

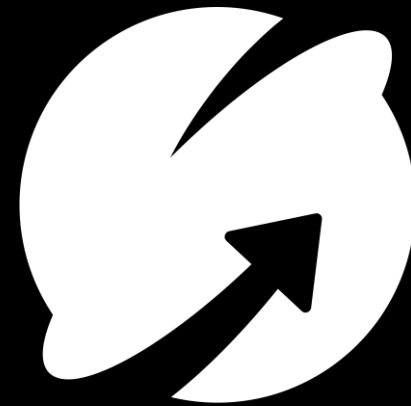
Performance and IMS

Part 2

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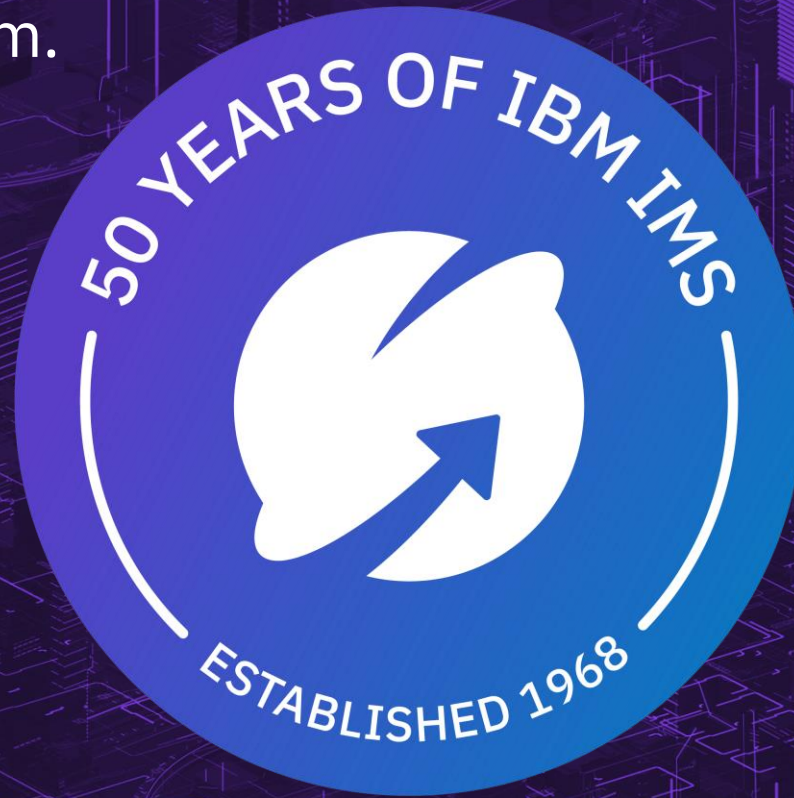


IBM

IMS Tools

for z/OS

1968, IMS was created to manage large bill of materials for the Apollo space program.



Today, IMS is processing **265 billion transactions per day**, more than **3 million transactions per second**, for enterprises around the world.

Over the past 50+ years, the IMS team has been delivering features that have made IMS an integral part of your enterprise and our day-to-day lives.

- Key Performance Metrics
- Performance Analysis Tools
 - Resource Measurement Facility (RMF)
 - IMS Performance Analyzer (IMSPA)
 - IMS Problem Investigator (IMSPI)
 - IMS Connect Extensions (IMSCEX)



Performance Analysis Tools

Tools commonly used:

- RMF
- IMS Performance Analyzer

Other Available IBM Tools:

- Application Performance Analyzer (APA)
- Hardware Instrumentation Services (HIS)
- IMS Monitor
- Health center
- IMS Problem Investigator (PI) *
- IMS Connect Extensions *
- Omegamon XE for IMS
- IMS Buffer Pool Analyzer
- Transaction Analysis Workbench for z/OS



Performance Tools and Analysis

Data useful to debug performance problems:

- SMF Records
 - SMF 70-79 always
 - Plus SMF 88 if using shared queues
 - SMF 98 if enabled (new HFTS function in z/OS 2.2)
- IMS Log Records
- Monitor Data
- Dumps
- External Trace
- GTF Trace

Having data from both a good and a bad (problem) period is very useful to help see what is different

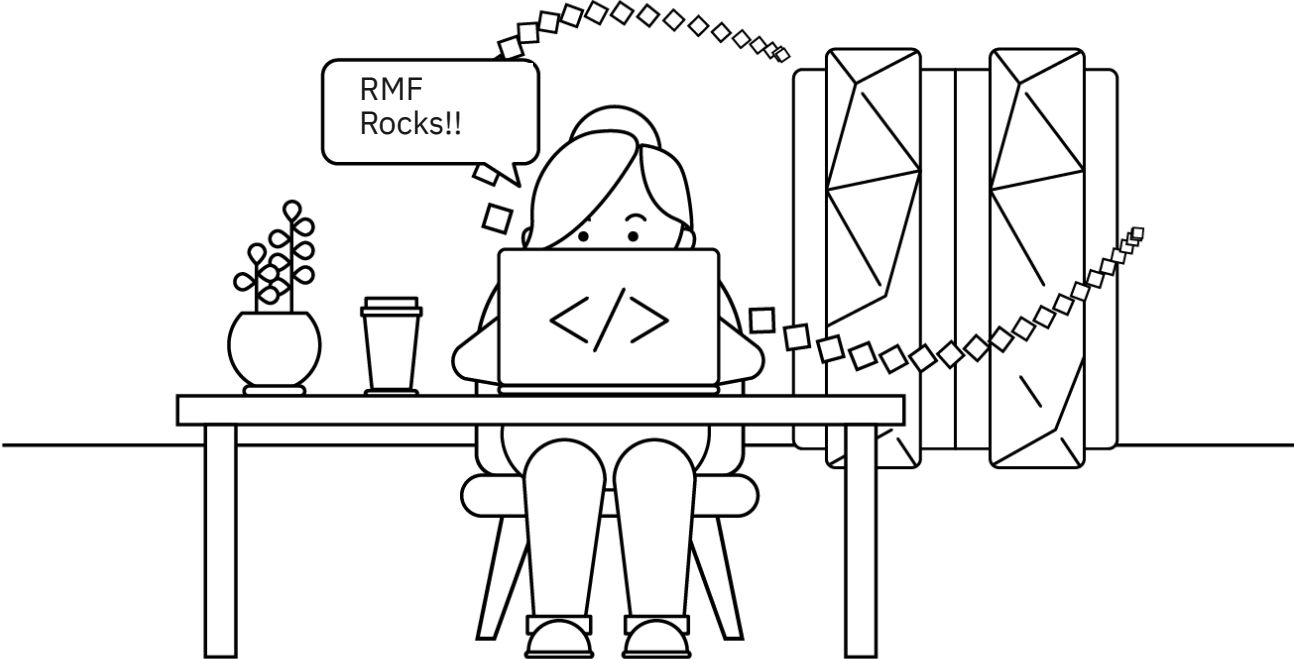


RMF Reports

RMF Analysis

We need to be able to look at data from RMF viewpoint by analyzing these reports:

