD.

Source: IMS

Column heading: OTHREAD Buffers

FPBFSTL

Fast Path Buffer steals per Tran. The number of times buffer stealing is invoked by this transaction.

Source: IMS

Column heading: FPBuffer Steals

FPBFWT

Fast Path Waits for Buffer. The number of times the transaction waited for a buffer to become available.

Source: IMS

Column heading: FPBuffer Waits

FPBUFFER Steals

See FPBFSTL

FPCALLS

Fast Path database call count. FP DB calls are GU, GN, GNP, GHU, GHN, GHNP, ISRT, DLET, REPL, FLD, POS. FP resource usage statistics are accurate, not approximations. FP cuts a 5937 syncpoint record for every MPP transaction that uses a Fast Path database.

Source: IMS

Column heading: FP Call Count

FPCILWT

Fast Path CI Lock IWAITs.

Source: IMS

Column heading: CI Lock WAITS

FPDB5950

The number of Fast Path database update (type 5950) log records cut by this transaction.

FPDDEPU

The number of Direct Dependent Segment updates for the Fast Path database.

A transaction can update more than one database. In this case there will be additional report lines for each database used by the transaction.

Recommendation: When requesting this field, also include the DATABASE field in the form. This will identify the database to which this field applies.

Source: IMS

Column heading: DDEP Updates

FPDECL

Fast Path DEDB call count. DL/I calls to DEDB databases.

Source: IMS

Column heading: DEDB Calls

FPDEGET

Fast Path DEDB Get count.

Source: IMS

Column heading: DEDB Get Count

FPDEPUT

Fast Path DEDB Put count.

Source: IMS

Column heading: DEDB Put Count

FPDLET

Fast Path database DLET call count.

Source: IMS

Column heading: FP DLET Count

FPFLD

Fast Path FLD call count.

Source: IMS

Column heading: FLD Call Count

FPGETS

Fast Path database get call count. FP DB get calls are GU, GN, GNP, GHU, GHN, GHNP. FP resource usage statistics are accurate, not approximations. FP cuts a 5937 syncpoint record for every MPP transaction that uses a FP database.

Source: IMS

Column heading: FP Get Count

FPGHN

Fast Path GHN call count. Fast Path database Get Hold Next (GHN) call count.

Source: IMS

Column heading: FP GHN Count

FPGHNP

Fast Path GHNP call count. Fast Path database Get Hold Next within Parent (GHNP) call count.

Source: IMS

Column heading: FP GHNP Count

FPGHU

Fast Path GHU call count. Fast Path database Get Hold Unique (GHU) call count.

Source: IMS

Column heading: FP GHU Count

FPGN Fast Path GN call count. Fast Path database Get Next (GN) call count.

Source: IMS

Column heading: FP GN Count

FPGNP

Fast Path GNP call count. Fast Path database Get Next within Parent (GNP) call count.

Source: IMS

Column heading: FP GNP Count

FPGNS

Fast Path GN + GNP + GHN + GHNP call count. Total of Fast Path database GN, GNP, GHN and GHNP calls.

Source: IMS

Column heading: FP GNx Count

FPGU Fast Path GU call count. Fast Path database Get Unique (GU) call count.

Source: IMS

Column heading: FP GU Count

FPGUS

Fast Path GUx call count. Total of Fast Path database GU and GHU calls.

Source: IMS

Column heading: FP GUx Count

FPISRT

Fast Path ISRT call count. Fast path database ISRT call count.

Source: IMS

Column heading: FP ISRT Count

FPMSCl

Fast Path MSDB call count. DL/I calls to MSDB databases.

Source: IMS

Column heading: MSDB Calls

FPNBFS

Fast Path NBA Value. The NBA (normal) buffer value specified in the region startup procedure.

Source: IMS

Column heading: NBA Buffers

FPNBFU

Fast Path NBA Buffers used. The number of NBA (normal) buffers used.

Source: IMS

Column heading: NBA Used

FPNRDBFU

Fast Path MSDB and SDEP buffers used. Number of buffers used by MSDB and SDEP processing.

Source: IMS

Column heading: SDEP Buf Used

FPOBFS

Fast Path OBA Value. The OBA (overflow) buffer value specified in the region startup procedure.

Source: IMS

Column heading: OBA Buffers

FPOBFU

Fast Path OBA Buffers used. The number of OBA (overflow) buffers used.

Source: IMS

Column heading: OBA Used

FPOTELAP

For transactions that update Fast Path DEDBs, the time taken to complete output thread (OThread) processing.

OThread is an asynchronous process that performs the updates to the Fast Path databases. Depending on delays, OThread can complete before or after the end of transaction processing, but always independently.

It is calculated as 5612 suffix STCK - TPCCLK

FPPBFU

Fast Path PVT Buffers used. The number of private buffers used by HSSP or the High Speed DEDB Direct Reorganization utility in a transaction (one unit of work).

Source: IMS

Column heading: PVT Buff Used

FPPBFWT

Fast Path PVT Buffer Waits. The number of waits for private buffers by HSSP or the High Speed DEDB Direct Reorganization utility in a transaction (one unit of work).

Source: IMS

Column heading: PVT Buff Waits

FPPH1PH2

Fast Path Phase 1 + Phase 2 time. Fast Path Syncpoint Phase 1 + Phase 2 time.

Source: IMS

Column heading: PH1+PH2 Time

FPPOS

Fast Path POS call count.

Source: IMS

Column heading: POS Call Count

FPPRCTYP

Fast Path Process type. Fast Path Process type from the 5937/38 log record. Reported values are:

HSSP HSSP

Non-HSSP

Non-HSSP

Data-Cap

Data Capture Log written

Abort APPL Abort (Sent DFS2766I)

Java JAVA Application

Source: IMS

Column heading: Process Type

FPREPL

Fast Path REPL call count. Fast Path database REPL call count.

Source: IMS

Column heading: FP REPL Count

FPRTCODE

Fast Path Routing Code.

Source: IMS

Column heading: Routing Code

FPSDEPCI

Commit SDEP CI number used.

Source: IMS

Column heading: Commit SDEP CIs

FPSDEPI

The number of Sequential Dependent Segment inserts for the Fast Path database.

A transaction can update more than one database. In this case there will be additional report lines for each database used by the transaction.

Recommendation: When requesting this field, also include the DATABASE field in the form. This will identify the database to which this field applies.

Source: IMS

Column heading: SDEP Inserts

FPSDEPSG

Commit SDEP Segment used. Commit SDEP Segment number.

Source: IMS

Column heading: Commit SDEP Seg

FPSEMHQI

Fast Path Shared EMHQ Input time. Shared EMHQ Input time is the elapsed time a transaction input message spends on the shared EMH queue.

Source: IMS

Column heading: SEMHQ Input

FPSEMHQO

Fast Path Shared EMHQ Output time. Shared EMHQ Output time is the elapsed time a transaction output message spends on the shared EMH queue.

Source: IMS

Column heading: SEMHQ Output

FPSYNCCT

Fast Path Syncpoint count. The number of Fast Path synchronization points for a transaction. This value is a count of the following IMS log records for a transaction:

- X'5937' Fast Path synchronization point operation completed
- X'5938' Fast Path synchronization point operation was unsuccessful

Source: IMS

Column heading: FP SyncP Count

FPTOTIME

Fast Path Terminal Output time. Terminal output time is the elapsed time that the Fast Path transaction output message took to be sent to the terminal.

Source: IMS

Column heading: OutTermQ Time

FPUOWLWT

Fast Path UOW Lock IWAITs.

Source: IMS

Column heading: UOW Lock WAITs

FPUPDATS

Fast Path database update call count. FP DB update calls are ISRT, DLET, REPL. FP resource usage statistics are accurate, not approximations. FP cuts a 5937 syncpoint record for every MPP transaction that uses a FP database.

Source: IMS

Column heading: FP Updat Count

FPVSORFD

VSO Reads from Dataspace. The number of CI read requests satisfied from a dataspace or coupling facility structure.

Source: IMS

Column heading: VSO Read Dataspace

FPVSREAD

VSO Reads from DASD. The number of CIs read from DASD into a dataspace or coupling facility structure.

Source: IMS

Column heading: VSO Read DASD

FPVSWRIT

VSO Writes to DASD. The number of CIs with updates to a dataspace or coupling facility structure. This number represents the number of CIs that would have been sent to OTHREAD if the areas were non-VSO.

Source: IMS

Column heading: VSOWrite DASD

FPWAITS

Fast Path DB wait count. Fast Path database wait count. FP DB waits include waits for DEDB Buffers, CI locks, UOW locks. FP resource usage statistics are accurate, not approximations. FP cuts a 5937 syncpoint record for every MPP transaction that uses a FP database.

Source: IMS

Column heading: FP Wait Count

H**HWSID**

IMS Connect system name.

Source: IMS Connect

Column heading: Connect System

I

ICALCNT

Sync Callout Message count. The number of IMS calls (DL/I ICAL calls) by this transaction. This number is taken from either the application terminate accounting (log code 07) record or the transaction-level statistics (log code 56FA) record.

IMSACK

IMS acknowledgement indicator. Indicates how the IMS Connect transaction was acknowledged by IMS. Reported values are:

ACK IMS positively acknowledged (ACK)

NAK IMS negatively acknowledged (NAK)

blank Transaction was not acknowledged by IMS

Source: IMS Connect

Column heading: IMS ACK

IMSID

Processing IMS ID. IMS subsystem ID where the transaction was processed.

Source: IMS and TRF

Column heading: Proc IMS ID

IMS Problem Investigator global field: IMSID

IMS log DD name

See DDNAME

IMSRel

See IMSVER

IMS Resp Time

See RESPIMS

IMS RTp Time

See OUTRTIMS

IMS RTp Tot Time

See TOTRTIMS

IMS Tran Start

See STARTIMS

IMSVER

Processing IMS Version. IMS Version of the system where the IMS transaction was processed.

Source: IMS and TRF

Column heading: Proc Vers

IMS Problem Investigator global field: IMSRel

Input Msg Len

See MSGLIN

INPUTQ

Input queue time. The elapsed time from when the input message is enqueued onto the message queue (01/35) to when the program starts processing the transaction (31 DLI).

Source: IMS and TRF

Column heading: InputQ Time

INREAD

Input read Socket time. The elapsed time taken for IMS Connect to read the incoming message from when the transaction input message enters IMS Connect (Read Prepare) to when IMS Connect has completed reading the message (final Read Socket).

Source: IMS Connect

Column heading: ReadSock In Time

IPADDR

IP Address. Client IP address, either IPv4 dot-decimal notation or IPv6 format.

Source: IMS Connect

Column heading: IP Address

J

JOBNAME

Region Jobname. Jobname of the dependent region that processed the transaction.

Source: IMS and TRF

Column heading: Jobname

L

LOCKMAX

The high water lock count for the Unit of Recovery. This shows the maximum number of locks held at any one time by a transaction, and can provide an insight as to whether database contention could be the cause of transaction delays.

In the case of a non-message driven BMP, the value is an aggregate count for the schedule, unless the BMPSYNC(YES) option is specified, in which case the lock count is for each BMP syncpoint interval.

For a Fast Path transaction the lock count is obtained from the x'5937' SYNCLKS field, otherwise the count is obtained from the x'3730' XFERLHLD field.

Source: IMS

Column heading: High water lock count

LOCKTIME

Database Locking elapsed time. Database Locking elapsed time, approximation only at completion level 5, accurate at completion level 6. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: DB Lock Time

LogToken

See CONNLTK

LTERM

Input LTERM. The LTERM from where the incoming transaction was initiated. For a generated message, the LTERM is unavailable and the Userid is reported.

