

IMS Performance Analyzer for z/OS

IMS Problem Investigator for z/OS

Updates

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Agenda

- IMS Performance Analyzer 4.4 Updates
- IMS Problem Investigator 2.4 Updates
- Other Key Features



IMS Performance Analyzer for z/OS Version 4.4 Updates



Support Improvements

- **IMS support**
 - Support for IMS Versions 13 and 14
- **Inflight transaction support for IMS Log reports**
 - Transaction information that was previously incomplete due to a log switch is now complete
- **Region PST increased from 3 to 4 bytes**
 - Region PST field size increased due to an increase in the maximum partition specification table (MAXPST) limit to 4095



- **BMP treatment option**
 - New option to report each BMP syncpoint interval as a single transaction
- **Shared queues option**
 - New option to only report transactions that were processed on the input Logs from included subsystems
- **Program switches option**
 - New option to either report all transactions independently, or to group transactions associated with a program switch sequence



- **Additional reporting of CPU time as service units**
 - The service unit normalizes the reporting of CPU time to allow for performance comparisons
- **New value in QTYPE form field**
 - Form-field **QTYPE** has a new value, **LOCALF**, that indicates the shared queue transaction was processed ‘**local-first**’
- **New region occupancy form field**
 - Form field “**REGOCCUP**” reports the elapsed time the transaction occupies in a message region



Log report enhancements

- **FORMAT2 option for Database Update Activity reports**
 - Reports can be generated with the more concise FORMAT2 option

```
Start 01Jun2011 12:04:23:01
```

IMS Performance Analyzer
Database Update Activity-ICDE

Database	Program	Proc	5050 Total		Updates	ISRT	DLET	REPL
DI21PART	CEXSPGM	APPL	152	DLI	152	38	76	38
				I/O	114	38	0	76
	CEXSPGM	B/O	10	DLI	10	4	4	2
				I/O	8	0	0	8
	CEXTPGM	APPL	317	DLI	317	80	158	79
				I/O	238	80	0	158
	CEXTPGM	B/O	55	DLI	55	22	22	11
				I/O	44	0	0	44
	DFSSAM04	APPL	85	DLI	85	55	30	0
				I/O	53	11	0	42
	MQDTPGM	APPL	21	DLI	21	6	10	5
				I/O	16	6	0	10
	Total	APPL	575	DLI	575	179	274	122
				I/O	421	135	0	286
	Total	B/O	65	DLI	65	26	26	13
				I/O	52	0	0	52



- **Alternate IMS processing ID identification available via option 3 (Report Sets) - Log Global Options**
 - PA can now source IMS processing ID in 2 ways:
 1. From the Log input DD - Lxxxxunn where xxxx is the IMSID
 2. Derived from the IMS Log Records – field TPCPOSSN via 56 records
- **Monitor report enhancement**
 - Monitor report **ALTSCHED** global option is improved to count actual schedules only, and provide a more accurate picture of the transactions per schedule ratio in pseudo-WFI environments



Log report enhancements

- **OMEGAMON ATF Trace Report Enhancement**

- Provides additional transaction characteristics
- Provides reporting detail for DB2 SQL and WebSphere MQ events

ATF - Record Trace

Specify report options.

Reports Required:

- Trace Overview
- Trace Detail
- Trace Detail (Expanded)

Report Options:

- Include Monitor events

Selection Criteria:

Object Type	Inc/Exc	Object +	List	Validation Warning
Transaction Code	___	_____	-	
User ID	___	_____	-	
IMS Subsystem ID	___	_____	-	
Program	___	_____	-	

Report Output DDnames:

- TRACE001
- TRACE002
- TRACE003

When selecting Trace Detail reports, include Monitor events for greater details



❑ IMS Connect Gap Analysis Report

```
CEXGARPT - Gap Analysis
Command ==> _____
Specify report options.
Report Output DDname GAPS
Processing Options:
  Gap Threshold . . . 1.500000 seconds (s.thmiju)
_____ Report Interval _____
          YYYY/MM/DD  HH:MM:SS:TH
From _____
To _____
```

- Quickly identify potential performance issues by locating periods of time when log records are not being written
 - Requires IMS Connect Extensions archive journals
- User customizable Gap threshold lets you choose what an “acceptable” gap really is.



Log report enhancements

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- LOGINFO operand
 - Use IMSPALOG LOGINFO batch command to generate Log Info report without Running a report set.

Code	Count	MCNT	Recs/Sec	Avg Len	Max Len	Byte/Sec	MB	%	
01 IN	21,342		0	1,725	3,240	96	36.8	6.3	IMS Message
INPUT	15,072		0	1,727	3,240	67	26.0	4.5	Input message
MSC FE	134		0	1,032	1,912	0	0.1	0.0	MSC front end
MSC BE	3,418		0	1,193	3,240	10	4.0	0.7	MSC back end
CONTINUE	2,718		0	2,417	3,240	17	6.5	1.1	Continuation record
03 OUT	15,256		0	2,081	3,240	82	31.7	5.4	IMS Message
OUTPUT	14,602		0	2,138	3,240	81	31.2	5.3	Output message
MSC BE	137		0	1,749	2,672	0	0.2	0.0	MSC back end
MSG SWI	517		0	551	800	0	0.2	0.0	Message switch
07	41,039	50,985	0	456	456	48	18.7	3.2	Program schedule end
MPP	32,753	34,446	0	456	456	38	14.9	2.6	MPP
QUICK	8,190	16,463	0	456	456	9	3.7	0.6	MPP quick reschedule
FALSE	12	0	0	456	456	0	0.0	0.0	MPP false schedule
BMP	15	0	0	456	456	0	0.0	0.0	BMP
ABEND	69	76	0	456	456	0	0.0	0.0	Abended transaction
08	41,040		0	148	148	15	6.0	1.0	Program schedule start
MPP	32,835		0	148	148	12	4.8	0.8	MPP
QUICK	8,190		0	148	148	3	1.2	0.2	MPP quick reschedule