- CPU
- Subchannel Activity
- Coupling Facility
- Serialization Delay



RMF Monitor III Workload Activity Report

IMS Performance Workload Summary

-TRANSACTIONS-	TRANS-TIME	HHH.MM.SS.TTT	--DASD I/O--	---SERVICE---	SERVICE TIME	---APPL %---	--PROMOTED--	----STORAGE----
AVG 386.85	ACTUAL	2	SSCHRT 78043	IOC 1924K	CPU 234.467	CP 677.73	BLK 0.000	AVG 1741.12
MPL 386.85	EXECUTION	1	RESP 1.2	CPU 14828K	SRB 63.484	AAPCP 0.00	ENQ 0.000	TOTAL 673555.4
ENDED 3394191	QUEUED	0	CONN 0.0	MSO 0	RCT 0.000	IIPCP 0.00	CRM 0.000	SHARED 6.01
END/S 74097.65	R/S AFFIN	0	DISC 1.2	SRB 4015K	IIT 12.498		LCK 0.170	
#SWAPS 0	INELIGIBLE	0	Q+PEND 0.0	TOT 20767K	HST 0.000	AAP N/A	SUP 0.000	-PAGE-IN RATES-
EXCTD 3394160	CONVERSION	0	IOSQ 0.0	/SEC 453353	AAP N/A	IIP N/A		SINGLE 0.0
AVG ENC 0.00	STD DEV	13			IIP N/A			BLOCK 0.0
REM ENC 0.00				ABSRPTN 1172				SHARED 0.0
MS ENC 0.00				TRX SERV 1172				HSP 0.0

IMS Transaction Rate (trans/sec)

Service Time/Tran=(Service Time/Sec)/(Trans/sec)

RMF Monitor III Serialization Delay Report

- Helps analyze serialization related performance problems
- Provides contention information on system and address space level
- Only available in XML output format. XPRPT in postprocessor job needs to be specified.
- Generates both serialization delay summary and details. Summary provides information on system locks showing avg. contention time and also GRS latch/enqueue statistics

▼ Serialization Delay Summary

GRS Mode : STAR

System Locks

Lock Type	Total Contention Time	Avg Contention Time	Total Contention Count	Contention Count with QLen>1
CMS	0		0	0
CMSEQDQ	0	0.00	1	0
CMSLatch	0		0	0
CMSSMF	0	0.00	1	0
Local	146214	0.01	9029501	5893539
CML Owner	0	0.00	47	4

GRS Latch Set Creator

Total Contention Time	Avg Contention Time	Std Dev of Contention Time	Total Contention Count
0			0

GRS Enqueue

Scope	Total Contention Time	Avg Contention Time	Std Dev of Contention Time	Total Request Count	Total Contention Count
Step	0			1296	0
System	21	0.13	0.16	2381	155
Systems	0			248	0

RMF Monitor III Serialization Delay Report

Serialization Delay Details

CMS Lock Details

Address Space ID	Job Name	Service Class Name	Service Class Period	CMS Total Contention Time	CMS Avg Contention Time	CMS Total Contention Count	CMS Contention Count with QLen>1	CMSEQDQ Total Contention Time	CMSEQDQ Avg Contention Time	CMSEQDQ Total Contention Count	CMSEQDQ Contention Count with QLen>1	CMSLatch Total Contention Time	CMSLatch Avg Contention Time	CMSLatch Total Contention Count	CMSLatch Contention Count with QLen>1
000A	CONSOLE	SYSTEM	1	0	0.00	1	0								
0001	*MASTER*	SYSTEM	1	0	0.00	1	0								
000F	RMFGAT	RMF	1					0	0.00	1	0				
01A8	JB175911	SYSSTC	1					0	0.00	1	0				

CML and Local Lock Details

Address Space ID	Job Name	Service Class Name	Service Class Period	CML Lock Owner Total Contention Time	CML Lock Owner Avg Contention Time	CML Lock Owner Total Contention Count	CML Lock Owner Contention Count with QLen>1	Local Lock Total Contention Time	Local Lock Avg Contention Time	Local Lock Total Contention Count	Local Lock Contention Count with QLen>1	CML Lock Requestor Total Contention Time
01B3	IDBCTR01	CNTL	1					196651	0.02	8331620	6643207	0
01B7	HWSDR02	ICON	1					698	0.00	383381	53447	
01BA	HWSDR05	ICON	1					442	0.00	286169	34341	
01B6	HWSDR03	ICON	1					416	0.00	273367	31100	
01B5	HWSDR04	ICON	1					370	0.00	261132	24182	
01B8	HWSDR01	ICON	1					222	0.00	228577	24110	

➤ Serialization delay details: provides information on lock details

RMF Monitor III Coupling facility Usage Summary

C O U P L I N G F A C I L I T Y A C T I V I T Y

PAGE 1

z/OS V2R1

SYSPLEX PLX14
RPT VERSION V2R1 RMF

DATE 04/22/2015
TIME 19.55.00

INTERVAL 002.00.000
CYCLE 00.250 SECONDS

COUPLING FACILITY NAME = ICF1B
TOTAL SAMPLES (AVG) = 480 (MAX) = 480 (MIN) = 480

C O U P L I N G F A C I L I T Y U S A G E S U M M A R Y

GENERAL STRUCTURE SUMMARY

STRUCTURE			% OF			% OF	% OF	AVG	LST/DIR	DATA	LOCK	DIR REC/
TYPE	NAME	STATUS CHG	ALLOC	CF	#	ALL	CF	REQ/	ENTRIES	ELEMENTS	ENTRIES	DIR REC
LIST			SIZE	STOR	REQ	REQ	UTIL	SEC	TOT/CUR	TOT/CUR	TOT/CUR	XI'S
	ISTMNPS	ACTIVE	25M	0.2	0	0.0	0.0	0.00	18K	37K	N/A	N/A
	ISTMNPS2	ACTIVE	25M	0.2	0	0.0	0.0	0.00	18K	37K	N/A	N/A
	IXCSTRUC_DEFAULT	ACTIVE	52M	0.4	384	0.0	0.1	3.20	7954	7937	N/A	N/A
	IXCSTRUC_SMALL	ACTIVE	39M	0.3	4	0.0	0.0	0.03	7003	6973	N/A	N/A
	RRS_DELAYEDUR_1	ACTIVE	512M	4.3	1597K	98.3	98.7	13305	567K	1134K	N/A	N/A
	RRS_MAINUR_1	ACTIVE	16M	0.1	19	0.0	0.0	0.16	2263	20K	N/A	N/A
	RRS_RESTART_1	ACTIVE	16M	0.1	12	0.0	0.0	0.10	6	48	N/A	N/A
	RRS_RMDATA_1	ACTIVE	16M	0.1	16	0.0	0.0	0.13	2595	23K	N/A	N/A
LOCK	IRLMLOCKTBL1	ACTIVE	32M	0.3	0	0.0	0.0	0.00	19	46	N/A	N/A
	ISGLOCK	ACTIVE	10M	0.1	26858	1.7	0.8	223.82	37K	0	4194K	N/A
									2379	0	0	N/A
									0	0	1049K	N/A
									0	0	885	N/A0.0

RMF Monitor III Coupling Facility Structure Activity

COUPLING FACILITY NAME = ICF1A

COUPLING FACILITY STRUCTURE ACTIVITY

STRUCTURE NAME = IMSLOGMSGQ01 TYPE = LIST STATUS = ACTIVE												
SYSTEM NAME	# REQ TOTAL AVG/SEC	# REQ	REQUESTS			SERV TIME (MIC)		REASON	# REQ	DELAYED REQUESTS		
			% OF ALL	AVG	STD_DEV	% OF REQ	AVG TIME (MIC) /DEL			STD_DEV /ALL		
STLAB14	14451	SYNC	14K	100	4.0	0.4	NO SCH	0	0.0	0.0	0.0	0.0
	240.8	ASync	0	0.0	0.0	0.0	PR WT	0	0.0	0.0	0.0	0.0
		CHNGD	0	0.0	INCLUDED IN ASync		PR CMP	0	0.0	0.0	0.0	0.0
		SUPPR	0	0.0			DUMP	0	0.0	0.0	0.0	0.0
TOTAL	14451	SYNC	14K	100	4.0	0.4	NO SCH	0	0.0	0.0	0.0	0.0
	240.8	ASync	0	0.0	0.0	0.0	PR WT	0	0.0	0.0	0.0	0.0
		CHNGD	0	0.0			PR CMP	0	0.0	0.0	0.0	0.0

