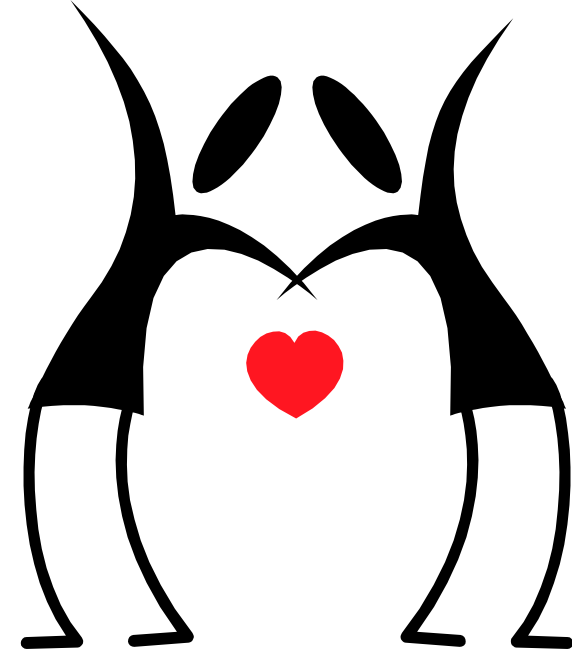




SHARE – Boston, August 3rd, 2010



CICS Performance Analysis Essentials

By Ivan Gelb

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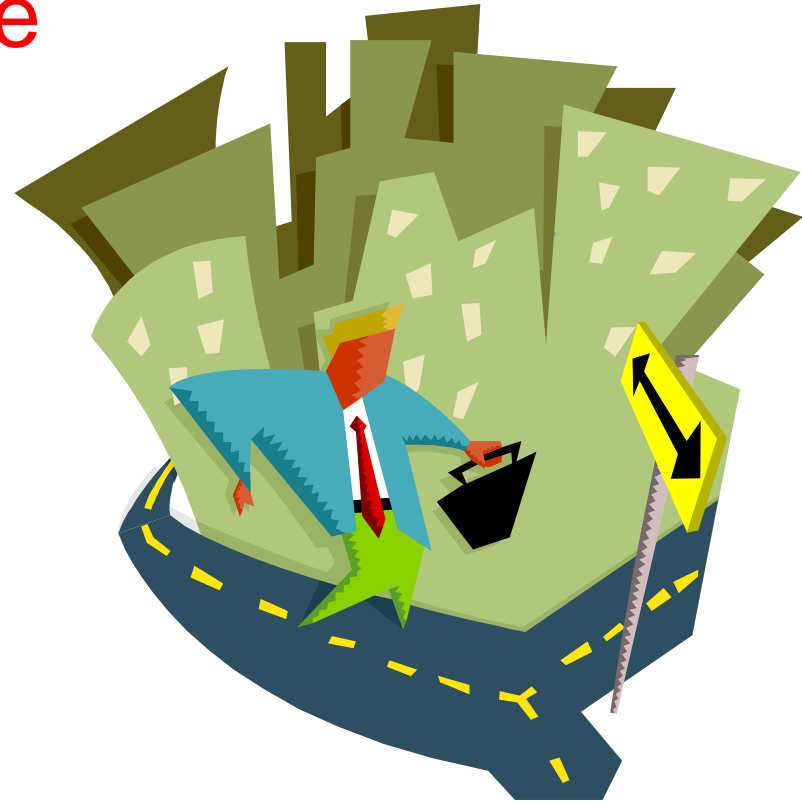
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Agenda

- Your Questions @Anytime
- V4.1 Performance
- Performance Analysis
- Processor Performance
- I/O Performance





V4.1 Performance - 1

- Throughput improved via more efficient workload management with Sysplex optimized workload routing enabled at the z/OS Coupling Facility (CF)
 - **Most** effective if routing and target regions managed by different CMASs in a **single** Sysplex
 - Monitor distribution of dynamic workloads through CICSplex via **new CPSM WUI views**
 - Load value, including all tasks, and health status for a CICS region is broadcast with basic health status
 - CICSplex SM uses data in CF to make dynamic routing decisions
 - Target regions refresh interval for their data in CF is between 1 ms and up to 2 seconds. Default = 200ms
 - **Smaller refresh values increase CF utilization**





V4.1 Performance - 2

- New support for z/OS Workload Manager (WLM) service policy specified percentile goals
 - Addition to average response time goals support
 - CICSplex SM optimizes response times by routing to region it deems most likely to meet goals
 - Router and target regions managed by same CMAS
 - Percentile goal example: 95% of transactions need response time of less than 1 second
 - Average response time goal example: Average response time < 0.75 seconds
 - Average response time goals subject to WLM “over-reactions” due to effects a few long tasks ending in the interval’s workload mix





V4.1 Performance - 3

- CICS XML parsing improved via new z/OS XML System Services (XMLSS) parser which CICS can access directly
 - XMLSS can offload parsing to zSeries Application Assist Processor (zAAP)
 - Parsing offload can improve response time for all transactions because CPU time is moved to zAAP
 - zAAP CPU time cost is **at least 80% lower** than general purpose CPU cost!
 - XMLSS parser uses above-the-bar storage





V4.1 Performance - 4

- Improvements in CICS monitoring
 - New performance data metrics for Web and Web service applications
 - New transaction resource class monitoring data for distributed program link (DPL) requests
 - DPLLIMIT, FILELIMIT and TSQUEUELIMIT options limit the number of DPL requests, files, and Temp Storage queues for which CICS will perform transaction resource monitoring
 - New default is to compress monitor records





Performance Analysis - 1

Top 10 recommended questions for performance analysis:

1. What is the complaint, and are any other older complaints still around/being reported?
2. When did this problem 1st occur and occur the last time?
3. How many changes occurred during period we study and what are they?
4. How much the transaction rate changed in any direction?
5. How much did total system workload composition change?