Source: IMS and TRF

Column heading: Input LTERM

IMS Problem Investigator global field: LTerm

LTERMOUT

Output LTERM. The LTERM to where the output message from the transaction is sent.

Source: IMS

Column heading: Output LTERM

LTERMOVR

Override LTERM. Override LTERM to where the output message from the transaction is sent.

Source: IMS and Connect

Column heading: Override LTERM

M

MSC MSC indicator. Indicates whether the transaction involved MSC. Reported values are:

FE Front-end MSC transaction, where the transaction originated

BE Back-end MSC transaction, where the transaction was processed

blank Not an MSC transaction

Source: IMS

Column heading: MSC

MSDB Calls

See FPMSCL

MSGLIN

Input Message length (including prefix). Input message length, including the message prefix. All type 01 records for the transaction input messages are accumulated to obtain the total input message length.

Source: IMS and TRF

Column heading: Input Msg Len

MSGLOUT

Output Message length (including prefix). Output message length, including the message prefix. All type 03 records for output messages issued by the transaction are accumulated to obtain the total output message length.

Source: IMS and TRF

Column heading: Output Msg Len

N

NBA Buffers

See FPNBFS

NBA Used

See FPNBFU

O

OBA Buffers

See FPOBFS

OBA Used

See FPOBFU

ORGIMS

Originating IMS ID. IMS subsystem ID where the IMS transaction originated For shared queue transactions, the transaction was processed by the IMS subsystem in field IMSID.

Source: IMS and IMS Connect

Column heading: Org IMS ID

ORGLTERM

Originating LTERM. Input LTerm of the originating transaction in the program switch sequence. For the first transaction in a program switch sequence, ORGLTERM is input LTerm. For subsequent transactions in the program switch sequence, ORGLTERM is blank for List reports and the originating LTerm for Summary reports.

Use ORGLTERM for Transit List-style reporting where you want to see the start of a program switch sequence, followed by the program switches in sequence.

ORGLTERM has special values for non-message driven transactions:

CICS-DBCTL

CICS APPLID (taken from the IMS recovery token)

BMP Job name

Source: IMS

Column heading: Org LTERM

ORGTRAN

Originating transaction code. Transaction Code of the originating transaction in the program switch sequence. Use ORGTRAN, TRANCOD and PGMSWIT (hidden) as keys for Form-based summary reporting when transit analysis is required. IMS PA will summarize transaction transit activity by grouping all transactions involved in program switching, in the sequence that they are processed.

Source: IMS and IMS Connect

Column heading: Org Trancode

ORGUOWID

Originating tracking unit of work (UOW) ID. Only the tracking token is reported, as this uniquely identifies a transaction in a sysplex. Field ORGIMS contains the UOW originating IMS subsystem ID.

Source: IMS

Column heading: Originating UOW ID

IMS Problem Investigator global field: OrgUOWID

ORGVER

Originating IMS Version. IMS Version of the system where the IMS transaction originated.

Source: IMS

Column heading: Org Vers

ORIGDS

Original IMS data store. For OTMA workloads in IMS Connect, the name of the IMS data store specified in the IMS destination ID field (IRM_IMSDESTID) of the IMS request message (IRM). *See also* TARGDS.

Source: IMS Connect

Column heading: Original Datastor

Orig Tmember

See TMEMBERO

OSAMREAD

OSAM read IO count, approximation only at completion level 5, accurate at completion level 6. Available from IMS V10. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: OSAMRead Count

OSAMWRIT

OSAM write IO count, approximation only at completion level 5, accurate at completion level 6. Available from IMS V10. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: OSAMWrit Count

OTHRD Buffers

See FPBFOTHR

OTMA

OTMA indicator. Indicates whether the transaction originated from OTMA. Reported values are:

OTMA

Transaction originated from OTMA, via an unknown Client

CONNECT

Transaction originated from OTMA, via IMS Connect

MQ Transaction originated from OTMA, via IBM MQ

blank Transaction did not originate from OTMA

Source: IMS

Column heading: OTMA

OTMAconf Time

See CONFOTMA

OTMADlay Time

See DLAYOTMA

OTMAproc Time

See PROCOTMA

OUTDEQ

Output messages dequeued count. The number of output messages sent (dequeued) by the transaction. Compare OUTENQ to OUTDEQ to ensure that output messages issued by transactions are being sent to the destination LTERM (dequeued). Outstanding output messages can fill the message queue, causing IMS to fail.

Source: IMS

Column heading: Out DEQ Count

OUTENQ

Output messages enqueued count. The number of output messages issued (enqueued) by the transaction. Compare OUTENQ to OUTDEQ to ensure that output messages issued by transactions are being sent to the destination LTERM (dequeued). Outstanding output messages can fill the message queue, causing IMS to fail.

Source: IMS

Column heading: Out ENQ Count

OUTPUTG

SMQ global output queue time. The elapsed time from when the output message is put onto the shared message queue by the backend system to when it is read off the queue by the frontend system.

Source: IMS and TRF

Column heading: SMQ Glob OutQTime

OUTPUTL

SMQ local output queue time. The elapsed time from when the output message is read from the shared message queue to when it is sent to the output LTERM.

Source: IMS and TRF

Column heading: SMQ Loc1 OutQTime

Output LTERM

See LTERMOUT

Output Msg Len

See MSGLOUT

OUTPUTQ

Output queue time. The elapsed time from when the transaction ends to when the output message is sent back to the LTERM.

Source: IMS and TRF

Column heading: OutputQ Time

OUTRTCON

IMS Connect Resume-Tpipe time. Calculated as the elapsed time between the Connect 48 Trigger Event that terminates the Send-Only Connect transaction and the subsequent Connect 42 OTMA Message Received Event after the Resume-Tpipe transaction has commenced.

Source: IMS Connect

Column heading: Conn RTp Time

OUTRTIMS

IMS Resume Tpipe output time. The elapsed time from when the transaction output message is sent to the Tpipe (transaction 31 COMMS) to when the Resume Tpipe takes the output message and sends it to its final destination (RTPIPE 31 COMMS).

Source: IMS

Column heading: IMS RTp Time

OutTermQ Time

See FPTOTIME

P

P2P Program-switch indicator. Indicates whether the transaction is a program switch. The reported values are:

- Y** Program switch transaction.
- N** Not a program switch transaction, but may be the originating transaction in a program switch sequence.
- Unknown. Typically a SL=2 transaction started with a type 31 (DLI GU) record.

Source: IMS

Column heading: Program-switch indicator

PARTRAN

Parent transaction code. The transaction code of the parent transaction in the program switch sequence.

Source: IMS

Column heading: Parent Trancode

PGMSIZE

MPP preload module size in bytes. If the address space is swapped out during the TRF data collection, this field will be zero. Always zero for BMPs and DBCTL threads.

Source: TRF

Column heading: Preload Size

PGMSWIT

Transaction number in program switch sequence. The sequence number of the transaction in the program switch sequence. The originating transaction starts the sequence at position 0. Use ORGTRAN, PGMSWIT (hidden) and TRANCODE as keys for Form-based summary reporting when transit analysis is required. IMS PA will summarize transaction transit activity by grouping all transactions involved in program switching, in the sequence that they are processed.

Source: IMS

Column heading: Prog Swit#

PgmSwitc Time

See SWITTIME

PH1+PH2 Time

See FPPH1PH2

PORT IMS Connect TCP/IP Port number.

Source: IMS Connect

Column heading: Port

IMS Problem Investigator global field: Port

PORTDEP

Port depth. The number of concurrently open sockets on the port from which the transaction was received. This field can be used to monitor the socket usage at the time the individual transactions were received by IMS Connect.

Source: IMS Connect

Column heading: Port Depth

PORTTYPE

Port type. Indicates whether a transaction is using a TCP/IP or Local port connection. Reported values are:

T TCP/IP

L Local

blank Not a Connect transaction

Source: IMS Connect

Column heading: Port Type

POS Call Count

See FPPOS

POSTOTMA

Total post-OTMA output time. For Sync Level NONE transactions, the elapsed time from when OTMA completed processing the input message to when the transaction terminates (trigger event). For Sync Level CONFIRM transactions, the elapsed time from when OTMA completed processing the ACK response to when the transaction terminates (trigger event).

Source: IMS Connect

Column heading: PostOTMA Time

PREOTMA

Total pre-OTMA input time. The elapsed time from when the transaction input message enters IMS Connect (Read Prepare) to when the transaction is sent to IMS (OTMA) for processing.

Source: IMS Connect

Column heading: PreOTMA Time

PRIORITY

Transaction priority. As specified in the TRANSACT macro PRTY parameter.

Source: IMS

Column heading: Pr

Private <16M

See PRMEM24

Private >16M

See PRMEM31

PRMEM24

Private storage below 16M line. Allocated private storage in bytes below the 16M line. If the address space is swapped out during the TRF data collection, this field will be zero. Always zero for DBCTL threads.

Source: TRF

Column heading: Private <16M

PRMEM31

Private storage above 16M line. Allocated private storage in bytes above the 16M line. If the address space is swapped out during the TRF data collection, this field will be zero. Always zero for DBCTL threads.

Source: TRF

Column heading: Private >16M

PROCESS

Processing time. The elapsed time the transaction spends processing in the dependent region.

Source: IMS and TRF

Column heading: Process Time

Processing UOW ID

See PROUOWID

Process Start

See STARTDEP

Process Type

See FPPRCTYP

Proc IMS ID

See IMSID

PROCOTMA

OTMA processing time. The elapsed time OTMA spent processing the transaction, from when the message is sent to IMS (OTMA) to when the response is received back from OTMA. Transaction messages are sent to OTMA for processing. For Sync Level CONFIRM transactions, the ACK response from the client is also sent to OTMA for processing.

Source: IMS Connect

Column heading: OTMAproc Time

PROGRAM

Program or PSB name.

Source: IMS and TRF

Column heading: Program

IMS Problem Investigator global field: Program

Program exec time

See PROCESS

Prog Swit#

See PGMSWIT

PROUOWID

Processing tracking unit of work (UOW) ID.

Source: IMS

Column heading: Processing UOW ID

PSTID

Region PST ID. The PST ID of the dependent region that processed the transaction.

Source: IMS and TRF

Column heading: PST

IMS Problem Investigator global field: Region

PVT Buff Used

See FPPBFU

PVT Buff Waits

See FPPBFWT

Q**QTYPE**

Queue type. Indicates the type of queue from where the transaction was taken to be processed. Reported values are:

MSGQ

IMS message queue

LOCALF

Local-first (always processed by the same system where the message was queued)

LOCAL

IMS shared queue, processed locally by the frontend IMS system

GLOBAL

IMS shared queue, processed globally by another backend IMS system

NONMSG

Non-message driven BMP

CPI-CI

CPI-CI APPC transaction scheduled in message region

Use TRANCODE and QTYPE as keys for Form-based summary reporting when transit analysis of input queue time is required. For shared queues, you will be able to compare input queue times for globally and locally processed transactions.

Source: IMS

Column heading: Queue Type

R**RATEMIN**

Transaction rate / Minute. For Form-based summary reporting only, the transaction rate per minute.

Source: IMS, Connect, and TRF

Column heading: Rate/Min

RATESEC

Transaction rate / Second. For Form-based summary reporting only, the transaction rate per second.

Source: IMS, Connect, and TRF

Column heading: Rate/Sec

READEXIT

Read message Exit time. The elapsed time the input message spent being processed by the READ Message Exit. For Sync Level NONE transactions, the READ Message Exit is called once for the input message. For Sync Level CONFIRM transactions, the READ Message Exit is called twice, initially for the input message and a second time for the ACK response from the client.