- Detailed information on each structure, by system and total
- CHNGD and DELAYED REQUESTS could indicate shortage of sub channels
- SYNC and ASync requests

RMF Monitor III Coupling Facility Sub Channel Activity

SUBCHANNEL ACTIVITY															
SYSTEM NAME	# REQ TOTAL AVG/SEC	-- CF LINKS --			PTH BUSY	REQUESTS				DELAYED REQUESTS					
		TYPE	GEN	USE		# REQ	-SERVICE AVG	TIME (MIC) - STD_DEV	# REQ	% OF REQ	----- /DEL	AVG TIME (MIC) STD_DEV	----- /ALL		
STLAB14	82424	ICP	4	4	0	SYNC	86670	3.4	0.5	LIST/CACHE	0	0.0	0.0	0.0	0.0
	1373.7	SUBCH	28	28		ASYN	378	18.4	8.1	LOCK	0	0.0	0.0	0.0	0.0
						CHANGED	0	INCLUDED	IN ASYN	TOTAL	0	0.0			
						UNSUCC	0	0.0	0.0						

Number and type of links from each system

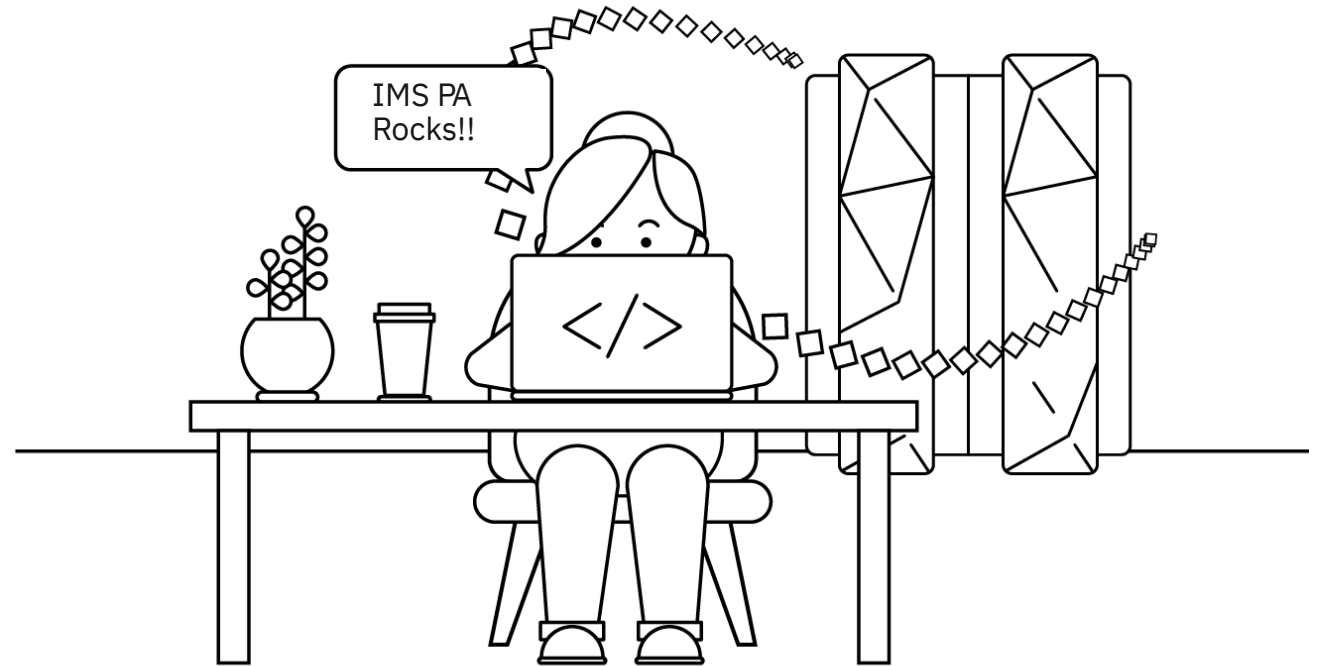
PTH Busy numbers

- PTH BUSY shows the number of CF requests that were rejected

IMS PA Analysis

We need to be able to look at data from IMS PA viewpoint by analyzing these reports:

- Log Info Report
- Transit Analysis
- Distributions and Service Levels
- Analyzing Message Queue pools
- BMP Checkpoint analysis
- Syncpoint affect on Response



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

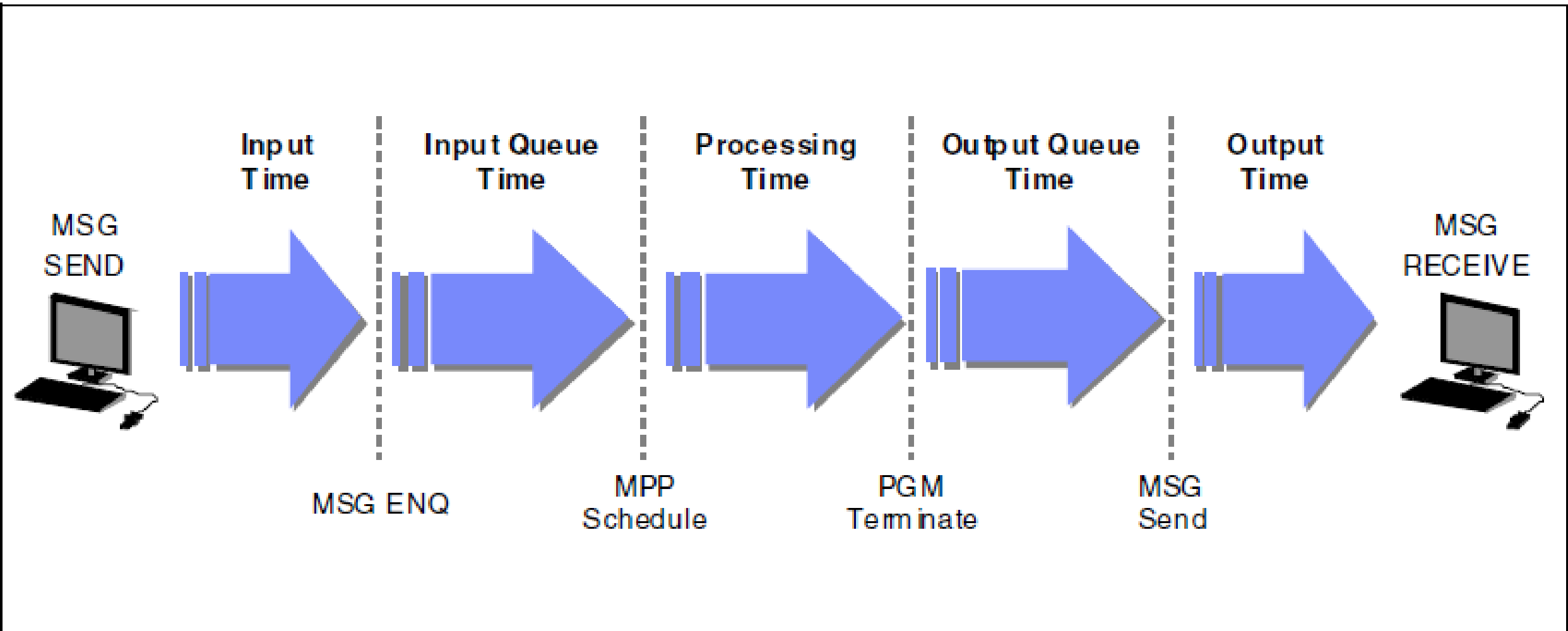
IMS Performance Analyzer - Log Information

Log data From 2014-06-29 14:58:00.941667 To 2014-06-29 15:12:39.354269 Duration 14:38.412602

----- In -----									
Code	Count	MCNT	Recs/Sec	Ave Len	Max Len	Byte/Sec	MB	%	
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: Analyzing Full Function Transaction Response Time