- **Gap Analysis Report**
 - New option to ignore type x'6D' surveillance records that can mask periods of system inactivity
- **Fast Path Region Occupancy Report**
 - Exploits the new type x'5904' record to provide a clearer breakdown of occupied versus idle time
- **Internal Resource Usage (IRUR) Report**
 - Enhanced to support the new statistics provided by IMS versions 12, 13 and 14



IMS Problem Investigator for z/OS Version 2 Release 4 Updates



Support Improvements:

- **IMS Version 14 support**
 - Supports new and changed log record types introduced in IMS V14.
- **DB2® Version 11 support**
 - Support for DB2 logs in extended 10-byte RBA and LRSN format
 - Improved DB2 log record type recognition



Log Browser “Timeout” settings

```
Command ==> TIMEOUT 15 Scroll ==> CSR
Forwards / Backwards . . 00.03.00.000000 Time of Day . .
Code Description Date 2013-11-20 Wednesday LSN
/
— 01 Input Message TranCode=MQATREQ1 000000000000544F
— 31 DLI GU TranCode=MQATREQ1 Region=0001 0000000000005450
— 5600 Sign-on to ESAF Region=0001 SSID=MQP1 0000000000005451
— 5600 Thread created for ESAF SSID=MQP1 0000000000005452
```

- Use **TIMEOUT** primary command to avoid delays when browsing large log files.
 - set timeout values of 1 - 99 seconds, or 0 for no timeout.



New reasons for not reaching “Bottom of Data”

```
BROWSE      IPI000.QADATA.WGNIMS01.VC10.ICDE001 +          FINDLIM Reached
Command ==>      Scroll ==> CSR
/  _____  Navigate < 00.00.01.000000 >   Date/Time 2011-06-01 12.04.23.008757
/  _____  Tracking _____           Wednesday 2011-06-01 Time (LOCAL)
_  01  Input Message TranCode=CEXTCONV           12.04.27.144920
_  35  Input Message Enqueue TranCode=CEXTCONV    12.04.27.145964
_  31  DLI GU TranCode=CEXTCONV Region=0002      12.04.27.146473
```

- If the log browser does not reach the end of the selected files, the label now offers one of the following reasons:
 - FINDLIM reached (find limit)
 - ATTN interrupt
 - TIMEOUT reached (timeout value)
 - DURATION reached (time slice duration)

New Display Options

- Control the visibility of the expanded view record separator line

Display Settings

Show separation line between log records (in expanded view):

- 1 1. Always
- 2. Only when the file changes
- 3. Only when the file changes and tracking is active
- 4. Never



```
Forwards / Backwards . . 00.03.00.000000   Time of Day . . _____
Code Description          Date 2013-11-20 Wednesday   Time (GMT)
/-----/
01  Input Message          04.04.59.944276
   UTC=12.04.59.935300 TranCode=MQATREQ1 Userid=IPI2 LTerm=IPI2
   Terminal=VAPIPI2B  OrgUOWID=IDDF/CC4A42B41B604B06
-----
31  DLI GU                 04.04.59.944287
   UTC=12.04.59.944283 TranCode=MQATREQ1 Region=0001
   OrgUOWID=IDDF/CC4A42B41B604B06 RecToken=IDDE/0000019500000000
```



New Display Options

Display Settings

Display LSN (Log Sequence Number):

- 2 1. Always, and prepend the merge file number e.g. 1-nnn, 2-nnn
- 2. Always, and prepend the record type e.g. IMS-nnn, DB2-nnn
- 3. Never (only Time will be displayed)

Control the display and format of the log sequence number(LSN)

Code	Description	Date	2008-01-25 Friday	LSN
/				
CA01	Transaction TranCode=MQATREQ1 Region=0001			IMS-000000000001
01	Input Message TranCode=MQATREQ1			IMS-00000000006E8
35	Input Message Enqueue TranCode=MQATREQ1			IMS-00000000006E9
31	DLI GU TranCode=MQATREQ1 Region=0001			IMS-00000000006EA
5E	SB Handler requests Image Capture Region=0001			IMS-00000000006EB
5050	Database REPL Database=DI21PART Region=0001			IMS-00000000006EC
5050	Database DLET Database=DI21PART Region=0001			IMS-00000000006ED
5052	Database insert into KSDS Database=DI21PART			IMS-00000000006EF
5600	Sign-on to ESAF Region=0001 SSID=DB3A			IMS-00000000006F1
0020	Begin UR			DB2-00000291A804
0600	Update in-place in a data page			DB2-00000291A894
0600	Savepoint			DB2-00000291A8DA
0600	Delete from a data page			DB2-00000291A909



New Display Options

Record type	Color Highlighting					
	Log Code		Description		Fields	
IMS IMS Log	<u>GREEN</u>	<u>NONE</u>	<u>GREEN</u>	<u>NONE</u>	<u>GREEN</u>	<u>NONE</u>
DB2 DB2 Log	<u>RED</u>	<u>NONE</u>	<u>RED</u>	<u>NONE</u>	<u>RED</u>	<u>NONE</u>
MQ WebSphere MQ Log	<u>WHITE</u>	<u>NONE</u>	<u>GREEN</u>	<u>NONE</u>	<u>TURQ</u>	<u>NONE</u>
MON IMS Monitor	<u>WHITE</u>	<u>NONE</u>	<u>GREEN</u>	<u>NONE</u>	<u>TURQ</u>	<u>NONE</u>