Source: IMS Connect

Column heading: ReadExit Time

ReadSock Ack Time

See ACKREAD

ReadSock In Time

See INREAD

RECOVER

Recoverable transaction indicator. Indicates whether a transaction is recoverable or non-recoverable as defined in the TRANSACT macro INQUIRY parameter. Reported values are:

R Recoverable

N Non-recoverable

blank Not a message queue transaction

Source: IMS

Column heading: Rec

REGOCCUP

The elapsed time that an MPP transaction spends in the dependent region, from when it is scheduled, or starts processing, to when the next transaction is eligible for processing.

Source: IMS

Column heading: Region Occ Time

RECTOKEN

The last 8 hexadecimal bytes (unique part) of the IMS unit of recovery token.

The recovery token is a 16-byte token that uniquely identifies a unit of work. The token consists of the following items:

IMSID

8-character IMS subsystem ID padded with blanks.

OASN

4-byte origin application sequence number assigned at schedule time. OASN is unique and reset back to zero at cold start.

COMN

4-byte commit number initialized to zeros and incremented each time the application goes through commit processing.

For CICS-DBCTL only, the recovery token is generated by CICS and consists of the 8-character CICS generic APPLID followed by the 8-byte RMUOWID (a STCK value).

To report the full recovery token, use RECTOKID and RECTOKEN together.

Source: IMS and TRF

Column heading: Recovery Token

IMS Problem Investigator global field: RecToken

RECTOKID

The first 8 characters of the IMS unit of recovery token, identifying the system where the transaction is processed.

The recovery token is a 16-byte token that uniquely identifies a unit of work. The token consists of the following items:

IMSID

8-character IMS subsystem ID padded with blanks.

OASN

4-byte origin application sequence number assigned at schedule time. OASN is unique and reset back to zero at cold start.

COMN

4-byte commit number initialized to zeros and incremented each time the application goes through commit processing.

For CICS-DBCTL only, the recovery token is generated by CICS and consists of the 8-character CICS generic APPLID followed by the 8-byte RMUOWID (a STCK value).

To report the full recovery token, use RECTOKID and RECTOKEN together.

Region

See PSTID

REGTYPE

Region type. The type of region that processed the transaction. Reported values are:

AER	IMS Application Execution
BAT	Batch Application
BMP	Batch message region
CPI	CPI-CI APPC in a Message region
DBC	DBCTL
IFP	Fast Path Message-Driven region
JBP	JBP region
JMP	JMP region
MPP	Message region
MSC	MSC transaction sent to a remote IMS system for processing
ODB	Open database (ODBM/ODBA)
SWI	Message switch or generated output message, not a transaction
TRK	Tracking thread
UTI	Utility

Source: IMS and TRF

Column heading: Reg Typ

REJECT

Transaction rejected indicator. Indicates whether an IMS Connect transaction has been rejected. Reported values are:

R Transaction rejected
blank Transaction not rejected

Source: IMS Connect

Column heading: Rej

REROUTNM

Connect Reroute name. The name used on a NAK Reroute request to specify the new destination for the message being NAK'd.

Source: IMS Connect

Column heading: Reroute Name

RESPCON

Connect response time. The elapsed time from when the transaction input message enters IMS Connect (Read Prepare) to when the transaction terminates (trigger event).

Source: IMS Connect

Column heading: CON Resp Time

RESPIMS

IMS response time. IMS transaction end-user response time. The elapsed time from when the input transaction is enqueued by IMS (01/35) to when the response is sent back to the originating LTERM (31 Communications). Only transactions that respond back to their originating LTERM incur a response time. Responses may occur prior to the completion of program execution time resulting in a response time less than the total transaction time. To analyze all transactions from end-to-end, regardless of their response destination, use field TOTALTM.

Source: IMS and TRF

Column heading: IMS Resp Time

RESPMODE

Response mode indicator. Indicates whether a transaction is response mode or not. Reported values are:

R Response mode
N Not response mode
blank Not a message queue transaction

Source: IMS

Column heading: Resp Mode

Resp time

See RESPIMS

RESUMETP

Resume Tpipe indicator. Indicates whether IMS Connect uses a resume Tpipe to request asynchronous output data from IMS during a transaction.

Reported values are:

R Resume Tpipe is used
N Resume Tpipe is not used
blank Not a Connect transaction

Source: IMS Connect

Column heading: Resum Tpipe

IMS Problem Investigator global field: ResumeTP

Resume Tpipe Orig Msg Token

See CONNOTOK

Routing Code

See FPRTCODE

RXMLEXIT

XML Adapter message Exit time. The elapsed time the input message from the XML Adapter spent being processed by the READ Message Exit.

Source: IMS Connect

Column heading: RXMLExit Time

R0TIME

Internal Application Response time. The sum of the input queue time and processing time.

Source: IMS and TRF

Column heading: ApplResp Time(R0)

R1TIME

Total Response time. The sum of the input queue time, processing time, and output queue time.

Source: IMS and TRF

Column heading: Tot Resp Time(R1)

S

SAF Call Time

See SAFTIME

SAFTIME

SAF security call time. The accumulated elapsed time spent in all SAF calls for the message.

Source: IMS Connect

Column heading: SAF Call Time

SCHEDTM

Schedule time. The elapsed time from when the application program starts (08) to when the input message processing starts (31 DLI).

Source: IMS and TRF

Column heading: Schedule Time

SCHEDWIC

Wait time for Intent Conflict, taken from the LINTMINT field of the IMS Application Start (08) record.

SCHEDWPS

Wait time for Pool Space, taken from the LINTMPOL field of the IMS Application Start (08) record.

SCOACKCT

Sync Callout ACK count. The number of Sync callout ACK events attributed to the transaction. *See also* SCOACKTM.

Source: IMS

Column heading: SyncCout ACK Cnt

SCOACKTM

Sync Callout ACK time. The elapsed time from when the Sync Callout message is sent to when the ACK is received (YOUT-YACK). If the transaction issued more than one ICAL call, then this field contains the sum of all ACK times. The count of ACK times is available in SCOACKCT.

Source: IMS

Column heading: SyncCout ACK Time

SCOCALCT

Sync Callout Response count. The number of ICAL calls issued by the transaction that recorded a response time. *See also* SCOCALTM.

Source: IMS

Column heading: SyncCout Resp Cnt

SCOCALTM

Sync Callout Total time. The elapsed time from when the Sync Callout message is sent to when the Response (YOUT-YRSP) or a NAK (YOUT-YNAK) is received back. If the transaction issued more than one ICAL call, then this field contains the sum of all elapsed times. The count of Total Response times is available in SCOCALCT.

Source: IMS

Column heading: SyncCout RespTime

SCOEXTCT

Sync Callout External Response count. The total number of Sync Callout external acknowledgements or responses processed by the transaction. *See also* SCOEXTTM.

Source: IMS

Column heading: SyncCout XRsp Cnt

SCOEXTTM

Sync Callout External Response time. The elapsed time from when the Sync Callout ACK is received to when either the Response (YOUT-YRSP) or a NAK (YOUT-YNAK) is received. If the transaction issued more than one ICAL call, then this field contains the sum of all elapsed times. The count of External Response times is available in SCOEXTCT.

Source: IMS

Column heading: SyncCout XRspTime

SCONAKCT

Sync Callout NAK count. The number of Sync callout ACK events attributed to the transaction. *See also* SCONAKTM.

Source: IMS

Column heading: SyncCout NAK Cnt

SCONAKTM

Sync Callout NAK time. The elapsed time from when the Sync Callout message is sent to when the NAK is received (YOUT-YNAK). If the

transaction issued more than one ICAL call, then this field contains the sum of all NAK times. The count of NAK times is available in SCONAKCT.

Source: IMS

Column heading: SyncCout NAK Time

SDEP Buf Used

See FPNRDBFU

SEMHQ Input

See FPSEMHQI

SEMHQ Output

See FPSEMHQO

SMQ Glob OutQTime

See OUTPUTG

SMQ Locl OutQTime

See OUTPUTL

SOCKET

Socket number.

Source: IMS Connect

Column heading: Sock Num

SRBTIME

Program execution SRB time.

Source: TRF

Column heading: SRB Time

STARTCON

Connect transaction start time. The time of day when the transaction input message enters IMS Connect (Read Prepare).

Source: IMS Connect

Column heading: CON Tran Start

STARTDEP

IMS transaction processing start. The time of day when the IMS Full Function transaction starts (31). The time of day when the Fast Path transaction starts (5901+InputQ).

Source: IMS

Column heading: Process Start

STARTIMS

IMS transaction arrival time. The time of day when the transaction input message is enqueued onto the IMS message queue (01/35).

Source: IMS and TRF

Column heading: IMS Tran Start

STARTLVL

IMS transaction start level. Start level is an attribute that IMS PA assigns to every transaction reported in the IMS log. It is an indicator of how far the transaction lifecycle has already progressed at the start of the IMS log. Together with Completion level, Start level is an indicator of the

completeness of information collected about the reported transaction. For example you may choose to report only those transactions that started and ended with the IMS log to guarantee complete performance metrics.

Specify Start level to instruct form-based reporting to report only those transactions with a Start Level less than or equal to the required value. For example: Specify 1 to report start level 1 transactions only; specify 2 to report start level 1 and 2 transactions, and so on. The default is 2.

The IMS transaction start levels are:

1 The transaction first arrives in this IMS log.

For message driven transactions, the type 01 input message is available indicating the transaction has arrived onto the message queue. For non-message driven transactions (BMP, DBCTL, ODBM), the type 08 program start record is available indicating the start of processing. Use start level 1 when analyzing input message arrival rates and lengths.

2 The transaction starts processing in this log.

For message driven transactions only, the type 01 input message is not available, but the type 31 DLI record is available indicating that transaction dependent region processing starts in this IMS log. The complete transit time breakdown is available, including input queue time (which is derived). Use Start level 2 when analyzing transaction dependent region processing time.

3

Dependent region processing is already in progress at the start of this log.

The type 08 application start record is not available for long running BMP or thread processes that commenced processing prior to this log. Processing start time is derived from the first log event for the Job. Processing elapsed time is calculated from this time to the job end (type 07). Use Start level 3 when analyzing all activity that occurred in the IMS log.

Source: IMS

Column heading: Start Level

STEPNAME

Region Stepname. The stepname of the dependent region that processed the transaction.

Source: IMS and TRF

Column heading: Stepname

SWITTIME

Program switch time.

A program switch occurs when one transaction calls another by inserting a message (destination is SMB) onto the message queue. Program switch time is the elapsed time from when the program switch message is eligible for processing to when it actually starts processing in a dependent message processing region. It is attributed to the program switch transaction not the originating transaction, and is analogous to input queue time for transactions coming into IMS from VTAM or OTMA.

P2P transactions are discrete transactions with their own units of recovery. Their processing eligibility depends on the type of IO PCB used to insert the message:

- For EXPRESS=YES IO PCB, the P2P transaction is immediately eligible for processing (asynchronously).
- Otherwise, the P2P transaction cannot start until the parent starts syncpoint phase 2 and transfers the message to its permanent (SMB) destination.

Source: IMS

Column heading: PgmSwch Time

SYNCELAP

Syncpoint total elapsed time (phases 1 and 2).

SYNCFAIL

Syncpoint Failure Code. Fast Path Syncpoint Failure code from the 5938 log record.

Source: IMS

Column heading: Sync Fail

SYNCLEV

Synchronization level. IMS Connect Synch Level. Reported values are:

NONE

No acknowledgement is required from the client

CONFIRM

The client is required to acknowledge

SYNCH

Two-phase commit processing is required

blank Not an IMS Connect transaction

Source: IMS and Connect

Column heading: Synch Level

SYNCTIME

IMS transaction syncpoint time. The time of day when the IMS Full Function transaction ends (5612) or the Fast Path transaction ends (5937).