Analyze transaction time: Five parts of transaction flow



IMS PA: Transaction Response Time

IMS Performance Analyzer

Transit Time Analysis By Transaction Code

Log 10Apr2015 4:41:01:72 Report 4.54 10Apr2015 Page 1

Transact Code	PSB	Resp Count	Min Tran Time	***** Average Transit Time (msec) *****	Input Queue	Swit Queue	Pgm Exec	----- Output Queue	---- CQS Local	Total	***** 90% Peak Transit Time (msec) *****	Input Queue	Swit Queue	Pgm Exec	----- Output Queue	---- CQS Local	Total	Max Tran Time	Avg CPU Time
DSFFHR1A	PDSFHR1A	732	3	62	0	40	0	0	0	102	186	0	85	0	0	0	231	735	0
DSFFHR1B	PDSFHR1B	754	4	176	0	31	0	0	0	207	405	0	73	0	0	0	440	1090	0
DSFFHR1C	PDSFHR1C	674	4	48	0	38	0	0	0	86	109	0	81	0	0	0	161	354	0
DSFFHR1D	PDSFHR1D	757	3	36	0	39	0	0	0	75	82	0	83	0	0	0	140	304	0
DSFFHR1E	PDSFHR1E	666	4	42	0	41	0	0	0	83	104	0	87	0	0	0	162	358	0
DSFFHR1F	PDSFHR1F	684	4	42	0	42	0	0	0	84	102	0	88	0	0	0	163	411	0
DSFFHR1G	PDSFHR1G	795	3	97	0	35	0	0	0	133	241	0	81	0	0	0	285	832	0
DSFFHR1H	PDSFHR1H	762	4	199	0	28	0	0	0	228	474	0	70	0	0	0	508	1445	0
DSFFHR1I	PDSFHR1I	778	3	27	0	40	0	0	0	67	67	0	85	0	0	0	127	292	0
DSFFHR1J	PDSFHR1J	704	3	20	0	40	0	0	0	60	62	0	83	0	0	0	121	380	0
DSFFHR1K	PDSFHR1K	740	4	14	0	43	0	0	0	57	47	0	88	0	0	0	113	383	0
DSFFHR1L	PDSFHR1L	749	3	12	0	42	0	0	0	54	43	0	88	0	0	0	109	274	0

Understanding the overall performance of our transaction workloads, can help us pinpoint problem areas that we need to look into regarding performance degradation.

IMS PA: 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

Response Time Distribution

Trancode	Tran Count	Min	Avg	Max	<0.01	<0.05	<0.10	<0.20	<0.50	>=0.50	>=0.50
		Total IMS Time	Total IMS Time	Total IMS Time	Total IMS Time	Total IMS Time	Total IMS Time	Total IMS Time	Total IMS Time	Total IMS Time	Total 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 PA: IMS Message Queue Analysis

Message Queue Pool Statistics

	Count	/Transact	/Second	Interval :	1.51
Locate calls from QMGR	177,119	7.87	1,589.31		
Record Release calls from QMGR	61,434	2.73	551.25		
Locate and Alter calls from QMGR	312,482	13.89	2,803.93		
Requests to Purge the Q pool	0	.00	.00		
Address to DRRN translation requests	0	.00	.00		
Total requests to QMGR not incl Translates	551,035	24.49	4,944.49		
Read requests	4,345	.19	38.99	13.20% of I/O's	
Write requests (Total)	28,561	1.27	256.28		
Writes done by Purge	0	.00	.00	0.00% of I/O's	
Writes done for Space	28,561	1.27	256.28	86.80% of I/O's	
Total I/O requests	32,906	1.46	295.27		
Locate calls satisfied in Pool	456,695			93.28% of all Locate calls	

Processing Time of Scheduling:

➤ I/O to the message queue data set

➤ IMS PA Message Queue Pool Statistics

- High percentage of “Locate calls satisfied in the Pool” indicate Message Queue Pool is satisfying most requests without the need for I/O

IMS PA: Shared queues Analysis - Local-first and false scheduling

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

shared queues transaction performance

IMS ID	Queue Type										
		Tran Count	Avg InputQ Time	Avg Process Time	Avg OutputQ Time	Avg Total Time	>1.0 InputQ Time	>1.0 Process Time	Avg CPU Time	Max CPU Time	>0.1 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%

2. False schedule and WFI analysis:

Region overview

MPP Total	***** DLI Calls *****							WFI SUBQ6	Quick	**** Schedule Distribution ****		
	CPU	Sched	Trans	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

IMS PA: Program Scheduling Optimization

Customer has 100's of message regions, some rarely used – they want to undertake a region consolidation exercise and optimize the effectiveness of program scheduling.

Summary Report Form - REGUTIL															
Field	Sort		Len	Description	Jobname	Reg	Tran	Count	Tot	Tot	Avg	Tot	Avg		
Name +	K	O	Func			PST	Typ	Schedule	Schedule	Rate	Process	Process	CPU	CPU	
JOBNAME	K	A		8 Region Jobname	IMSP2736	66	MPP	9,860	8,778	49.105	131	2168.853	0.220	649.190	0.066
PSTID	K	A		4 Region PST ID	IMSP1946	60	MPP	11,010	9,924	77.767	146	2145.491	0.195	729.828	0.066
REGTYPE	K	A		3 Region type	IMSP0956	130	MPP	11,158	10,164	75.609	148	2111.504	0.189	684.341	0.061
TRANCNT				10 Transaction count	IMSP0523	159	MPP	10,417	9,296	54.893	138	2103.756	0.202	700.114	0.067
SCHEDTM			COUNT	8 Program schedule time	IMSP2175	70	MPP	10,855	9,909	78.136	144	2084.185	0.192	647.252	0.060
SCHEDTM			TOTAL	8 Program schedule time	IMSP0056	59	MPP	11,463	10,435	74.511	152	2068.037	0.180	648.803	0.057
RATEMIN				10 Transaction rate / Minute	.	.	.	.	.	.	.	.	.	.	.
PROCESS			D TOTAL	8 Processing time	IMSP1627	62	MPP	8	8	0.002	0	4.872	0.609	2.634	0.329
PROCESS			AVE	8 Processing time	IMSP2167	70	MPP	7	7	0.000	0	4.743	0.678	2.453	0.350
CPUTIME			TOTAL	8 CPU time	IMSP0201	30	MPP	7	7	0.001	0	4.721	0.674	1.862	0.266
CPUTIME			AVE	8 CPU time	IMSP0982	137	MPP	111	100	0.007	1	4.582	0.041	0.129	0.001
					IMSP2162	73	MPP	116	99	0.008	2	4.560	0.039	0.124	0.001
					IMSP1634	11	MPP	101	89	0.009	1	4.498	0.045	0.112	0.001
					Total			330,869	286,034	4884.526	4,391	105194.2	0.319	34996.64	0.106



1. JOBNAME, PSTID and REGTYPE key fields will aggregate the report by region
2. RATEMIN reports the number of transactions processed per minute by each region
3. PROCESS with the TOTAL function reports the total amount of time each region spends processing transactions – this is the field that determines occupancy
Notice that the alternative sort sequence for PROCESS is D. This orders the report from the most used to the least used regions.
You can change the sequencing to A to reverse the ordering so that the least used regions are at the top of the report
4. CPUTIME is reported for additional information
5. SCHEDTM(COUNT) is the number of transactions that performed a new schedule. You can compare this number with TRANCNT to determine scheduling efficiency
6. $SCHEDTM(COUNT) / TRANCNT * 100 =$ percentage of transactions that performed a schedule. A low percentage is efficient, and a higher percentage is not as efficient
7. SCHEDTM(TOTAL) is the total amount of (elapsed) time that the region spent scheduling a new PSB

IMS PA: BMP Checkpoint report

```
SAMPLOG - BMP Checkpoint
Command ==>
Specify report options.
Reports Required:
  List
 / Summary
Report Interval
  YYYY/MM/DD  HH:MM:SS:TH
From
To
Report Options:
 / Report update activity only
Report Output DDname  BMPCHKP
Average Checkpoint Frequency:
  Minimum . 4  per Minute
  Maximum . 1  per Second
Selection Criteria:
  Object Type      Inc/Exc  Object +  List      Validation Warning
Transaction Code
Program (PSB)
IMS Subsystem ID
```

Reports only BMP jobs with database update activity. This option is only applicable to Summary reports.