Set color and highlighting according to log type

Code	Description	Date	2008-01-25 Friday	LSN
/				
CA01	Transaction TranCode=MQATREQ1 Region=0001			IMS-000000000001
01	Input Message TranCode=MQATREQ1			IMS-0000000006E8
35	Input Message Enqueue TranCode=MQATREQ1			IMS-0000000006E9
31	DLI GU TranCode=MQATREQ1 Region=0001			IMS-0000000006EA
5E	SB Handler requests Image Capture Region=0001			IMS-0000000006EB
5050	Database REPL Database=DI21PART Region=0001			IMS-0000000006EC
5050	Database DLET Database=DI21PART Region=0001			IMS-0000000006ED
5050	Database DLET Database=DI21PART Region=0001			IMS-0000000006EE
5052	Database insert into KSDS Database=DI21PART			IMS-0000000006EF
5050	Database ISRT Database=DI21PART Region=0001			IMS-0000000006F0
5600	Sign-on to ESAF Region=0001 SSID=DB3A			IMS-0000000006F1
0020	Begin UR			DB2-00000291A804
0600	Update in-place in a data page			DB2-00000291A894
0600	Savepoint			DB2-00000291A8DA



New Display Options

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- **Time of day remembered for each file in the Process list**
 - Log file in the process list now remembers its last date and time position in the log file.
- **MOD option for EXTRACT primary command**
 - Append new records to an existing extract data set using the EXTRACT primary command and the MOD option.

```
Command ==> EXTRACT 'JM3.IMS.TEST' MOD! Scroll ==> extr
Forwards / Backward           Time of Day . .
Code Description                Date 2008-01-25 Friday  LSN
/
__ CA01 Transaction TranCode=MQATREQ1 Region=0001      IMS-00000000000E
__ 01  Input Message TranCode=MQATREQ1                IMS-0000000000831
__ 35  Input Message Enqueue TranCode=MQATREQ1        IMS-0000000000832
__ 31  DLI GU TranCode=MQATREQ1 Region=0001           IMS-0000000000833
```



IMS log type x'50' database update enhancements

- IMS type x'50' database update record is now split into 3 subtypes to improve understanding of the update taking place

Code	Description	LSN
/	_____	_____
— 5050	Database REPL Database=DI21PART Region=0001	IMS-0000000006EC
— 5050	Database DLET Database=DI21PART Region=0001	IMS-0000000006ED
— 5050	Database DLET Database=DI21PART Region=0001	IMS-0000000006EE
— 5052	Database insert into KSDS Database=DI21PART	IMS-0000000006EF
— 5050	Database ISRT Database=DI21PART Region=0001	IMS-0000000006F0
— 5051	Database change unsuccessful	IMS-000000000707
— 5050	Database DLET Database=DI21PART Region=0001	IMS-000000000708
— 5050	Database DLET Database=DI21PART Region=0001	IMS-000000000709
— 5052	Database insert into KSDS Database=DI21PART	IMS-00000000070A
— 5050	Database ISRT Database=DI21PART Region=0001	IMS-00000000070B
— 5050	Database REPL Database=DI21PART Region=0001	IMS-00000000071F



Detect unsorted Transaction Index and issue warning message

```
Data Set Name . . : JM3.IMS.TEST
```

```
The IMS transaction index is not sorted in transaction start time
sequence.  When indexes are built, the records are written as soon as
possible after the transaction completes.
```

```
Sorting the index into start time sequence has the following
advantages:
```

1. The transactions will be displayed in the order that they arrive in IMS.
2. Tracking against the index, when merged with its associated IMS log, will show the index record at the top (start of the transaction).

```
Use the SORT line action from the process list to sort the index.
```

```
_ Do not show me this message again
```



Schedule Tracking and Time Zone Checking

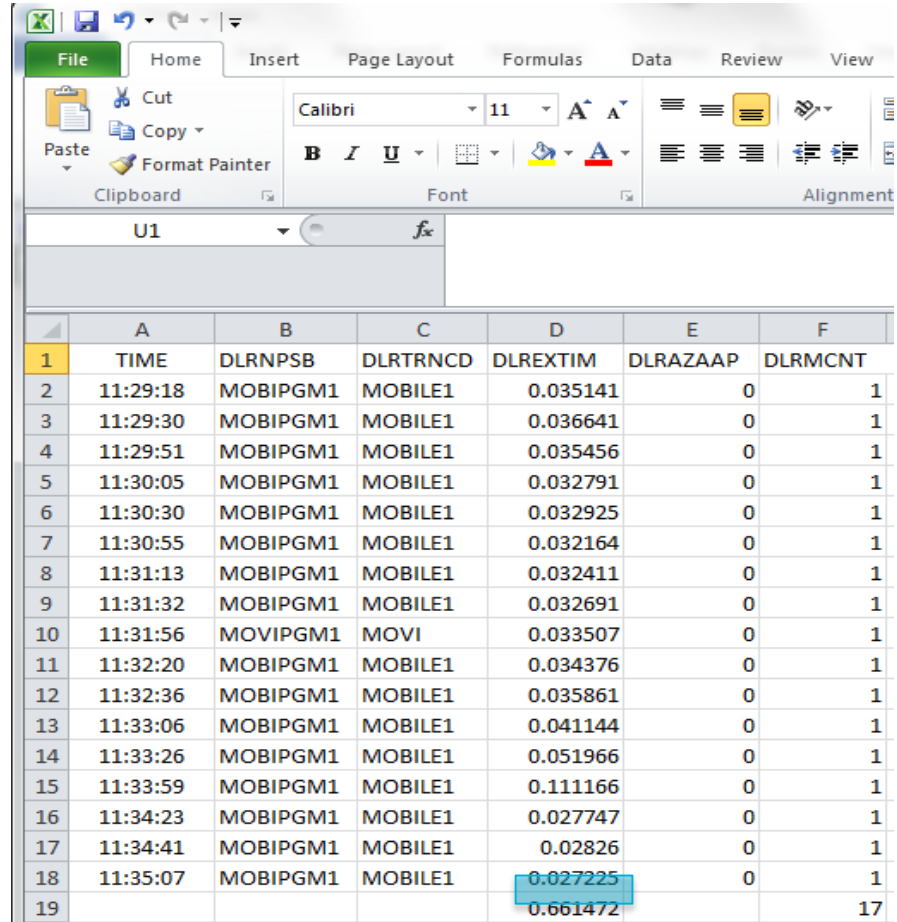
- **TX or TU line command against CA01 for a non-message driven BMP invokes “schedule tracking”**
 - Tracks all the units of recovery within a single program schedule
- **Time Zone Checking option**
 - Issues a message when the time zone detected in the log file differs from the time zone being used to process the file



Mobile Workload Pricing using IMSPI

IMS Problem Investigator for z/OS version 2.3 [APAR PI23921](#) / PTF UI20951 makes it simpler for you to create a CSV that contains IMS transaction CPU usage information. The CSV can then assist you to measure your mobile workload for [IBM Mobile Workload Pricing for z/OS](#).