Source: IMS

Column heading: Syncpoint Time

SYNCPH1E

Syncpoint phase 1 elapsed time. Note that the required log records are not always available, in which case the time will be reported as not available.

SYNCPH2E

Syncpoint phase 2 elapsed time. Note that the required log records are not always available, in which case the time will be reported as not available.

SYNCPH2F

Syncpoint phase 2 elapsed time for Fast Path only. Note that the required log records are not always available in which case the time will be reported as not available.

T

TARGDS

Target IMS data store. For OTMA workloads in IMS Connect, the name of the IMS data store that processed the request. *See also* ORIGDS.

Source: IMS Connect

Column heading: Target datastor

TERMINAL

VTAM Node name. VTAM Node name or BTAM Line/PTerm number. When neither VTAM or BTAM, TERMINAL may be reported as:

- For implicit APPC transactions, network ID (LUP_NETWORK_ID)
- For OTMA transactions, Tpipe name (TMAMCTNM)
- For MSC transactions, origin LTERM (MSGMSINM)

Source: IMS and TRF

Column heading: Terminal

IMS Problem Investigator global field: Terminal

TIMEOUT

Transaction timeout indicator. Indicates whether an IMS Connect transaction has timed-out. Reported values are:

- T** Transaction timed-out
blank Transaction did not time out

Source: IMS Connect

Column heading: Time Out

TIMERV

Transaction timer value. This value, set by the client in the IRM header, is the time IMS Connect will wait for a response from OTMA before timing out. The time is reported in microseconds. Use the SECGROUP operand to report values in seconds in the range 0 (no wait option) to 4200 (70 mins), or 9999 to wait forever. Use the TIMEOUT field to indicate whether the Connect transaction did time out.

Source: IMS Connect

Column heading: Transact Timer

TMEMBERD

Destination OTMA Tmember name. Connect XCF queue which delivers the message to the IMS System.

Source: IMS Connect

Column heading: Dest Tmember

TMEMBERO

Originating OTMA Tmember name. IMS XCF queue which will return the message to the Connect System.

Source: IMS

Column heading: Orig Tmember

Total IMS Time

See TOTALTM

Total IO Count

See DBIOCALL

Total time

See TOTALTM

TOTALTM

Total transaction elapsed time. The total elapsed time that the transaction incurs in message queues and being processed by IMS. For self-contained transactions, or the initial transaction in a program switch sequence, total time consists of input queue, processing and output queue times. For subsequent transactions in a program switch sequence, total time consists of switch time, processing time and output queue time.

Source: IMS and TRF

Column heading: Total IMS Time

Tot Resp Time(R1)

See R1TIME

TOTRTIMS

Resume Tpipe total time. The elapsed time from when the input message arrives (01/35) to when the Resume Tpipe takes the output message and sends it to its final destination (RTPIPE 31 COMMS). This time is useful for transactions that use SENDONLY RESUME-TPIPE protocol – it measures the overall time in IMS that contributes to end-user response time.

Source: IMS

Column heading: IMS RTp Tot Time

TPIPE Connect Tpipe name derived from IMS Connect Extensions journal 41 record field CERE_41_TPIPE_NAME.

Source: IMS Connect

Column heading: Tpipe

TRANCNT

Transaction count. For Form-based summary reporting only, the number of transactions that were accumulated in this key range.

When TRANCNT is used in combination with fields that report on database activity or external subsystems, additional report lines are produced that provide a count for each database or external subsystem affected by the transaction. If requested, a summary line is also produced that reports on the total number of transactions. As transactions can update more than one database, or more than one external subsystem, the total in the summary line will not necessarily be the sum of counts listed above.

In the following example, the total number of transactions (**A**) does not equal the sum of counts for each database as some transactions have accessed more than one database.

Trancode	Database DBD Name	Tran Count
IVTNO	-	4
IVTNO	IVPDB1	7
IVTNO	IVPDB1I	6
IVTNO		11 A

Fields that report on database activity: DATABASE, DBACMETH, DBBLKDEL, DBBLKINS, DBBLKREP, DBBLKUPD, DBORGTYP, DBUPRATE, DEDBAREA, FPDDEPU, FPSDEPI

Fields that report on external subsystems: ESAFNAME, ESAFCALL, ESAFCCON, ESAFCOMT, ESAFPRE

See also ABENDCNT

Source: IMS and IMS Connect

Column heading: Tran Count

TRANCODE

IMS Transaction Code.

Source: IMS, Connect, and TRF

Column heading: Trancode

IMS Problem Investigator global field: TranCode

Transact Timer

See TIMERV

U

UORTIME

Unit-of-recovery time. The elapsed time the transaction spends processing in the dependent region. UOR time is similar to Processing Time, the difference for an MPP transaction is:

- UOR time starts when the IMS unit-of-recovery commences (5607).
- Processing time starts when the MPP transaction gets the input message from the message queue (31 DLI), usually after the commencement of the UOR.

Therefore UOR time is usually longer than Processing time.

Source: IMS

Column heading: UOR Time

UOW Lock WAITS

See FPUOWLWT

USERID

User ID. RACF user ID, or substitute as used by IMS for security purposes.

Source: IMS, Connect, and TRF

Column heading: Userid

IMS Problem Investigator global field: Userid

V

VSAMREAD

VSAM read IO count, approximation at completion level 5, accurate at completion level 6. Available from IMS V10. At completion level 5, resource usage metrics are obtained from the type 07 application termination record and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: VSAMRead Count

VSAMWRIT

VSAM write IO count, approximation at completion level 5, accurate at completion level 6. Available from IMS V10. At completion level 5, resource usage metrics are obtained from the type 07 application termination record

and apportioned equally among all transactions that executed under that schedule, regardless of their respective processing times. At completion level 6, resource usage metrics are obtained from the type 56FA transaction accounting record.

Source: IMS

Column heading: VSAMWrit Count

VSO Read DASD

See FPVSREAD

VSO Read Dataspace

See FPVSORFD

VSO Write DASD

See FPVSWRIT

W

WFITIME

WFI elapsed time. SUBQ6 time where the message region waited before the next WFI transaction starts processing. Warning: IMS only records SUBQ6 time to a precision of 0.1 seconds.

Source: IMS

Column heading: WFI Time

X

XMITEXIT

Transmit message Exit time. The elapsed time output messages (responses) spent being processed by the XMIT Message Exit.

Source: IMS Connect

Column heading: XmitExit Time

XMLADAPT

XML Adapter name. The name of the XML Adapter passed by the SOAP Gateway.

Source: IMS Connect

Column heading: XML Adapter

Part 8. Appendixes

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Index

Special characters

/TRACE command 340, 453, 501
\$IMSDIR 413
*** (overflow values) 505
*Batch 261, 265, 267
*BMP 246, 253, 258, 261, 265, 267
*CMD 517
*DBC 246, 253, 258, 261, 265, 267
*IFP 246, 253, 258
*MPP 246, 253, 258, 261, 265, 267
*SF 261
*Unknown 261
*Utility 261, 265, 267
FIELDS parameter
 field names 629
IMSPAATF command 596
 TRACE level 2 601
IMSPACEX command 514
IMSPALOG command 39
 FIELDS parameter 86, 94
 LIST default values 86
 SUMMARY default values 97
 LIST report options 86
 SUMMARY report options 94
IMSPAMON command 326
IMSPATRF commands 574

Numerics

64-bit Cache Statistics report 189
64-bit Storage Statistics report 192

A

abends
 log records 611
 monitor trace 365
 partial reports 319, 505
 program abends, error log 133
 pseudo-abends 296
accessibility
 overview 17
ACK/NAK report 554
active journals, IMS Connect
 Extensions 3
ALLLIST sample report form 88
ALLSUMM sample report form 99
ALLSUMMX sample report form 100
Alternate Sequencing 408
 comparison of IMS PA and
 DFSUTR20 505
 described 343
 sample report, Communication
 IWAIT 460
 sample report, Communication Line
 Functions 463
 sample report, Communication
 Summary 457
 sample report, Database IWAIT
 Analysis 394

Alternate Sequencing (*continued*)
 sample report, Database IWAIT
 Summary 375
 sample report, DEDB Resource
 Contention 476
 sample report, Enqueue/Dequeue
 Trace 408
 sample report, ESAF 472
 sample report, Fast Path Buffer
 Statistics 481
 sample report, MSC Summary 467
 sample report, MSC Traffic 468
 sample report, Program
 Summary 365
 sample report, region analysis 382
 sample report, Region Summary 355
 sample report, Total System IWAIT
 Detail 418
 sample report, VSO Summary 490
APPC
 Output Queue time blank 61
 Transaction Transit Log report 58
 Transaction Transit reports 47
Application Detail report
 described 388
 introduced 331
 sample report, ESAF Integration 390
application efficiency indicators
 Region Summary report 350
Application Scheduling Statistics
 report 164
asterisks (overflow values) 505
ATF
 data 595
 Exception Transaction extract 605
 extract record processing 606
 log codes processed by IMS PA 627
 OMEGAMON ATF, described 595
 Record Trace report 599
 Record Trace reports
 report options 599
 Trace level 1 600
 Trace level 2 601
 Trace level 3 604
 Transit List report 597
 Transit Summary report 598
 using with IMS Performance
 Analyzer 11
ATF Enhanced Summary
 described 277
ATF Enhanced Summary DB2 Call
 Analysis report
 sample report 287
ATF Enhanced Summary DLI Call
 Analysis report 283, 286
 described 283, 286
 sample report 283
ATF Enhanced Summary Extract
 sample extract summary report 278
ATF Enhanced Summary MQ Call
 Analysis report 289

ATF Enhanced Summary MQ Call
 Analysis report (*continued*)
 described 289
 sample report 289
ATF enhanced summary reports 277
ATF Enhanced Summary reports
 introduced 25
ATF Enhanced Summary Transaction
 Analysis report 279
 described 279
 sample report 280
ATF extracts
 described 605
ATF reports
 batch commands 595, 596
 described 595
 types of 595
averages
 Management Exception report 127
 print averages data set 128

B

backup failures, error log 134
BADRESP sample report form 100
BALG/Shared EMHQ Analysis report
 described 484
BALG/Shared EMHQ report
 introduced 331
 sample report 484
bandwidth, MSC links 193
batch commands 39, 325, 347, 573, 595
 IMSPAATF 596
 IMSPACEX 514
 IMSPALOG 39
 IMSPAMON 326
 IMSPATRF 574
batch monitor 335
Batch VSAM Statistics report
 described 447
 introduced 331
 sample report 448
Blk Ldr Busy, defined 505
BMP
 COMPLVL Transaction Completion
 Summary report 101
 impact on performance 340
 log processing restrictions 319
BMP Checkpoint report
 introduced 19
 sample report, List 233
Buffer Pool and Latch Statistics reports
 described 452
 introduced 331
 sample report, Latch Statistics 455
 sample reports, Buffer Pools 453