The Average Checkpoint Frequency is used to establish a desired checkpoint rate. This rate is then compared to the actual rate in the BMP Checkpoint report to determine if BMP jobs are issuing application checkpoints too frequently, or not often enough.

If the rate is less than the minimum, “Lo” is printed in the report. If the rate is higher than the maximum, “Hi” is printed in the report.

https://www.ibm.com/support/knowledgecenter/S8AVH0_4.5.0/SSAVH0_4.5.0 Ug/ipiu-report-log-bmpchkp.html

IMS PA: BMP Checkpoint report

Start 12Feb2018 11:19:08:55

IMS Performance Analyzer
BMP Checkpoint Summary - IFDZ

End 16Feb2018 10:28:27:51 Page 4

PSB Name	TranCode	Count	Average Duration	-----Frequency-----			-- SYNC Count --		----- Between BMP Syncpoints -----		--- IMS CKPTs ---	
				/Sec	/Min	Ind	Average	Total	Average	Long	Average	Max
DFSIVP6		7	16.509388	3.12	Lo	0.8	6	2.898917	15.887568	N/C		
DFSIVP7		6	8:02.416323	.10	Lo	0.8	5	9:22.298701	46:51.432755	N/C		

For this report, the desired minimum checkpointing rate was 4 per minute. Here we can see rates of 3.12 and .10, below our desired rate. The “Ind” column identifies these programs with the text “Lo”.

IMS PA: Syncpoint – how is it affecting response time?

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

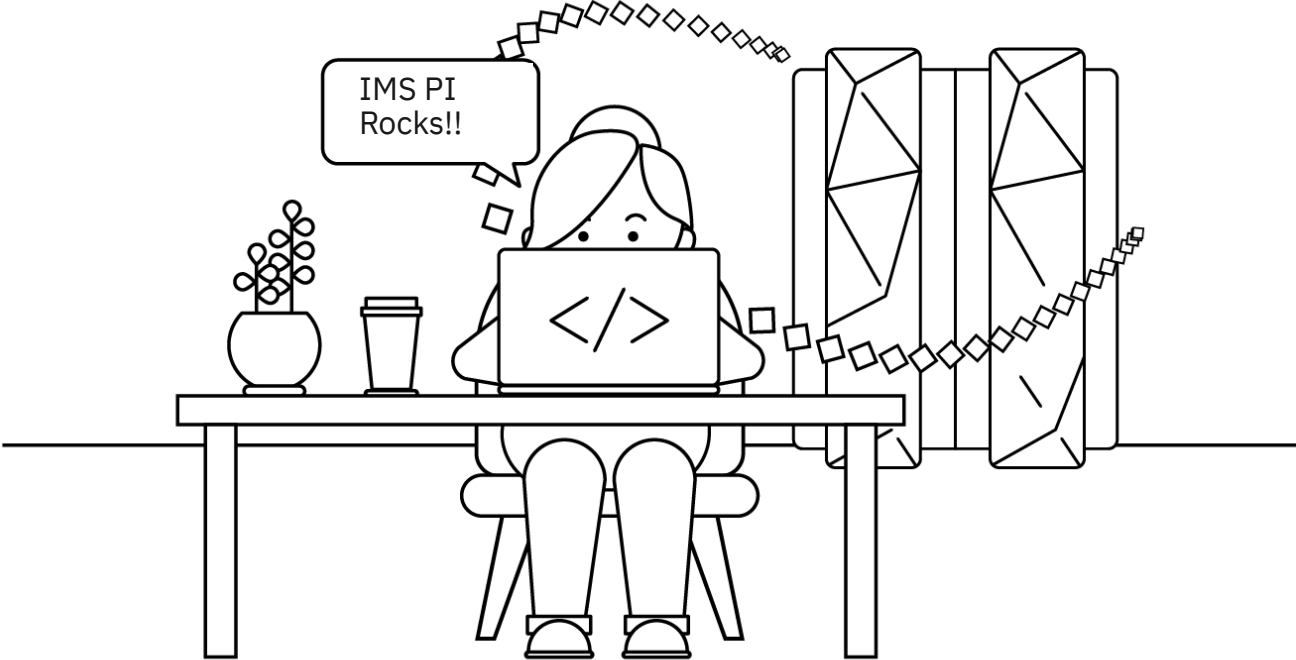
- Total syncpoint time
- Phase 1
- Phase 2
- Phase 2 attributable to Fast Path database only
- OTHREAD time to complete (asynchronous – not part of SYNCPT)

Syncpoint analysis

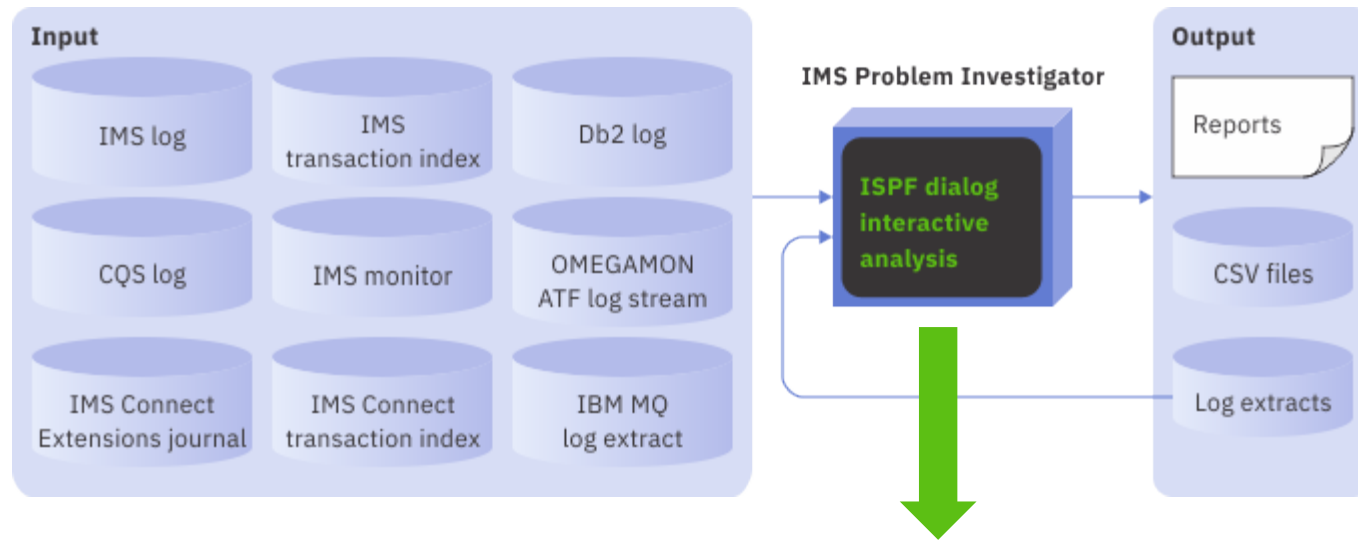
Trancode	Count	Process Time	CPU Time	DB Calls	Syncpt Time	Phase 1 Time	Phase 2 Time	Phase 2 FP Time	OThread Time
BANK1	18	0.041045	0.006635	8	0.014769	0.000030	0.014739	0.014739	0.000980
BANK2	26	0.051985	0.005922	8	0.000071	0.000032	0.000039	0.000039	0.001107
BANK3	280	0.048873	0.004889	23	0.000038	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

IMS PI Analysis

We need to be able to look at data from IMS PI viewpoint by analyzing instrumentation data.