A simple one-step command **CSV FORM(MWP)** produces:



	A	B	C	D	E	F
1	TIME	DLRNPSB	DLRRNCD	DLREXTIM	DLRAZAAP	DLRCNT
2	11:29:18	MOBIPGM1	MOBILE1	0.035141	0	1
3	11:29:30	MOBIPGM1	MOBILE1	0.036641	0	1
4	11:29:51	MOBIPGM1	MOBILE1	0.035456	0	1
5	11:30:05	MOBIPGM1	MOBILE1	0.032791	0	1
6	11:30:30	MOBIPGM1	MOBILE1	0.032925	0	1
7	11:30:55	MOBIPGM1	MOBILE1	0.032164	0	1
8	11:31:13	MOBIPGM1	MOBILE1	0.032411	0	1
9	11:31:32	MOBIPGM1	MOBILE1	0.032691	0	1
10	11:31:56	MOVIPGM1	MOVI	0.033507	0	1
11	11:32:20	MOBIPGM1	MOBILE1	0.034376	0	1
12	11:32:36	MOBIPGM1	MOBILE1	0.035861	0	1
13	11:33:06	MOBIPGM1	MOBILE1	0.041144	0	1
14	11:33:26	MOBIPGM1	MOBILE1	0.051966	0	1
15	11:33:59	MOBIPGM1	MOBILE1	0.111166	0	1
16	11:34:23	MOBIPGM1	MOBILE1	0.027747	0	1
17	11:34:41	MOBIPGM1	MOBILE1	0.02826	0	1
18	11:35:07	MOBIPGM1	MOBILE1	0.027225	0	1
19				0.661472		17



Other Key Features to Consider



LOGINFO – what am I collecting in my IMS log?

- Provides a quick recap of the type and volume of records in the IMS log
- This report is always produced when you run IMS PA and PI

V4R3M0 IMS Performance Analyzer - Log Information									
Log data From 2014-06-29 14:58:00.941667				To 2014-06-29 15:12:39.354269		Duration		14:38.412602	
Code	Count	MCNT	Recs/Sec	In		Byte/Sec	MB	%	
				Ave Len	Max Len				
01 IN	21,342		24	1,725	3,240	41,942	36.8	6.3	IMS Message
INPUT	15,072		17	1,727	3,240	29,655	26.0	4.5	Input message
MSC FE	134		0	1,032	1,912	157	0.1	0.0	MSC front end
MSC BE	3,418		3	1,193	3,240	4,644	4.0	0.7	MSC back end
01 OUT	291		0	1,410	3,157	467	0.4	0.1	IMS Message
MSC FE	149		0	1,486	2,325	252	0.2	0.0	MSC front end
MSG SWI	142		0	1,331	3,157	215	0.1	0.0	Message switch
03 IN	97,160		110	2,176	3,240	240,902	211.5	36.2	IMS Message
INPUT	25,643		29	1,218	3,240	35,597	31.2	5.3	Program switch
MSC FE	7,661		8	3,235	3,240	28,234	24.7	4.2	MSC front end
MSC BE	11,236		12	807	3,240	10,337	9.0	1.6	MSC back end
CONT	52,620		59	2,782	3,240	166,731	146.3	25.0	Continuation
03 OUT	15,257		17	2,081	3,240	36,166	31.7	5.4	IMS Message
OUTPUT	14,603		16	2,138	3,240	35,568	31.2	5.3	Output message
MSC BE	137		0	1,749	2,672	272	0.2	0.0	MSC back end
MSG SWI	517		0	551	800	324	0.2	0.0	Message switch
07	41,039	50,985	46	456	456	21,314	18.7	3.2	Program schedule end
MPP	32,753	34,446	37	456	456	17,010	14.9	2.6	MPP
QUICK	8,190	16,463	9	456	456	4,253	3.7	0.6	MPP quick
reschedule									
FALSE	12	0	0	456	456	6	0.0	0.0	MPP false schedule
BMP	15	0	0	456	456	7	0.0	0.0	BMP
ABEND	69	76	0	456	456	35	0.0	0.0	ABEND
08	41,040		46	148	148	6,917	6.0	1.0	Program schedule
MPP	32,835		37	148	148	5,534	4.8	0.8	MPP
QUICK	8,190		9	148	148	1,380	1.2	0.2	MPP quick
reschedule									
BMP	15		0	148	148	2	0.0	0.0	BMP



IMS Performance Analyzer: Benefits of Collecting 56FA – transaction accounting statistics

- TRANSTAT=YES cuts type x'56FA' transaction accounting statistics records at transaction-end and BMP-checkpoint.
- Overcomes the limitations of type x'07' which is cut at program schedule termination and often accumulates statistics for many transactions.
- Without 56FA you cannot get accurate transaction CPU time or other useful transaction-level details.

```
Code... 56FA Transaction Statistics
STCK... CBFC740BD90293A4      LSN.... 000000001C254F89
Date... 2014-06-23 Monday     Time... 14.58.01.912361.227

JOBNAME.... 'IMSPMSG1'  PROGRAM.... 'BANKING'  TRAN..... 'BANK2'

CPU..... 0.009593

DBIO..... 0.068882  LockWait... 0.000544  IOcalls.... +15

VSAMread... +7          VSAMwrite.. +2
OSAMread... +6          OSAMwrite.. +1

ESAFcalls.. +12
```