C

- call analysis 29, 335, 435, 436
 - ESAF 365
 - call data 382
 - ESAF 355
 - FP 355
 - callouts, synchronous 474
 - capacity planning
 - Management Exception report 127
 - CCTL 25, 30, 46, 336
 - Checkpoint report
 - described 225
 - introduced 19
 - sample report, Checkpoint Duration distribution 231
 - sample report, Checkpoint Summary 230
 - sample report, Database Definitions 227
 - sample report, Terminals 229
 - sample report, Transaction Definitions 227
 - supersedes IPIPU9xx 306
 - Checkpointed IMS Resource Definitions report
 - IPIPPGM9 307
 - CICS Performance Analyzer 11
 - codes
 - log records 611
 - monitor record 501, 613
 - Cold Start Analysis report
 - described 237
 - introduced 19
 - sample report 238
 - Collection Level and Report
 - cross-reference 621
 - collection level, IMS Connect event records 615
 - combined reporting 533
 - COMBLIST sample report form 536
 - COMBSUMM sample report form 539
 - Common Queue Server 318
 - Communication reports
 - described 457
 - introduced 331
 - sample report, Alternate Sequencing 457, 460, 463
 - sample report, Communication IWAIT 460
 - sample report, Communication Line Functions 463
 - sample report, Communication Summary 457
 - completion levels
 - COMPLVL sample report form 101, 102
 - COMPLVL sample report form 101, 102
 - CONNACK sample report form 539
 - Connect ACK/NAK report
 - described 554
 - sample report 555
 - Connect active journals 3
 - Connect event records
 - for ACK/NAK report 554
 - for Exception Events report 557
 - for Gap Analysis report 562
 - for Port Usage report 546
 - Connect event records (*continued*)
 - for Resume Tpipe report 549
 - Connect Exception Events report
 - correlation with Transit Log report 558
 - described 557
 - flood notification 559
 - OTMA flood notification 560
 - sample report 558, 559
 - Connect Port Usage report
 - described 546
 - sample report 547
 - Connect records
 - for Transit Analysis report 516
 - for Transit Event Trace 564
 - for Transit Extract report 527
 - for Transit Log report 523
 - Connect Resource Usage reports 546
 - Connect Resume Tpipe report
 - described 549
 - sample report: extended 552
 - sample report: standard 550
 - connect status event records 615
 - Connect Trace reports 563
 - Connect Transaction Transit reports (Form-based)
 - sample reports, Connect and combined 533
 - Connect Transit Analysis report
 - described 515
 - Connect Transit Event Trace report
 - described 564
 - sample report 565
 - Connect Transit Extract
 - described 527
 - Connect Transit Log report
 - described 523
 - CONNLIST sample report form 536
 - CONNPLEX sample report form 540
 - CONNTCOD sample report form 541
 - cookie policy 677
 - coupling facility 23, 256, 273, 331, 490
 - CPU resource utilization indicators
 - Region Summary report 350
 - CPU time, defined 504
 - CPU usage
 - CPUHIGH sample report form 102
 - CPU Usage report and extract
 - described 152
 - introduced 19
 - sample extract data 157
 - sample report 153
 - CPUHIGH sample report form 102
 - CQS 318
- ## D
- Dashboard report
 - introduced 19
 - data collection, monitor 340
 - database I/O errors, error log 134
 - Database IWAIT Analysis report
 - described 393
 - introduced 331
 - sample report, Alternate Sequencing 394
 - Database IWAIT Summary report
 - described 374
 - introduced 331
 - sample report, Alternate Sequencing with Limit 375
 - database times 151
 - Database Trace report
 - described 296
 - introduced 19
 - sample report 298
 - Database Update Activity report and extract
 - FORMAT1 sample reports 201
 - described 200
 - FORMAT2 sample report 204
 - introduced 19
 - sample extract data 207
 - database/application efficiency indicators
 - Region Summary report 350
 - DB monitor
 - Exception Listing 399
 - DB Monitor
 - introduced 9
 - OSAM Buffer Pool Statistics report 162
 - reports 29, 335
 - understanding monitor data 501
 - VSAM Buffer Pool Statistics report 163
 - DB2 9, 72
 - DB2 Call List report, TRF 581
 - DB2 Call Summary report, TRF 583
 - DBBF tuning 320
 - DBCTL 365, 481
 - DBCTLIST sample report form 89
 - DBCTSUMM sample report form 102
 - sample report, Transaction Resource Usage 136
 - DBCTL, log 246, 253, 258, 261, 265, 267
 - DBCTL, log reports 25, 46
 - DBCTL, monitor 30, 336
 - DBCTLIST sample report form 89
 - DBCTSUMM sample report form 102
 - DBFULTA0 23, 249, 320
 - Fast Path Transaction Exception report 239
 - DBFX tuning 320
 - DBRC
 - READONLY 3
 - DBT (DB Tools) 296
 - DC Queue Manager Trace report
 - described 291
 - introduced 19
 - sample report 292
 - sample UOW Tracker report 293
 - DC UOW Tracker report 293
 - DCCTL 581
 - DDgroup report
 - described 396
 - introduced 331
 - sample report 397
 - DDIWELAP
 - sample distribution 397
 - DDname by PSB-Transaction Code report
 - described 439
 - sample report 440

- deadlock repo
 - IPIERA30 309
- Deadlock report 215
 - described 215
 - introduced 19
 - sample report, DB2 (External) List 223
 - sample report, DB2 (External) Summary 225
 - sample report, IMS List 216
 - sample report, IMS Summary 224
 - supersedes IPIERA30 309
- DEDB Resource Contention report
 - described 475
 - introduced 331
 - sample report, Alternate Sequencing 476
- DEDB Update Activity report
 - described 272
 - introduced 23
- DEDB Update Trace report
 - described 300
 - introduced 23
 - sample report 301
- delimiter character 72, 157, 207, 250
- dependent region activity in progress, defined 503
- design standards for programs 337
- detail reports, log 19, 23
- DFSERA10 utility 132
- DFSILTA0 19, 316, 317, 320
- DFSISTS0 320
- DFSLOG10 macro 133
- DFSLOG4E macro 497
- DFSUTR20
 - compared with IMS PA 505
- DFSUTR30
 - compared with IMS PA 508
- diagnostic information, gathering 49, 241
- dialog 325
- Dispatcher Statistics report 174
- distribution, sample
 - DDIWELAP 397
- DL/I Call Statistics report 171
 - IPIPU1xx 304
- DLI Call List report, TRF 575
- DLI Call Summary report, TRF 578
- documentation
 - accessing 16
 - sending feedback 16
- documentation of programs 337
- download to PC 9
- Dynamic SAP Statistics report 177

E

- EASF Integration
 - report reference table, Monitor reports 342
- elapsed time, defined 504
- elapsed, defined 505
- EMH Message Statistics report
 - described 270
 - introduced 23
 - sample report 271
- Enqueue/Dequeue Trace report
 - described 407
 - introduced 331
 - sample report 407
 - sample report, Alternate Sequencing (with Limit) 408
- Error Conditions log
 - described 132
 - sample report 132
- ESAF Integration 326, 341, 365
 - sample report, Application Detail 390
 - sample report, Exception Listing 400
 - sample report, Program Summary 365
 - sample report, Program Trace 442
 - sample report, PSB Details 425
 - sample report, PSB-Transaction Code Analysis 436
 - sample report, region analysis 382
 - sample report, Region Summary 355
 - terminology 502
- ESAF report, monitor
 - described 471
 - introduced 331
 - sample report, Alternate Sequencing 472
- ESAF Trace report, log 19
 - described 302
 - introduced 19
 - sample report 303
- event collection
 - IMS Connect Extensions 511
- event records
 - connect status 615
 - IMS-to-CICS TCP/IP communications 617
 - IMS-to-IMS TCP/IP communications 617
 - ISC (intersystem communication) 617
 - log user data 620
 - message-related 617
 - Open Database 617
 - RECORDER trace 619
 - trace 617
 - XML-related 617
- EWLM Statistics report 189
- examples
 - Form-based Connect Transit Summary report 538
 - OMEGAMON ATF Transit List report 597
 - OMEGAMON TRF DLI Call List report 575
 - OMEGAMON TRF DLI Call Summary report 579
- Excel 66
- Exception Listing report
 - described 399
 - introduced 331
 - sample report, ESAF Integration 400
- Exception Transaction extract, ATF 605
- Expectation Set
 - Fast Path Transaction Exception report and extract 249
 - Management Exception report 127

- Expectation Set (*continued*)
 - Transaction Exception report and extract 70
- export file content 66
- External Subsystem Resource Usage report 28
- External Subsystem Trace report 19
- extract
 - ATF Extract 605
 - Connect Transit Extract 527
 - delimiter character 72, 157, 207, 250
 - Fast Path Transaction Exception report 249, 260
 - file content, CPU Usage report 157
 - file content, Database Update Activity report 207
 - file content, Fast Path Transaction Exception report 250
 - file content, Transaction Exception report 72
 - Transaction Exception report 19, 70, 74, 79
 - Transaction History File 19
- extract by interval data 65
- extract export 66
- Extract Export Graphing 69
- Extract Export report 68
- extract graphing 66

F

- Fast Batch Buffer Usage report 320
- Fast Path 64-bit Buffer Statistics report 189
- fast path analysis reports
 - introduced 29, 331
- Fast Path Analysis reports
 - described 475
- Fast Path Buffer Statistics report
 - described 480
 - introduced 331
 - sample report, Alternate Sequencing (with Limit) 481
- Fast Path Buffer Usage report 264
 - sample report 265
- Fast Path Database Call Statistics report
 - described 266
 - sample report 267
- Fast Path log records 611
- Fast Path Resource Usage and Contention report
 - described 260
 - introduced 23
 - sample report 261
- fast path resource usage reports 260
- Fast Path Transaction Exception report
 - DBFULTA0 239
- Fast Path Transaction Exception report and extract
 - described 249
 - Fast Path Transaction Exception Log 253
 - introduced 23
 - sample extract data 250
 - sample reports 253, 260
 - Transaction Exception Recap 260
 - Transaction Exception Summary 258

- Fast Path Transaction Exception report and extract *(continued)*
 - Transaction Sync Failure Summary 259
- Fast Path Transit Analysis report
 - described 242
 - introduced 23
- Fast Path Transit Extract by Interval
 - described 248
 - sample extract summary report 249
- Fast Path Transit Log report
 - described 246
 - introduced 23
 - report options 246
 - sample report 246
- fast path transit reports 239, 260
- Fixed Pool Usage Statistics report 174
- flood control 559
 - Connect Exception Events report 560
- form-based reporting
 - list report, Connect and combined 534
 - sample report forms, Connect and combined 533
 - summary report, Connect and combined 537
- Form-based reporting
 - ALLLIST sample, LOG Summary 88
 - ALLSUMM sample, LOG Summary 99
 - ALLSUMMX sample, LOG Summary 100
 - CEX List
 - COMBLIST sample 536
 - CONNLIST sample 536
 - CEX Summary
 - COMBSUMM sample 539
 - CONNACK sample 539
 - CONNPLEX sample 540
 - CONNTCOD sample 541
 - combined IMS and Connect 533
 - Connect and combined 533
 - DBCTSUMM sample
 - DBCTSUMM sample 102
 - FPANAL sample, LOG Summary 103
 - FPBUFUSE sample, LOG Summary 103
 - FPDBCALL sample, LOG Summary 104
 - FPLOG sample, LOG List 89
 - FPMMSG sample, LOG Summary 104
 - FPRESUSE sample, LOG Summary 105
 - FPTRANX sample, LOG List 90
 - FPTRANXD sample, LOG List 90
 - LOG List
 - DBCTLIST sample 89
 - SMQLIST sample 91
 - SYNCCOUT 93
 - TRANLIST sample 94
 - LOG Summary
 - BADRESP sample 100
 - COMPLVL sample 101, 102
 - CPUHIGH sample 102
 - MSGLEN sample 105
 - QTYPE sample 107
 - RESPDIST sample 107