IMS Problem Investigator



New in V2.5	Primary resource
Support for fixed width columns and ISO 8601 timestamps in exported CSV files	https://www.ibm.com/support/knowledgecenter/SSAVJ9_2.5.0/alzu-reports-specified-files.html
Remove sensitive information from IMS Connect Extensions journals, IBM® MQ logs, CQS logs, and IBM OMEGAMON® for IMS on z/OS® Application Trace Facility (ATF) log streams and extracts (as well as IMS logs)	https://www.ibm.com/support/knowledgecenter/SSAVJ9_2.5.0/alzu-prefiles-scrub.html
The device relative record number (DRRN) field in the IMS log is now available as a filter field.	https://www.ibm.com/support/knowledgecenter/SSAVJ9_2.5.0/alzu-filter-cond-global-fields.html

```

File  Menu  Edit  Mode  Navigate  Filter  Time  Labels  Options  Help
BROWSE  IPI450.QAAUTO.P000000.IPICXOUT(I3GN0016)  Record 00000001 More: < >
Command ===>                               Scroll ===> PAGE
Forwards / Backwards . . HH.MM.SS.THMIJU  Time of Day . .
Code Description                               Date 2020-06-16 Tuesday  Time (Local)
/
CA20 Connect Transaction                               04.26.20.460492
Program=DFSIVP1 Userid=CEX001 ClientID=0DBEDE41 Port=48855
LogToken=D8135861BB603C47 Response=0.150817 SYNCLEVEL=0
TOV=DEFAULT Socket=Tran

CA20 Connect Transaction                               04.26.28.816265
Program=DFSIVP1 Userid=CEX001 ClientID=0DBDD447 Port=48855
LogToken=D8135869B3E9D241 Response=0.094542 SYNCLEVEL=0
TOV=DEFAULT Socket=Tran

CA20 Connect Transaction                               04.26.30.605484
Program=DFSIVP1 Userid=CEX001 ClientID=0DBC3045 Port=48855
LogToken=D813586B68D5A845 Response=0.313866 SYNCLEVEL=0
TOV=DEFAULT Socket=Tran
    
```

IMS Connect receives Open Database requests via TCP/IP

IMS Connect calls security and routing exits

IMS Connect forwards requests to ODBM

IMS Processes Open Database request

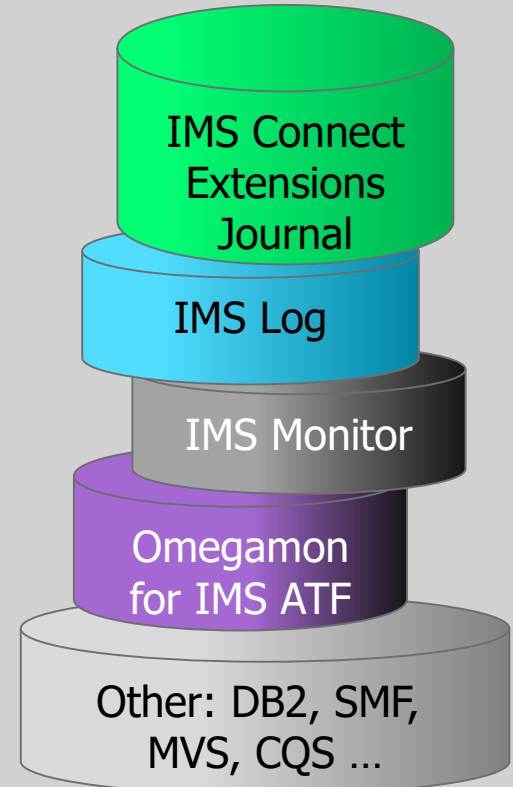
Response returns to client via ODBM & IMS Connect

IMS Connect receives next request from client

DRDA conversation continues until PSB deallocated and socket closes

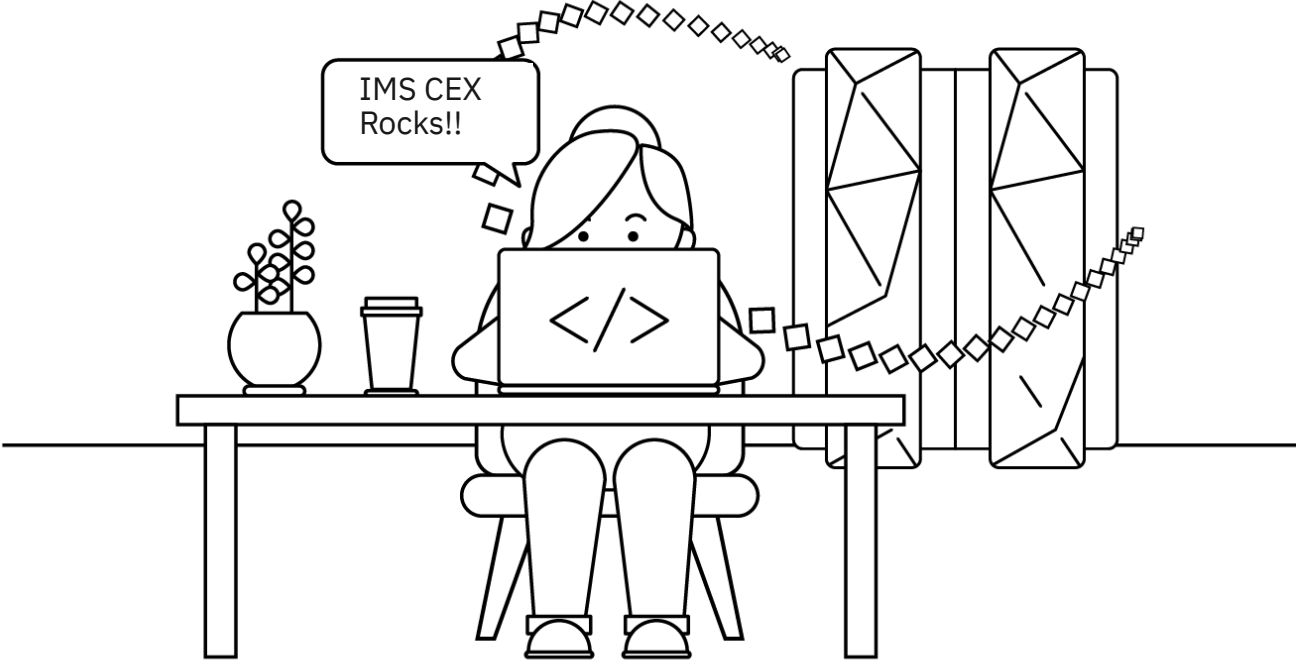
```
BROWSE CEX000.QADATA.DEMO.LOG.ICON Record 0000598 More: < >
Command ====> Scroll ====> CSR
Navigate < 00.00.01.000000 > Date/Time 2010-03-31 12.51.02.387397
Wednesday 2010-03-31 Time (Relative)
/
--- 003C Prepare READ Socket 13.16.53.026908
--- 0049 READ Socket +0.000118
--- 005B DRDA 1041 EXCSAT-Exchange Server Attributes +0.000125
--- 0049 READ Socket +0.000151
--- 005B DRDA 106D ACCSEC-Access Security +0.000182
--- 005C DRDA 1443 EXCSATRD-Server Attributes Reply Data +0.000204
--- 004A WRITE Socket +0.000310
--- 0049 READ Socket +0.854012
--- 005B DRDA 106E SECCHK-Security Check +0.854020
--- 0063 ODBM Security Exit called +0.854053
--- 0064 ODBM Security Exit returned +0.854126
--- 005C DRDA 1219 SECCHKRM-Security Check Reply Message +0.854142
--- 004A WRITE Socket +0.854230
--- 0049 READ Socket +1.022542
--- 005B DRDA 2001 ACCRDB-Access RDB +1.022551
--- 005D ODBM begin Allocate PSB (APSB) Program=AUTPSB11 +1.022572
--- 0061 ODBM Routing Exit called +1.022582
--- 0062 ODBM Routing Exit returned +1.022740
--- 00AA ODBM Trace: Message sent to ODBM +1.022880
--- 0069 Message sent to ODBM +1.022887
--- 06 BMP Scheduling start TranCode=ODBA02CD Region=0004 +1.024870
--- 4E02 BMP Scheduling start Region=0004 +1.024873
--- 08 Application Start Program=AUTPSB11 Region=0004 +1.025814
--- 5607 Start of UOR Program=AUTPSB11 Region=0004 +1.025815
--- 5616 Start of protected UOW Region=0004 +1.026013
--- 4E03 BMP Scheduling end TranCode=ODBA02CD Region=0004 +1.026018
--- 00AA ODBM Trace: Message received from ODBM +1.028028
--- 006A Message received from ODBM +1.028043
--- 005E ODBM end Allocate PSB (APSB) Program=AUTPSB11 +1.029573
--- 005C DRDA 2201 ACCRDBRM-Access RDB Reply Message +1.029600
--- 004A WRITE Socket +1.029600
--- 0048 Trigger Event for ODBMMSG +1.029600
--- 003C Prepare READ Socket +1.029600
--- 0049 READ Socket +1.029600
--- 005B DRDA 200C OPNQRY-Open Query +1.029600
--- 0049 READ Socket +1.029600
--- 005B DRDA CC05 DLIFUNC-DL/I function +1.029600
--- 0049 READ Socket +1.029600
--- 005B DRDA CC01 INAIB-AIB data +1.051689
--- 0049 READ Socket +1.051712
--- 005B DRDA CC04 RTRVFLD-Field client wants to retrieve data +1.051742
--- 0049 READ Socket +1.051787
--- 005B DRDA CC06 SSALIST-List of segment search argument +1.051795
--- 00AA ODBM Trace: Message sent to ODBM +1.052210
--- 0069 Message sent to ODBM +1.052221
--- 01 DLI GHU Database=AUTOLDB SC=' ' Elapse=0.000364 +1.052811
--- 4E60 DLI Call start Region=0004 +1.052816
--- 4E62 DLA00 start Database=AUTOLDB Region=0004 Func=GU +1.052873
--- 4E63 DLA00 end Region=0004 Seg=DEALER SC=' ' +1.053029
--- 4E61 DLI Call end Region=0004 +1.053165
--- 00AA ODBM Trace: Message received from ODBM +1.053760
--- 006A Message received from ODBM +1.053771
```