**You need
the 56FA**

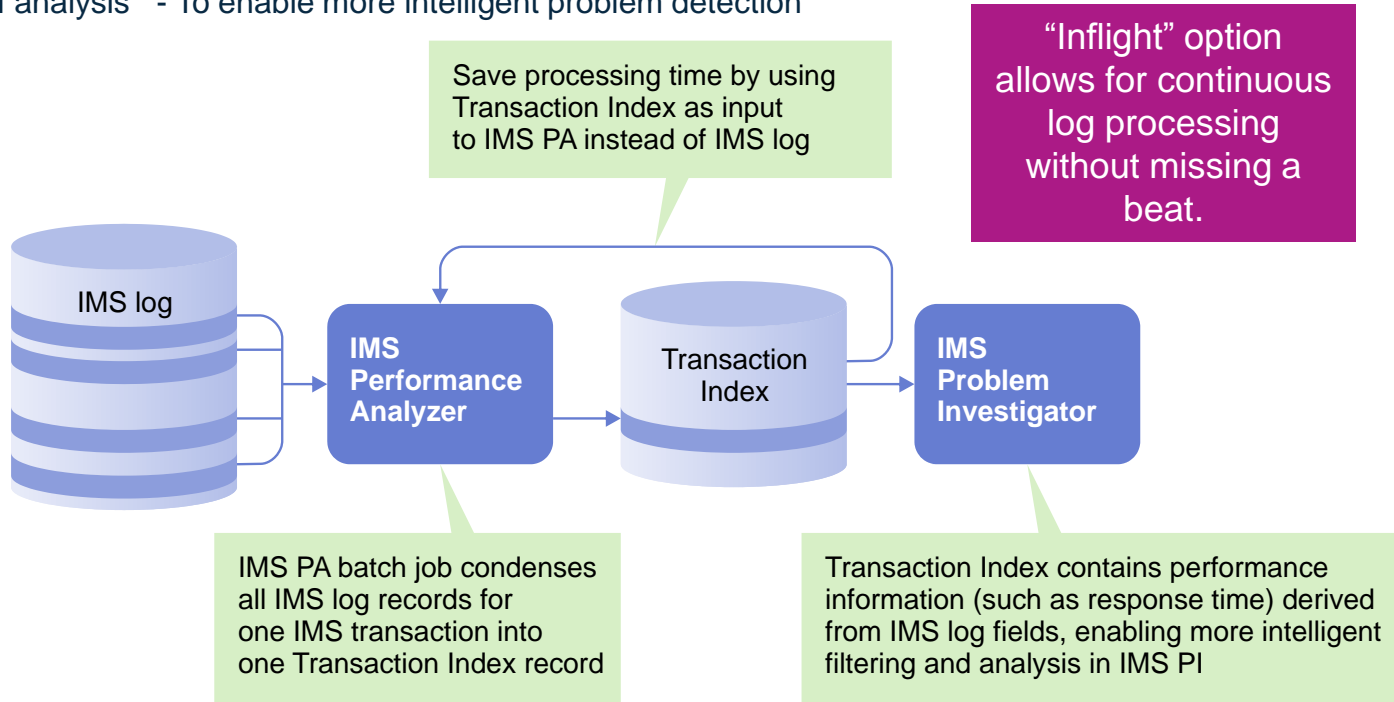


IMS Performance Analyzer - IMS transaction index

Whether Full or Exception, all the accumulated information from the IMS log about each transaction is condensed into a single transaction index record.

Use the transaction index as input into:

- IMS PA reporting - Instead of re-processing large SLDS log files
- IMS PI analysis - To enable more intelligent problem detection



IMS Performance Analyzer: Distributions and Service Levels

Once you have an index (or straight from the log) you can start to get answers:

- Ensure transactions are performing according to management-defined service levels
- User-defined thresholds, for example - <0.1, 0.1 to 0.5, >0.5 seconds etc.
- Report as either a percentage (of all transactions) or as a count

<u>Response Time Distribution</u>											
		Min	Avg	Max	<0.01	<0.05	<0.10	<0.20	<0.50	>=0.50	>=0.50
Trancode	Tran	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total
	Count	IMS Time	IMS Time	IMS Time	IMS Time	IMS Time	IMS Time	IMS Time	IMS Time	IMS Time	IMS Time
BALANCE	89	0.045362	0.119435	1.493757	1.12%	31.46%	85.39%	91.01%	93.26%	6.74%	6
LOGON	92	0.028291	0.158065	1.667653	1.09%	31.52%	72.83%	85.87%	93.48%	6.52%	6
ORDER	95	0.017040	0.117309	0.833115	0.00%	35.79%	80.00%	86.32%	94.74%	5.26%	5
PAY	936	0.004527	0.019000	0.358372	33.76%	94.87%	98.18%	99.47%	100.00%	0.00%	0
STOCK	98	0.025835	0.103145	0.812622	0.00%	29.59%	83.67%	89.80%	95.92%	4.08%	4
TRANSFER	78	0.015636	0.118776	0.765933	0.00%	44.87%	78.21%	80.77%	96.15%	3.85%	3
WITHDRAW	105	0.026213	0.110366	1.556585	0.00%	29.52%	75.24%	89.52%	96.19%	3.81%	4

Service Level dictates that 95% of transactions must have response time less than 0.5 seconds, then...
PAY, STOCK, TRANSFER, WITHDRAW do meet the required level of service – OK
BALANCE, LOGON, ORDER do not meet the required level of service – Fail



IMS Syncpoint Analysis using IMS Performance Analyzer: How is it affecting response times?