- Form-based reporting *(continued)*
 - LOG Summary *(continued)*
 - SMQTCOD sample 107
 - TRANCLAS sample 108
 - TRANINTV sample 109
 - TRANPRTY sample 109
 - TRANRESU sample 110
 - TRANTCOD sample 111
 - Message Queue List (Form-based), TRF 584
 - Message Queue Summary (Form-based), TRF 586
 - OLRLIST sample, LOG List 91
 - OLRSUMM sample, LOG Summary 106
 - sample Report Forms, Connect 533
 - sample Report Forms, IMS Log 85
 - SWITLIST sample, LOG List 92
 - SWITSUMM sample, LOG Summary 108
 - TRANRES1 sample, LOG Summary 110
 - TRANRESD sample, LOG Summary 110
- FP Buffer Statistics report 331
- FPANAL sample report form 103
- FPBUFUSE sample report form 103
- FPDBCALL sample report form 104
- FPLOG sample report form 89
- FPMMSG sample report form 104
- FPRESUSE sample report form 105
- FPTDR record 250
- FPTRANX sample report form 90
- FPTRANXD sample report form 90

G

- Gap Analysis report
 - IMS Connect
 - described 562
 - Log reports
 - introduced 19
- General Statistics report, MSC Link 193
- graphing and export
 - described 65
- guidelines for using monitor reports 337

H

- history file 19

I

- I/O resource utilization indicators
 - Region Summary report 350
- Idle time 146
- Idle, defined 505
- IFP region activity 349, 503
- IFP Region Occupancy report
 - described 268
 - introduced 23
 - sample report 268
- IMODULE Statistics report 187
- IMODULE Statistics report with STE Statistics 187

- IMS Connect
 - RECORDER trace 619
 - trace event records 619
- IMS Connect event records
 - connect status events 620
 - message related events 620
 - typical event flow 623
- IMS Connect Extensions
 - event collection 511
 - event records 615
 - using with IMS Performance Analyzer 11
- IMS Connect Gap Analysis report
 - sample report 562
- IMS Connect reports 511
 - batch commands 514
 - described 511
 - Gap Analysis 562
 - introduced 30
 - reporting options 30
 - Transit Analysis 515
 - types of 30, 513
- IMS Connect resource usage reports
 - introduced 30
- IMS Connect trace report
 - introduced 30
- IMS Connect Transaction Index, creating 541
- IMS Connect Transaction IndexIMS Problem Investigator
 - record contents 543
- IMS Connect transaction transit reports
 - introduced 30
- IMS DB/DC 581
- IMS log records 611
- IMS Log Transaction Analysis
 - utility 317, 320
- IMS Monitor
 - introduced 9
 - understanding monitor data 501
- IMS monitor operation 501
- IMS monitor records 501, 613
- IMS Performance Analyzer
 - introduced 1
 - Transaction Index, described 115, 541
- IMS PI 11
- IMS Problem Investigator
 - IMS Connect Transaction Index 543
 - Transaction Index, described 115, 541
 - Transaction Index, using 542
 - using with IMS Performance Analyzer 11
- IMS Statistical Analysis utility 320
- IMS Transaction Index
 - creating 119
 - record contents 116, 117
 - uses 115
- IMS Transaction Statistics report
 - IPIPPGM2 306
- IMS-to-CICS TCP/IP communications
 - event records 617
- IMS-to-IMS TCP/IP communications
 - event records 617
- IMSPAATF command
 - EXTRACT options 606
 - LIST report options 597
 - MONITOR option 599

IMSPAATF command (*continued*)
 SUMMARY report options 598
 TRACE level 1 600
 TRACE level 3 604
 TRACE report options 599
 IMSPACEX command
 FIELDS parameter
 field names 629
 IMSPALOG command
 FIELDS parameter
 field names 629
 IMSPATRF command
 FIELDS parameter
 field names 629
 IMSplex
 shared queue log record patterns 318
 In Use time 146
 Individual TCB Statistics report 191
 Internal Resource Usage reports
 described 158
 introduced 19
 sample reports 159
 Intersystem Communication 319
 IPICEXLI macro 529
 IPICEXSU macro 530
 IPICLDDL 527
 IPICLLOD 527
 IPICSDDL 527
 IPICSLOD 527
 IPIDIAGS 133, 134
 IPIERA30
 described 309
 sample report 309
 IPIFPDR macro 250
 IPIPPGM2
 described 305
 sample report, IMS Transaction
 Statistics 306
 IPIPU1xx
 described 304
 sample report, DL/I Call
 Statistics 304
 IPIPU9xx
 described 306
 sample report, Checkpointed IMS
 Resource Definitions 307
 IPITRDR macro 72
 IPITRHR macro 82
 IRLM Subsystem Statistics report 184
 IRLM System Statistics report 183
 IRUR
See also Internal Resource Usage
 reports
 Logger Statistics report 178
 ISC 319
 log processing restrictions 319
 ISC (intersystem communication) 617
 IWAITs, defined 504

K

K12TRFDS macro, TRF Extractor 589
 KI2TRFDS macro, TRF Extractor 573

L

Latch Statistics report 168
 legal notices
 cookie policy 677
 notices 677
 programming interface
 information 677
 trademarks 677, 679
 Limit 326
 sample report, Alternate
 Sequencing 408
 sample report, Communication Line
 Functions 463
 sample report, Communication
 Summary 457
 sample report, Database IWAIT
 Analysis 394
 sample report, Database IWAIT
 Summary 375
 sample report, DEDB Resource
 Contention 476
 sample report, ESAF 472
 sample report, Fast Path Buffer
 Statistics 481
 sample report, MSC Summary 467
 sample report, MSC Traffic 468
 sample report, Program
 Summary 365
 sample report, region analysis 382
 sample report, Region Summary 355
 sample report, Total System IWAIT
 Detail 418
 sample report, VSO Summary 490
 line times 151
 log codes
 ATF 627
 processed by IMS Performance
 Analyzer 611
 TRF 625
 log files
 ATF 11, 595
 Transaction Index, described 115, 541
 TRF 11, 573
 Log Gap Analysis report
 described 236
 Log Information report
 described 310
 sample report 311
 log records
 for ATF Enhanced Summary 277
 for ATF Enhanced Summary DLI Call
 Analysis report 283, 286
 for ATF Enhanced Summary MQ Call
 Analysis report 289
 for ATF Enhanced Summary
 Transaction Analysis report 279
 for Cold Start Analysis 237
 for CPU Usage report 152
 for Database Trace report 296
 for Database Update Activity
 report 200
 for DC Queue Manager Trace
 report 291
 for Deadlock report 215
 for DEDB Update Activity report 272
 for DEDB Update Trace report 300

log records (*continued*)
 for EMH Message Statistics
 report 270
 for ESAF Report 302
 for Fast Path Database Call Statistics
 report 266
 for Fast Path Resource Usage and
 Contention report 260, 264
 for Fast Path Transaction Exception
 report and extract 249
 for Fast Path Transit Analysis
 report 242
 for Fast Path Transit Extract by
 Interval 248
 for Fast Path Transit Log report 246
 for Gap Analysis 236
 for IFP Region Occupancy report 268
 for Internal Resource Usage
 reports 158
 for IPIERA30 309
 for IPIPPGM2 305
 for IPIPU1xx 304
 for IPIPU9xx 306
 for Management Exception
 report 127
 for Message Queue Utilization
 report 196
 for MSC Link Statistics 193
 for OSAM Sequential Buffering
 report 211
 for Region Histogram report 208
 for Resource Availability report 145
 for System Checkpoint report 225
 for Transaction Exception report and
 extract 70
 for Transaction Resource Usage
 report 135
 for Transaction Transit Analysis
 report 49
 for Transaction Transit Extract by
 Interval 64
 for Transaction Transit Graphic
 Summary report 62
 for Transaction Transit Log report 58
 for Transaction Transit Statistics
 report 56
 for VSO Statistics report 273
 processed by IMS Performance
 Analyzer 611
 log reports
 ATF enhanced summary 277
 ATF Enhanced Summary 277
 ATF Enhanced Summary DLI Call
 Analysis 283, 286
 ATF Enhanced Summary Extract 278
 ATF Enhanced Summary MQ Call
 Analysis 289
 ATF Enhanced Summary Transaction
 Analysis 279
 batch commands 39
 BMP Checkpoint 19
 Checkpoint 19
 Cold Start Analysis 19, 237
 comparison with other programs 319
 CPU Usage 19, 152
 Dashboard 19
 Database Trace 19, 296

log reports (*continued*)

- Database Update Activity 19, 200
- DBCTL 25, 46
- DC Queue Manager Trace 19, 291
- Deadlock 19, 215
- DEDB Update Activity 23, 272
- DEDB Update Trace 23, 300
- described 39
- DFSILTA0 utility 317, 320
- DFSISTS0 320
- EMH Message Statistics 23, 270
- ESAF Trace 19, 302
- Fast Path Buffer Usage 264
- Fast Path Database Call Statistics 266
- Fast Path resource usage 260
- Fast Path Resource Usage and Contention 23, 260
- Fast Path Transaction Exception 23, 249, 260
- Fast Path Transit Analysis 23, 242
- Fast Path Transit Extract by Interval 23, 248, 249
- Fast Path Transit Log 23, 246
- Gap Analysis 19
- IFP Region Occupancy 23, 268
- IMS Log Transaction Analysis utility 317
- Internal Resource Usage 19, 158
- introduced 19
- IPIERA30 309
- IPIPPGM2 305
- IPIPU1xx 304
- IPIPU9xx 306
- Log Gap Analysis 236
- Log Information 310
- Management Exception 19, 127
- Message Queue Utilization 19, 196
- MSC Link Statistics 19, 193
- OSAM Sequential Buffering 19, 211, 212
- program switch 111
- Region Histogram 19, 208
- Resource Availability 19, 145
- resource usage and availability 123
- restrictions 319
- System Checkpoint 19, 225
- Transaction Exception 19, 70
- Transaction History File 19
- Transaction Resource Usage 19, 135
- Transaction Transit Analysis 19, 49
- Transaction Transit Extract by Interval 19, 64
- Transaction Transit Graphic Summary 19, 62, 63
- Transaction Transit Log 19, 58
- Transaction Transit Statistics 19, 56
- transit time graphs 19, 23
- transit time, fast path 239, 260
- types of 39, 44
- user-written record processors 303
- VSO Statistics 23, 273

Log reports 39

- batch commands 39
- Object List cross-reference 39

Log Transaction Analysis utility 317, 320

log user data

- event records 620

Logger Statistics report 178

LOGINFO 311

Lookaside

- VSO Statistics report 274

M

macro

- K12TRFDS, TRF Extractor 589
- KI2TRFDS, TRF Extractor 573

Management Exception report

- backout failures 134
- database I/O errors 134
- described 127
- Error Conditions log 132
- introduced 19
- Management Exception Summary 129
- program abends 133
- sample report, Error Conditions log 132
- sample report, Summary 129
- security violations 133
- snap trace 135

management reports, log 23

MCS 133

Message Format Buffer Pool Statistics report 161

Message Queue Calls, defined 505

Message Queue List report (Form-based), TRF 584

Message Queue Pool Statistics for shared queues 160

Message Queue Pool Statistics report 159

Message Queue Summary report (Form-based), TRF 586

Message Queue Utilization report

- described 196
- introduced 19
- sample report 198

message switches 47, 50

message-related event records 617

Microsoft Excel 66

Miscellaneous Statistics report 172

Monitor Data Analysis report 29

monitor data collection 340

monitor operation 501

MONITOR option, OMEGAMON ATF trace reports 599

monitor record patterns 502

Monitor Record Trace report 29

- described 497
- introduced 29, 331
- sample report 497

monitor records 501, 613

- /TRACE command 501
- description 501, 613
- monitor record patterns 502
- nonstandard record sequences 502
- SLOG macro 501
- STIMER option 355, 501, 504

monitor reports 325

- /TRACE command 340
- Application Detail 388
- BALG/Shared EMHQ Analysis 484
- batch commands 325, 326, 347

monitor reports (*continued*)