Sudden jumps in elapsed or relative times may indicate problems



IMS CEX Analysis

We need to be able to look at data from IMS CEX viewpoint by analyzing output via the CEX Feed.



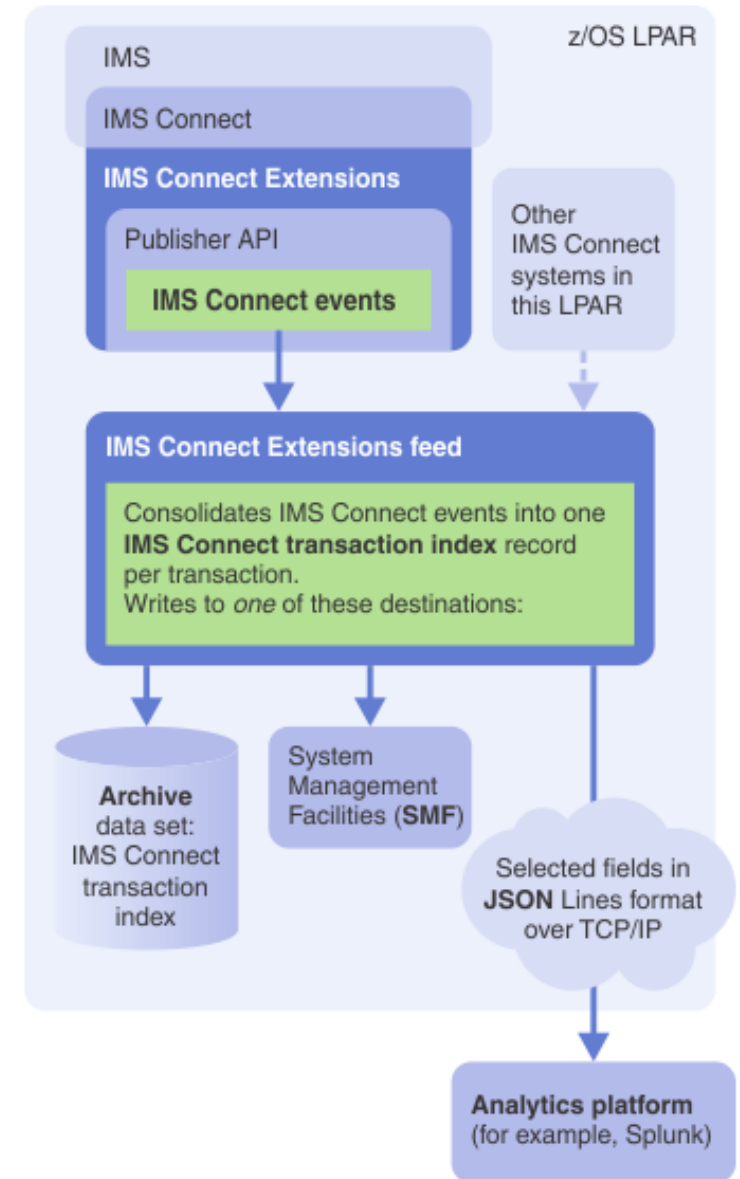
IMS Connect Extensions feed

What is it?

- A near real time data feed of IMS Connect transaction activity in summary form.
- The feed uses the IMS Connect Extensions Publisher API.
- It processes event records from the IMS Connect Extensions Publisher API using the same process that is found in IMS Performance Analyzer to produce IMS Connect transaction index records (also known as CA20 records).

What can you do with it?

- Chart the data in analytics platforms
 - Splunk sample application: <https://splunkbase.splunk.com/app/4320/>
 - Forward as JSON Lines, or use SMF (Common Data Provider)
- Use the IMS Connect transaction index with IMS Performance Analyzer, IMS Problem Investigator, or IBM Transaction Analysis Workbench.



<https://developer.ibm.com/recipes/tutorials/forwarding-a-live-feed-of-ims-connect-events-to-splunk/>

IMS Connect transaction analysis sample Splunk application Overview dashboard

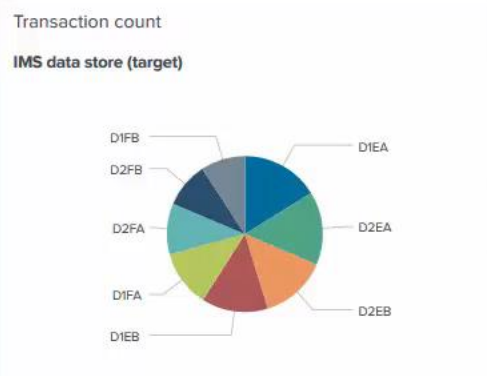
Overview

IMS Connect transactions grouped by your choice of identifier, showing the top 10 values by transaction count

Time range:

Identifier:

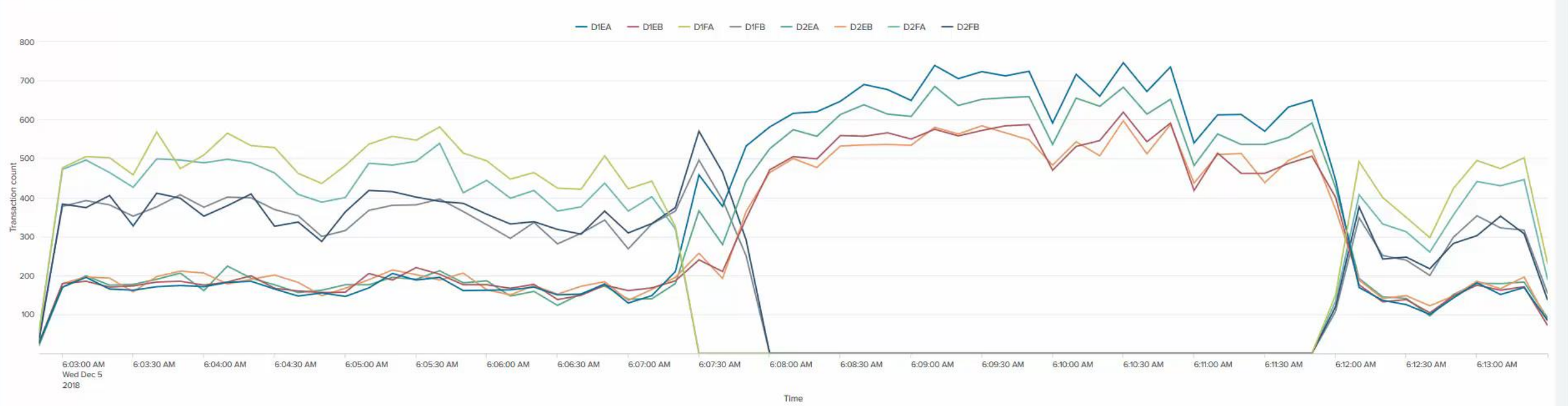
[Hide Filters](#)



IMS data store (target)	Transaction count	Percentage
D1EA	23482	16.20%
D2EA	22059	15.22%
D2EB	20041	13.83%
D1EB	19992	13.79%
D1FA	17041	11.76%
D2FA	15282	10.54%
D2FB	13728	9.47%
D1FB	13311	9.18%

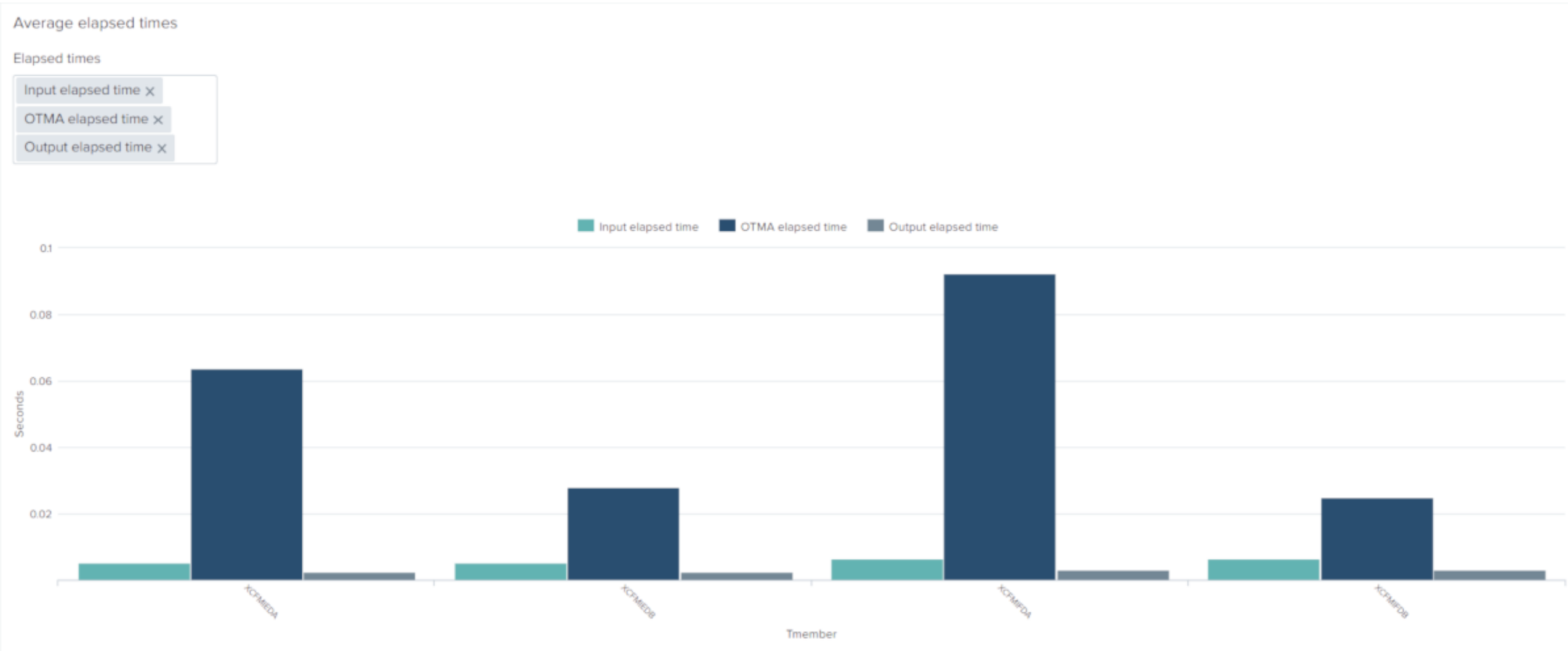


Transaction rate



IMS Connect transaction analysis sample Splunk application

Input, OTMA, and output elapsed time for each tmember



धन्यवाद

Hindi

多謝

Traditional

감사합니다

Korean

Спасибо

Russian

Ndzi khense ngopfu

Tsonga

Gracias

Spanish

Thank You

English

Obrigado

Brazilian
Portuguese

شكراً

Arabic

Grazie

Italian

Danke

German

多谢

Simplified
Chinese

Merci

French

Ke a leboha

Tswana

நன்றி

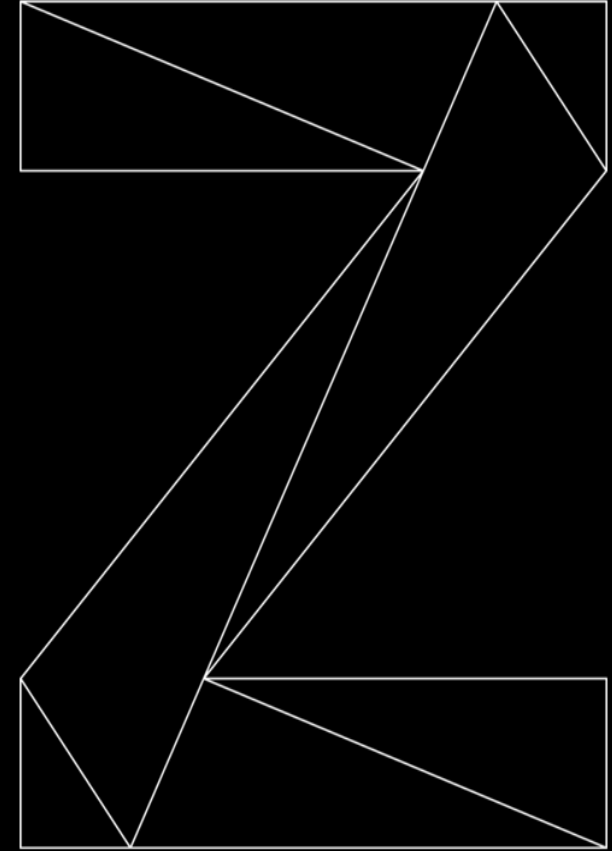
Tamil

ありがとうございました

Japanese

ขอบคุณ

Thai



IBM

IMS Tools