Syncpoint analysis

Trancode	Count	Process Time	CPU Time	DB Calls	Syncpt Time	Phase 1 Time	Phase 2 Time	Phase 2 FP Time	OTHRD Time
BANK1	18	0.041045	0.006635	8	0.014769	0.000030	0.014739	0.014739	0.000980
BANK2	26	0.051985	0.005922	8	0.000071	0.000032	0.000039	0.000039	0.001107
BANK3	280	0.048873	0.004889	23	0.000038	0.000018	0.000019	0.000019	0.001203
ORDERS	299	0.044485	0.004687	23	0.000034	0.000017	0.000017	0.000017	0.001200
MOBILE1	316	0.040288	0.004833	23	0.000789	0.000019	0.000771	0.000028	0.000789
MOBILE2	307	0.057567	0.004862	23	0.000037	0.000018	0.000019	0.000019	0.001195
MOBILE3	282	0.033802	0.004694	23	0.000036	0.000019	0.000016	0.000016	0.001191
WEBORDER	19	0.039227	0.007359	9	0.000076	0.000034	0.000043	0.000043	0.001057
STOCK1	21	0.036017	0.006329	9	0.000070	0.000031	0.000039	0.000039	0.001034
STOCK2	15	0.299056	0.020897	21	0.000053	0.000036	0.000016	0.000016	0.000983
STOCK3	16	0.372236	0.020957	21	0.000056	0.000039	0.000017	0.000017	0.001064
Total	18,243	0.089237	0.010805	11	0.000116	0.000027	0.009074	0.000012	0.001106

Are you using external subsystems and DASD mirroring? These might affect the time it takes for your transactions to commit:

- Total syncpoint time
- Phase 1
- Phase 2
- Phase 2 attributable to Fast Path database only
- OTHREAD time to complete (asynchronous – not part of SYNCPT)



IMS Performance Analyzer - Shared queues Analysis

☺Local-first and false scheduling☹

Shared queues transaction performance

IMS ID	Queue Type	Tran Count	Avg	Avg	Avg	Avg	>1.0	>1.0	Avg	Max	>0.1
			InputQ Time	Process Time	OutputQ Time	Total Time	InputQ Time	Process Time	CPU Time	CPU Time	CPU Time
IMS1	GLOBAL	493	0.152755	0.353057	0.111123	0.613036	4.26%	11.76%	0.018737	0.199393	5.77%
IMS1	LOCAL	222	0.164432	0.567554	0.000162	0.732051	4.05%	21.62%	0.028475	0.199393	7.37%
IMS1	LOCALF	8701	0.003339	0.056002	0.208816	0.249786	0.10%	0.92%	0.007174	15.15835	0.32%
IMS2	GLOBAL	472	0.157556	0.432707	0.000675	0.590806	4.45%	15.89%	0.023619	0.236885	6.86%
IMS2	LOCAL	224	0.234427	0.457905	0.000130	0.692367	7.14%	16.52%	0.022103	0.208415	5.58%
IMS2	LOCALF	8131	0.002857	0.065651	0.190159	0.242889	0.00%	0.97%	0.012947	31.13607	0.47%
Total		18243	0.015950	0.089237	0.186943	0.276655	0.42%	2.07%	0.010805	31.13607	0.87%

1. IMS workload broken down by queue type:

- GLOBAL – shared queues where transactions came in on another system
- LOCAL – shared queues where transactions came in on this system
- LOCALF – local-first where shared queue was bypassed

Region overview

MPP Total	CPU	Sched	Trans	***** DLI Calls *****			WFI SUBQ6	Quick	**** Schedule Distribution ****			
				DB	DC	Other			=0	=1	>1	
Total	181858	4636	16842	178088	41165	24530	41556K	6279	Sched	1408	2131	1097
/Sched	39	1.0	3.6	38.4	8.9	5.3	8963	1.4	Tran	0	2365	14477
/Tran	10	0.3	1.0	10.6	2.4	1.5	2467		Tr/Sch	0	1	13
/Minute	30309	772.7	2807.0	29681.3	6860.8	4088.3	6926016	1046.5	Sc/Min	234.7	355.2	182.8
% Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	%Sched	30.37	45.97	23.66

2. False schedule and WFI analysis:



IMS Performance Analyzer - Program Switch Analysis Following the Trail of Transactions

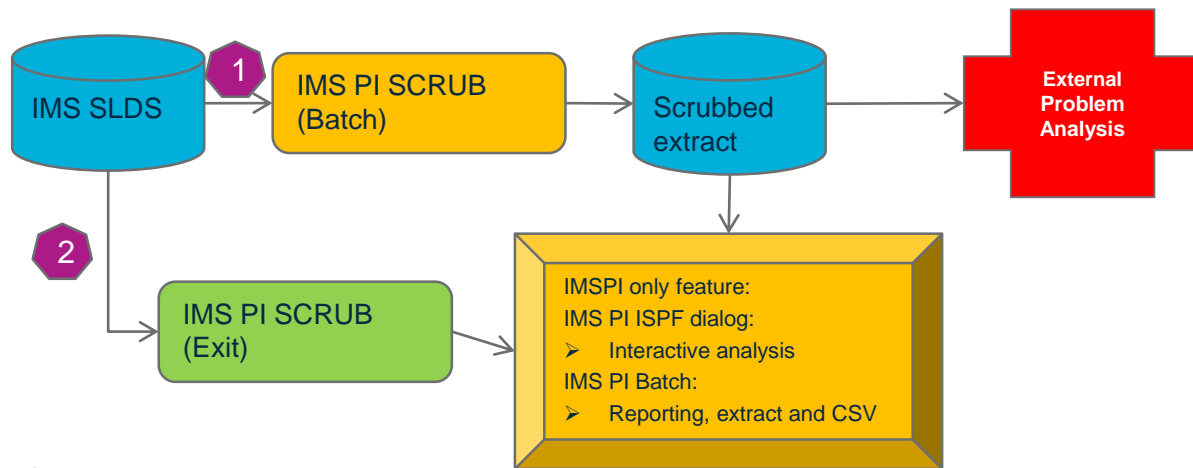
IMS Performance Analyzer Program Switch List								
Org	IMS Tran	Parent	Prog	InputQ	PgmSwrch	Process	OutputQ	
LTTERM	Start	Trancode	Trancode	Swit#	Time	Time	Time	Time
NEWYORK	14.58.02.023922		BANK0001	0	0.004688	-	0.009277	-
	14.58.02.037859	BANK0001	BANK0010	1	0.000150	0.000137	1.065917	-
	14.58.03.102187	BANK0010	BANK0011	2	0.001114	0.001093	0.762127	-
	14.58.03.861171	BANK0011	BANK0012	3	0.004557	0.004535	0.586579	-
	14.58.04.449915	BANK0012	BANK0013	4	0.003350	0.003330	0.458266	-
	14.58.04.909175	BANK0013	BANK0014	5	0.101360	0.101341	0.428108	-
	14.58.05.435875	BANK0014	BANK0015	6	0.312120	0.312099	0.754851	0.000000