- batch program reports 29, 335
- Batch VSAM Statistics 447
- BMP programs 340
- Buffer Pool and Latch Statistics 452
- categories 331
- choosing 339
- Communication 457
- comparing with other programs 505
- Database IWAIT Analysis 393
- Database IWAIT Summary 374
- DBCTL 30, 336
- DDgroup 396
- DDname by PSB-Transaction Code 439
- DEDB Resource Contention 475
- described 325
- Enqueue/Dequeue Trace 407
- ESAF 471
- Exception Listing 399
- fast path analysis reports 331, 475
- Fast Path Buffer Statistics 480
- format of report descriptions 347
- guidelines for using 337
- introduced 26, 30
- monitor data collection 340
- monitor record trace 331
- Monitor Record Trace 497
- MSC 466
- Object List cross-reference 326
- OTHRHEAD Analysis 487
- Performance Exceptions 399
- performance management 337
- performance monitoring and analysis 337
- performance threshold values 337
- Program Activity Detail 423
- Program Analysis reports 331, 423
- program design standards and documentation 337
- Program Summary 365
- Program Trace 441
- PSB Details 423
- PSB-Transaction Code Analysis 434
- region activity analysis reports 331, 380
- region activity summary reports 331, 348
- Region Analysis 380
- Region Histogram 409
- Region Summary 350
- reporting options 26
- resource usage reports 331, 452
- Schedule/Transaction Summary 348, 349
- Synchronous Callout 474
- system analysis reports 331, 412, 418
- terminology 325, 502
- Total System IWAIT Detail 418
- Total System IWAIT Summary 413
- Transactions by Time Period 378
- types of 26, 30, 326
- using 337
- VSO Summary 490

MPP

- COMPLVL Transaction Completion Summary report 101

MSC 319
 log processing restrictions 319
 MSC Link Statistics report 194
 described 193
 introduced 19
 MSC reports
 described 466
 introduced 331
 sample report, Alternate Sequencing
 (with Limit) 467
 sample report, MSC Queuing
 Summary 469
 sample report, MSC Summary 467
 sample report, MSC Traffic 468
 MSGLEN sample report form 105
 MSGQUEUE macro 196
 Multiple Systems Coupling 319

N

nonstandard monitor record
 sequences 502
 notices 677

O

Object Lists
 report cross-reference, log 39
 report cross-reference, monitor 326
 OLRLIST sample report form 91
 OLRSUMM sample report form 106
 OMEGAMON ATF 11
 OMEGAMON ATF reports 595
 OMEGAMON for IMS Application Trace
 Facility 11
 OMEGAMON for IMS Transaction
 Reporting Facility 11
 OMEGAMON TRF 11
 OMEGAMON TRF reports 573
 Open Database event records 617
 OSAM Buffer Pool Statistics report 162
 OSAM Sequential Buffering report 211
 described 211, 212
 introduced 19
 sample report 212
 OTHREDA Analysis report
 described 487
 introduced 331
 sample report 487
 OTMA 58
 flood notification 559, 560
 IMS Connect event records
 OTMA NAK sense codes 622
 NAK sense codes 622
 Output Queue time blank 61
 Transaction Transit reports 47
 overflow values (***) 505

P

PC
 download 9
 spreadsheet applications 66
 workstation file 66
 PCB feedback area, defined 505

performance
 managing using monitor reports 337
 monitoring and analysis 337
 program design standards and
 documentation 337, 434
 threshold values 337
 Performance Exception reports
 described 399
 introduced 331
 sample report, deadlock Event
 Summary 406
 sample report, Exception Listing 400
 sample report, Intent Failure
 Summary 405
 sample report, Pool Space Failure
 Summary 405
 performance, system 48, 241
 polling, restrictions 319
 port depth 547
 Port Usage report 546
 program abends, error log 133
 Program Activity Detail reports
 DDname by PSB-Transaction
 Code 439, 440
 described 423
 introduced 331
 PSB Details 423
 PSB-Transaction Code Analysis 434
 Program Analysis reports 331, 423
 introduced 28
 program isolation enqueue time 337
 Program Isolation Statistics report 168
 Program Summary report
 described 365
 introduced 331
 sample report, Alternate Sequencing
 with Limit 365
 sample report, ESAF Integration 365
 program switch
 described 111
 examples 113
 program switching 50, 315
 program times 149
 Program Trace report
 described 441
 introduced 331
 sample report (long form) 442
 sample report (short form) 442
 sample report (summary form) 442
 sample report, ESAF Integration 442
 programming interface information 677
 programs, user-written 303
 PSB Comparison (ESAF) 365
 PSB Details reports
 described 423
 sample report (by DDname IWAITed
 On) 425
 sample report (by Function Code
 (DD)) 425
 sample report (by Function
 Code-DDname) 425
 sample report (by Function
 Code) 425
 sample report (by Function-Segment
 Name) 425
 sample report (by Segment Name
 Feedback) 425

PSB Details reports (*continued*)
 sample report (PCB Total (DD)) 425
 sample report (PCB Totals) 425
 sample report, ESAF Integration 425
 PSB-Transaction Code Analysis report
 described 434
 sample report, ESAF Integration 436

Q

QTYPE sample report form 107

R

RACF 133
 RACF Statistics report 184
 reader comment form 16
 READONLY, DBRC 3
 record codes 611
 Record Trace report, ATF 599
 Record Trace report, TRF 588
 RECORDER trace
 event records 619
 redbooks 3
 Reference 611
 region activity analysis reports 331, 380
 introduced 27
 region activity summary reports 331,
 348
 introduced 27
 region analysis report
 sample report, Alternate Sequencing
 with Limit 382
 sample report, ESAF Integration 382
 Region Analysis report
 described 380
 introduced 331
 Region Detail report 331
 region elapsed time, defined 504
 Region Histogram (log) report
 described 208
 Region Histogram report, log
 introduced 19
 sample report 208
 sample report selected by Region
 Jobname 208
 Region Histogram report, monitor
 described 409
 introduced 331
 sample report 410
 region idle time
 in WFI or IFP region 503
 Region Summary report
 described 350
 introduced 331
 sample report, Alternate
 Sequencing 355
 sample report, ESAF Integration 355
 region times 149
 report categories
 ATF enhanced summary reports 277
 IMS Connect and Combined Transit
 reports 533
 IMS Connect Resource Usage
 reports 546
 IMS Connect Trace reports 563

report categories (continued)

- IMS Connect Transaction Transit reports 515
- Log Fast Path Resource Usage reports 260
- Log Fast Path Transit reports 239
- Log Information report 310
- Log Resource Usage and Availability reports 123
- Log Trace reports 291
- Log Transaction (MSGQ) Transit reports 47
- Log Transaction Transit (Form-based) reports 85
- Log User-written reports 303
- Monitor Data Analysis report 497
- Monitor Fast Path Analysis reports 475
- Monitor Program Analysis reports 423
- Monitor Region Activity Analysis reports 380
- Monitor Region Activity Summary reports 348
- Monitor Resource Usage reports 452
- Monitor System Analysis reports 412
- OMEGAMON ATF extract reports 605
- OMEGAMON ATF Trace reports 599
- OMEGAMON ATF Transaction Transit reports 597
- OMEGAMON TRF Database Usage reports 575
- OMEGAMON TRF Message Queue reports 584
- OMEGAMON TRF Trace reports 588

report content

- OMEGAMON ATF Transit List report 597

Report Forms

- FIELDS parameter field names 629

samples

- ALLLIST, LOG List report 88
- ALLSUMM, LOG Summary report 99
- ALLSUMMX, LOG Summary report 100
- BADRESP, LOG Summary report 100
- COMBLIST, CEX List report 536
- COMBSUMM, CEX Summary report 539
- COMPLVL, LOG Summary report 101, 102
- CONNACK, CEX Summary report 539
- CONNLIST, CEX List report 536
- CONNPLEX, CEX Summary report 540
- CONNTCOD, CEX Summary report 541
- CPUHIGH, LOG Summary report 102
- DBCTLIST, LOG List report 89
- DBCTSUMM, LOG Summary report 102

Report Forms (continued)

samples (continued)

- FPANAL, LOG Summary report 103
- FPBUFUSE, LOG Summary report 103
- FPDBCALL, LOG Summary report 104
- FPLOG, LOG List report 89
- FPMSG, LOG Summary report 104
- FPRESUSE, LOG Summary report 105
- FPTRANX, LOG List report 90
- FPTRANXD, LOG List report 90
- MSGLEN, LOG Summary report 105
- OLRLIST, LOG List report 91
- OLRSUMM, LOG Summary report 106
- QTYPE, LOG Summary report 107
- RESPDIST, LOG Summary report 107
- SMQLIST, LOG List report 91
- SMQTCOD, LOG Summary report 107
- SWITIST, LOG List report 92
- SWITSUMM, LOG Summary report 108
- TRANCLAS, LOG Summary report 108
- TRANINTV LOG Summary report 109
- TRANLIST, LOG List report 94
- TRANPRTY, LOG Summary report 109
- TRANRES1, LOG Summary report 110
- TRANRES2, LOG Summary report 110
- TRANRESU, LOG Summary report 110
- TRANTCOD, LOG Summary report 111
- SYNCCOUT, LOG List report 93
- reporting dependent region activity in progress 503
- reporting IWAITs, defined 504
- reports
 - IMS Connect reports 513
 - Connect ACK/NAK report 554
 - Connect Exception Events report 557
 - Connect Gap Analysis report 562
 - Connect Port Usage report 546
 - Connect Resume Tpipe report 549
 - Connect Transaction Transit Index 541
 - Connect Transaction Transit List report 534
 - Connect Transaction Transit Summary report 537
 - Connect Transit Analysis report 515

reports (continued)

IMS Connect reports (continued)

- Connect Transit Event Trace report 564
- Connect Transit extract 527
- Connect Transit Log report 523
- Log reports 44
 - ATF Enhanced Summary 277
 - ATF Enhanced Summary DLI Call Analysis report 283, 286
 - ATF Enhanced Summary MQ Call Analysis report 289
 - ATF Enhanced Summary Transaction Analysis report 279
 - Log BMP Checkpoint report 232
 - Log Checkpointed IMS Resource Definitions report 306
 - Log Cold Start Analysis report 237
 - Log CPU Usage report and extract 152
 - Log Dashboard report 123
 - Log Database Trace report 296
 - Log Database Update Activity report and extract 200
 - Log DC Queue Manager Trace report 291
 - Log Deadlock report 215, 309
 - Log DEDB Update Activity report 272
 - Log DEDB Update Trace report 300
 - Log DL/I Call Statistics report 304
 - Log EMH Message Statistics report 270
 - Log ESAF report 302
 - Log Fast Path Buffer Usage report 264
 - Log Fast Path Database Call Statistics report 266
 - Log Fast Path Resource Usage and Contention report 260
 - Log Fast Path Transaction Exception report and extract 249
 - Log Fast Path Transit Analysis report 242
 - Log Fast Path Transit Extract by Interval 248
 - Log Fast Path Transit Log report 246
 - Log Gap Analysis report 236
 - Log IFP Region Occupancy report 268
 - Log Information report 310
 - Log Internal Resource Usage report 158
 - Log Management Exception report 127
 - Log Message Queue Utilization report 196
 - Log MSC Link Statistics report 193
 - Log OSAM Sequential Buffering report 211
 - Log Region Histogram report 208

reports (continued)