Transaction BANK0001 originated from lterm NEWYORK at 14.58.02.023922
It switched to trancode BANK0010
Trancode BANK0010 then switched to BANK0011
Four (4) further switches to Trancode BANK0015 completed the sequence
The overall transaction response time is always reported against the originating transaction – 4.467306 seconds – from when the originating transaction arrived on the message queue to when a response was sent back to the terminal
The last transaction in the sequence responded back to the terminal – you can tell because it has an output queue time
Notice the long switch times for the last 2 transactions – this contributed to almost 0.5 seconds of the response time

Total	IMS Resp	CPU
IMS Time	Time	Time
0.013965	4.467306	0.000737
1.066054	-	0.014046
0.763220	-	0.015807
0.591114	-	0.015897
0.461596	-	0.014347
0.529449	-	0.013495
1.066950	-	0.028735



Address IMS Log privacy issues using IMS Problem Investigator



1 SCRUB utility

1. Systems Programmer creates a copy of the original SLDS with confidential data scrubbed
2. The scrubbed extract data set is made available to all IMS PI users – data set to <<CLEARED>>
3. 100% secure – user has no access to confidential data

2 SCRUB exit (ALZUAUTH) – IMSPI only

1. All IMS PI users have access to the original (un-scrubbed) SLDS
2. All IMS PI ISPF dialog and batch services scrub the log records prior to display or reporting
3. Not secure – other utilities such as ISPF browse or DFSERA10 will display the confidential data



IMS Problem Investigator batch reporting

SHORT batch report mode – similar to the ISPF dialog view

Code	Description	Date 2011-06-17 Friday	Time	Elapsed	LSN	Rec#
01	Input Message TranCode=CDB41PDS Userid=EVHWBUDR LTerm=4012 Terminal=4012 OrgUOWID=BUDR/C7EF90B3BC1BD08C Port=4012 LogToken=C7EE6AA5E342DC08 SSN=087124 Socket=PERS CM=1 SL=0 Source=Connect		21.57.00.950009.909	0.078041	0000000005AD82B0	9752
35	Input Message Enqueue TranCode=CDB41PDS Userid=EVHWBUDR LTerm=4012 Terminal=4012 OrgUOWID=BUDR/C7EF90B3BC1BD08C Port=4012 LogToken=C7EE6AA5E342DC08 SSN=087124 Socket=PERS CM=1 SL=0		21.57.00.950025.284	0.000015	0000000005AD82B1	9753
08	Application Start TranCode=CDB41PDS Region=000F RecToken=BUDR/0021DB9C00000000 RegTyp=MPP TClass=2D TPrty=01		21.57.00.950310.565	0.000285	0000000005AD82B2	9754
5607	Start of UOR Program=CDB41PT Region=000F IMSID=BUDR RecToken=BUDR/0021DB9C00000000		21.57.00.950310.627	0.000000	0000000005AD82B3	9755
31	DLI GU TranCode=CDB41PDS Region=000F OrgUOWID=BUDR/C7EF90B3BC1BD08C RecToken=BUDR/0021DB9C00000000		21.57.00.950329.127	0.000018	0000000005AD82B4	9756
5600	Sign-on to ESAF Region=000F IMSID=BUDR RecToken=BUDR/0021DB9C00000000 SSID=DSBR		21.57.01.048592.688	0.098263	0000000005AD82B5	9757



Using IMS Problem Investigator Forms and Batch Reporting for SYSGEN clean-up – removing unused definitions

Uses checkpoint records:

4004=Transactions, 4006=Databases, 4007=Programs

For databases:

```
Start of checkpoint interval Date=2014-06-26 Thursday Time=17.51.31
```

DDIR	DDIROPEN	DDIRDA	CHKWOPN	DDIRGOPN	Used?
ACCOUNTS	40	20	00	00	YES
BANKING	00	00	00	00	NO
ORDERS	00	00	00	00	NO
STOCK	40	20	00	00	YES

DDIR	Database name
DDIROPEN	At least one DCB is opened
DDIRDA	DMB has been dynamically allocated
CHKWOPN	DB was open
DDIRGOPN	GBLSTATUS = OPEN
Used?	YES – at least one of the above is set, DB is in use or has been used
	NO – none of the above are set, DB has not been used



Synchronous call-out Analysis using IMS Problem Investigator

From the perspective of IMS connect and the IMS log:

```
003C Prepare READ Socket 13.59.04.796236
0041 Message sent to OTMA Type=Transaction +0.000678
01 Input Message TranCode=JLMTRAN1 Source=Connect +0.002344
35 Input Message Enqueue TranCode=JLMTRAN1 +0.002373
08 Application Start TranCode=JLMTRAN1 Region=0001 +0.097370
5607 Start of UOR Program=JLMPGM01 Region=0001 +0.097371
31 DLI GU TranCode=JLMTRAN1 Region=0001 +0.097420
003C Prepare READ Socket +7.834564
0041 Message sent to OTMA Type=Command +7.834898
6701 YOUT Sync callout message sent +7.835620
0042 Message received from OTMA Type=Data +7.835867
0058 IMS Hold Queue Compensation +7.835888
004A WRITE Socket +7.836168
0041 Message sent to OTMA Type=Response, Resp=ACK +7.838083
6701 YACK Received ACK +7.838202
0045 OTMA Time-out +7.848143
004A WRITE Socket +7.848307
0048 Trigger Event for SYNCHPT +7.848323
0041 Message sent to OTMA Type=Command +7.848379
003C Prepare READ Socket +8.851081
0047 Session Error +8.851341
0048 Trigger Event for CLOSE +8.851501
6701 YRSP Sync callout response received +8.852048
03 Output Message Response LTerm=7901 Source=Connect +8.852911
31 Message GU for APPC LTerm=7901 +8.852933
5610 Syncpoint Start of Phase 1 Region=0001 +8.853035
```

Also, you can measure synch callout time as part of response time analysis using IMSPA.