- Log reports (continued)
 - Log Resource Availability report 145
 - Log System Checkpoint report 225
 - Log Transaction Exception report and extract 70
 - Log Transaction Resource Usage report 135
 - Log Transaction Statistics report 305
 - Log Transaction Transit (Form-based) List report 86
 - Log Transaction Transit (Form-based) Summary report 94
 - Log Transaction Transit Analysis report 49
 - Log Transaction Transit Extract by Interval 64
 - Log Transaction Transit Graphic Summary report 62
 - Log Transaction Transit Log report 58
 - Log Transaction Transit Statistics report 56
 - Log VSO Statistics report 273
 - Transaction History File 82
- Monitor reports 331
 - Monitor Application Detail report 388
 - Monitor BALG/Shared EMHQ Analysis report 484
 - Monitor Batch VSAM Statistics report 447
 - Monitor Buffer Pool and Latch Statistics report 452
 - Monitor Communication reports 457
 - Monitor Data Analysis report 497
 - Monitor Database IWAIT Analysis report 393
 - Monitor Database IWAIT Summary report 374
 - Monitor DDgroup report 396
 - Monitor DDname by PSB-Transaction Code report 439
 - Monitor DEDB Resource Contention report 475
 - Monitor Enqueue/Dequeue Trace report 407
 - Monitor ESAF report 471
 - Monitor Fast Path Buffer Statistics report 480
 - Monitor MSC reports 466
 - Monitor OTHREDA Analysis report 487
 - Monitor Performance Exception report 399
 - Monitor Program Summary report 365
 - Monitor Program Trace report 441
 - Monitor PSB Details reports 423

reports (continued)

- Monitor reports (continued)
 - Monitor PSB-Transaction Code Analysis report 434
 - Monitor Region Analysis report 380
 - Monitor Region Histogram report 409
 - Monitor Region Summary report 350
 - Monitor Schedule/Transaction Summary report 348
 - Monitor Synchronous Callout report 474
 - Monitor Total System IWAIT Detail report 418
 - Monitor Total System IWAIT Summary report 413
 - Monitor Transactions by Time Period report 378
 - Monitor VSO Summary report 490
- OMEGAMON ATF reports 595
 - ATF Exception Transaction extract 605
 - ATF Record Trace report 599
 - ATF Transit List report 597
 - ATF Transit Summary report 598
- OMEGAMON TRF reports 573
 - TRF Call Summary report 578
 - TRF DB2 Call List report 581
 - TRF DB2 Call Summary report 583
 - TRF DLI Call List report 575
 - TRF Message Queue List report 584
 - TRF Message Queue Summary report 586
 - TRF Record Trace report 588
- Resource Availability report
 - database times 151
 - described 145
 - in use, idle, and unavailable times 146
 - introduced 19
 - line times 151
 - program times 149
 - region times 149
 - sample report 146
 - transaction times 150
- resource usage and availability reports 123
- resource usage reports 331, 452
 - introduced 28
- RESPDIST sample report form 107
- response time
 - versus transit time 315
- response times
 - RESPDIST sample report form 107
 - TRANRESU sample report form 110
 - TRANTCOD sample report form 111
- restrictions, log reporting 319
- Resume Tpipe report 549

S

- sample distribution
 - DDIWELAP 397
- sample form-based reports
 - Connect and combined 533
- sample Form-based reports
 - IMS Log 88, 98
 - List Reports 88
 - Summary Reports 98
- sample Forms 88, 98
- sample report forms
 - combined reports, Connect and IMS 533
 - Connect reports 533
- sample Report Forms
 - ALLLIST, LOG List report 88
 - ALLSUMM, LOG Summary report 99
 - ALLSUMMX, LOG Summary report 100
 - BADRESP, LOG Summary report 100
 - COMBLIST, CEX List report 536
 - COMBSUMM, CEX Summary report 539
 - COMPLVL, LOG Summary report 101, 102
 - CONNACK, CEX Summary report 539
 - CONNLIST, CEX List report 536
 - CONNPLEX, CEX Summary report 540
 - CONNTCOD, CEX Summary report 541
 - CPUHIGH, LOG Summary report 102
 - DBCTLIST, LOG List report 89
 - DBCTSUMM, LOG Summary report 102
 - FPANAL, LOG Summary report 103
 - FPBUFUSE, LOG Summary report 103
 - FPDBCALL, LOG Summary report 104
 - FPLOG, LOG List report 89
 - FPMMSG, LOG Summary report 104
 - FPRESUSE, LOG Summary report 105
 - FPTRANX, LOG List report 90
 - FPTRANXD, LOG List report 90
- Log reports 88, 98
- MSGLEN, LOG Summary report 105
- OLRLIST, LOG List report 91
- OLRSUMM, LOG Summary report 106
- QTYPE, LOG Summary report 107
- RESPDIST, LOG Summary report 107
- SMQLIST, LOG List report 91
- SMQTCOD, LOG Summary report 107
- SWITLIST, LOG List report 92
- SWITSUMM, LOG Summary report 108
- TRANCLAS, LOG Summary report 108
- TRANINTV, LOG Summary report 109

- sample Report Forms *(continued)*
 - TRANLIST, LOG List report 94
 - TRANPRTY, LOG Summary report 109
 - TRANRES1, LOG Summary report 110
 - TRANRESD, LOG Summary report 110
 - TRANRESU LOG Summary report 110
 - TRANTCOD, LOG Summary report 111
- Scheds, defined 505
- schedule
 - defined 502
 - schedule end, in WFI or IFP region 503
 - schedule start, defined 503
 - schedule start, in WFI or IFP region 503
 - schedule to first DL/I call, defined 505
- Schedule/Transaction Summary report
 - described 348
 - introduced 331
 - sample report 349
- scheduling efficiency and workload indicators
 - Region Summary report 350
- Scheduling Statistics report 164
- screen readers and magnifiers 17
- security violations, error log 133
- Selection Criteria
 - report-Object List cross-reference, log 39
 - report-Object List cross-reference, monitor 326
- Send/Receive Statistics report, MSC Link 193
- sequential buffering 211
- service information 16
- shared queues 318
 - Message Queue Pool Statistics report 160
 - QTYPE sample report form 107
 - SMQLIST sample report form 91
 - SMQTCOD sample report form 107
- SLOG Formatter 29
- SLOG macro 501
- SMB 111
- SMQLIST sample report form 91
- SMQTCOD sample report form 107
- SMU (Space Management Utilities) 296
- snap trace, error log 135
- sort, alternate 326
- Space Management Utilities (SMU) 296
- Statistical Analysis utility 320
- STE Statistics report 187
- STIMER option 355, 501, 504
- Storage Pool Statistics report 173
- storage resource utilization indicators
 - Region Summary report 350
- support information 16
- SWITLIST sample report form 92
- SWITSUMM sample report form 108
- sync point 200, 239, 242, 246, 249, 250, 253, 260, 300

- SYNCCOUT
 - SYNCCOUT report form 93
- SYNCCOUT report form 93
- Synchronous Callout report
 - described 474
 - introduced 331
 - sample report 474
- system analysis reports 412
 - introduced 28
- System Checkpoint report
 - described 225
 - introduced 19
- system performance 48, 241

T

- T* 94, 537
- technotes 16
- terminology in monitor reports 325, 502
- threshold values 337
- timer units 239
- timing of monitor data collection 340
- Total System IWAIT Detail report
 - described 418
 - introduced 331
 - sample report, Alternate Sequencing (with Limit) 418
- Total System IWAIT Summary report
 - described 413
 - introduced 331
 - sample report 413
- totals level 94
- Tpipe report 549
- trace event records
 - connect status events 615
 - IMS Connect 619
 - message-related 617
 - user data logging 620
- trace interval, defined 504
- trace reports
 - TRF 573
- trademarks 677, 679
- TRANCLAS sample report form 108
- TRANINTV sample report form 109
- TRANLIST sample report form 94
- TRANPRTY sample report form 109
- TRANRES1 sample report form 110
- TRANRESD sample report form 110
- TRANRESU sample report form 110
- transaction
 - defined, monitor reports 503
- Transaction Analysis Workbench 11
- Transaction Exception report
 - extract 19
 - introduced 19
- Transaction Exception report and extract
 - described 70
 - described, FORMAT1 report 74
 - described, FORMAT2 79
 - sample extract data 72
 - sample reports 74, 79
- Transaction History File
 - introduced 19
- Transaction Index
 - described 115, 541
- IMS Problem Investigator, using the index 542

- Transaction Resource Usage report
 - described 135
 - DL/I Calls Summary 144
 - introduced 19
 - List 136
 - Long Summary 140
 - supersedes IPIPPGM2 305
 - supersedes IPIPU1xx 304
- transaction set 315
- Transaction Statistics report
 - IPIPPGM2 306
- Transaction Substitution Exit
 - Transit Analysis report 49, 50
 - Transit Exception report 71
- transaction times 150
- Transaction Transit Analysis report 49
 - described 49
 - introduced 19
 - sample report (shared queues) 54
 - sample report (standard) 50, 517
- Transaction Transit Extract by Interval 64
 - described 64
 - introduced 19
 - sample export data 66
 - sample extract summary report 64
- Transaction Transit Graphic Summary report 62
 - described 62, 63
 - introduced 19
 - sample report 63
- Transaction Transit List report (Form-based)
 - batch commands, Connect and combined 534
 - batch commands, IMS Log 86
 - default report content 86
- Transaction Transit Log report 58
 - described 58
 - introduced 19
 - sample report (shared queues) 61
 - sample report (standard) 59
- Transaction Transit reports 47, 74, 79, 515
- Transaction Transit reports (Form-based)
 - introduced 31
 - sample reports, Connect and combined 533
 - sample reports, IMS Log 85
- Transaction Transit Statistics report 56
 - described 56
 - introduced 19
 - sample report 57
- Transaction Transit Summary report (Form-based)
 - batch commands, Connect and combined 537
 - batch commands, IMS Log 94
 - default report content 97
- Transactions by Time Period report
 - described 378
 - introduced 331
 - sample report 379
- Transit Analysis report 49
 - Transaction Substitution Exit 49, 50
- Transit Extract by Interval 64
- Transit Graphic Summary report 62

- Transit List report, ATF 597
- Transit Log report 58
 - correlation with Connect Exception Events report 558
- Transit Statistics report 56
- Transit Summary report, ATF 598
- transit time
 - for fast path transactions 239
 - for message queue transactions 315
- Transit Time Graphs
 - introduced 19
 - sample graph using PC tools 69
- TRANTCOD sample report form 111
- trend analysis
 - Management Exception report 127
- TRF
 - DB2 Call List report 581
 - DB2 Call Summary report 583
 - DLI Call List report 575
 - DLI Call Summary report 578
 - KI2TRFDS macro, TRF Extractor 573
 - log codes processed by IMS PA 625
 - Message Queue List report
 - (Form-based) 584
 - Message Queue Summary report
 - (Form-based) 586
 - OMEGAMON TRF, described 573
 - Record Trace report 588
 - using with IMS Performance Analyzer 11
- TRF reports
 - batch commands 573, 574
 - described 573
 - traces 573
 - types of 573
- tuning IMS 49, 241

U

- Unavailable time 146
- UOW Tracker report 293
- User Exit Statistics report 190
- user programs 303
- user-written record processors 303
 - described 303
 - IPIERA30 309
 - IPIPPGM2 305, 306
 - IPIPU1xx 304
 - IPIPU9xx 306, 307
- utilities
 - DFSERA10 132
 - DFSILTA0 317, 320
 - DFSISTS0 320
 - IMS Log Transaction Analysis 317, 320
 - IMS Statistical Analysis 320

V

- Variable Pool Statistics report 164
- Virtual Storage Usage report 185
- VSAM Buffer Pool Statistics report 163
- VSAM database I/O errors 134
- VSO Statistics report
 - described 273
 - introduced 23

- VSO Statistics report (*continued*)
 - sample report 274
- VSO Summary report
 - described 490
 - introduced 331
 - sample report 490
 - sample report, Alternate Sequencing 490

W

- WFI 305
 - sample report, Transaction Resource Usage 136
- WFI region activity 349, 503
- Workbench 11

X

- XML Adapter, XML-related event records 617



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