IMS Problem Investigator - IMS Trace Record Analysis /DLI Trace

IMS Trace Table records are now interpreted, and can be tracked against the problem transaction:

```
BROWSE      JCH.IMSV12.LOGS.V05 +                      Record 00132074 More: < >
Command ==> |                                         Scroll ==> CSR
-----|-----
Slice      . Duration          Date      2010-12-07      Time
Code Description < 00.00.00.000000 > 2010-12-07 Tuesday      Time (Elapsed)
-----|-----
T CA01 Transaction                                         03.11.45.270005
X                                         UTC=11.11.22.270003 TranCode=OE5C Program=PROGOE5C Userid=DSX11294
  LTerm=DSX11294 Terminal=DSW11294 Region=0022
  OrgUOWID=IMS1/C6FD2F1743CDEADE IMSID=IADG IMSRel=121
  RecToken=IMS1/000185E500000000
  CPU=0.138545 InputQ=0.000244 Process=0.608935
  TotalTm=0.609179 RegTyp=MPP DBCalls=18
```

Transaction Index

DLI Trace events in IMS log:

- 67FF SNAP Trace when transaction abends
- 67FA /TRACE SET ON TABLE DL/I , LOCK etc

```
01 Input Message TranCode=OE5C 0.000000
35 Input Message Enqueue TranCode=OE5C 0.000015
08 Application Start TranCode=OE5C Region=0022 0.000212
5607 Start of UOR Program=PROGOE5C Region=0022 0.000000
31 DLI GU TranCode=OE5C Region=0022 0.000015
AA DLI Comms call: INIT Region=0022
AA DLI Comms call: INQY Region=0022
AA DLI Comms call: INQY Region=0022
AA DLI Comms call: GN Region=0022
AA DLI Database call: ISRT Region=0022
50 Database Update Database=CUSTOMRC Region=0022 0.000102
50 Database Update Database=CUSTOMRC Region=0022 0.002489
50 Database Update Database=CUSTOMRC Region=0022 0.001076
50 Database Update Database=CUSTOMRC Region=0022 0.003114
50 Database Update Database=CUSTOMRC Region=0022 0.000006
50 Database Update Database=CUSTOMRC Region=0022 0.000004
50 Database Update Database=CUSTOMRC Region=0022 0.000077
50 Database Update Database=CUSTOMRC Region=0022 0.002572
50 Database Update Database=CUSTOMRC Region=0022 0.000125
50 Database Update Database=CUSTOMRC Region=0022 0.003005
AA DLI Database call: ISRT Region=0022 0.001264
50 Database Update Database=CUALTC2 Region=0022 0.021042
50 Database Update Database=CUALTC2 Region=0022 0.000031
```

See every DLI call, then associate with the database updates (50's)



IMS Problem Investigator - IMS Trace Record Analysis

/TRACE SET ON TABLE LOCK

```

BROWSE          JCH.ITR.EXTRACT                      Record 00026435 More: < >
Command =====>                               Scroll =====> CSR
Slice . . . Duration 00.00.00 Date 2010-12-07 Time 03.11.45.554009
Code Description < 00.00.00.000000 > 2010-12-07 Tuesday Time (Elapsed)
-----
AA DLI Database call: REPL Region=0022 03.11.46.246045
CA08 (PI) DLI call Region=0022 0.000000
E2 Byte locate (buffer handler) Region=0022 0.000000
C802 Lock: LOCK Region=0022 0.000000
C8E2 Lock: SUSPEND Region=0022 0.000000
C8D9 Lock: RESUME Region=0022 0.000000
C902 Lock: LOCK exit Region=0022 0.000000
E2 Byte locate (buffer handler) Region=0022 0.000000
E2 Byte locate (buffer handler) Region=0022 0.000000
E2 Byte locate (buffer handler) Region=0022 0.000000
C802 Lock: LOCK Region=0022 0.000000
C8E2 Lock: SUSPEND Region=0022 0.000000
C8D9 Lock: RESUME Region=0022 0.000000
C902 Lock: LOCK exit Region=0022 0.000000
C802 Lock: LOCK Region=0022 0.000000
C8E2 Lock: SUSPEND Region=0022 0.000000
C8D9 Lock: RESUME Region=0022 0.000000
C902 Lock: LOCK exit Region=0022 0.000000
C802 Lock: LOCK Region=0022 0.000000
C8E2 Lock: SUSPEND Region=0022 0.000000
C8D9 Lock: RESUME Region=0022 0.001550
C902 Lock: LOCK exit Region=0022 0.000000
C802 Lock: LOCK Region=0022 0.000000
C902 Lock: LOCK exit Region=0022 0.000000
C803 Lock: UNLOCK Region=0022 0.000000
C903 Lock: UNLOCK exit Region=0022 0.000000
F4 Retrieve by key record to chain from insert logical re 0.000000
E2 Byte locate (buffer handler) Region=0022 0.000000
F2 Retrieve by key EQ or GT (buffer handler) Region=0022 0.001775
    
```

Locking events, including SUSPEND and RESUME and any Associated Delays

- Dispatcher
- DLI and Lock
- Log Router
- Scheduler
- Queue Manager
- DASD log
- External Subsystem
- OTMA
- Storage Manager
- Latch
- LU 6.2 (APPC)
- Fast Path
- RRS



Questions?



More information

- IBM DB2 and IMS Tools website:
www.ibm.com/software/data/db2imstools/
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