Performance Analysis - 2

Top 10 recommended questions continued:

6. Was anything moved around (workloads, files, disks, regions,..)?
7. Any changes made to z/OS WLM service policy?
8. If multiple LPARs under PR/SM, how much did the total load of all LPARs change, or is 100% physical utilization hit more often and longer than before?
9. If multiple LPARs under PR/SM, did any weights or caps change (switched from uncapped) ?
10. What were the recent changes to the application?
Yes – the list grows if you seek end-to-end info!





Performance Analysis - 3

Performance Hierarchy

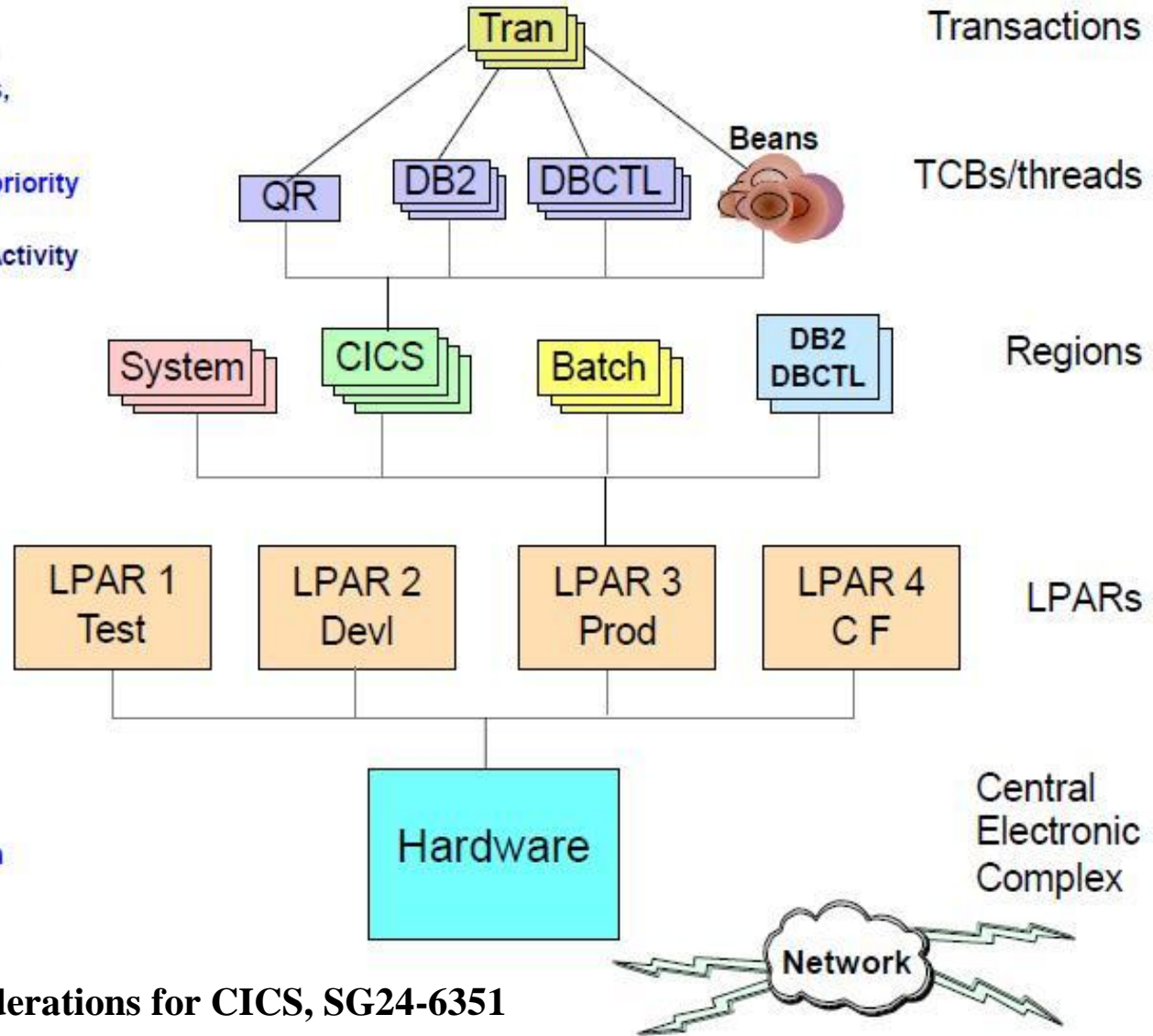
CICS dispatching and tuning; resource usage
Tools: SMF 110 records, statistics

TCB/thread execution priority and contention
Tools: RMF Workload Activity Reports

MVS dispatching and tuning; SRM/WLM
Tools: RMF Reports, SMF Type 30 records

LPAR Mgmt (weights and fair share)
Tools: RMF CPU and Partition data reports

CPU cycles - Engines, Memory, Devices, Hardware configuration
Tools: RMF



Source: Threadsafe Considerations for CICS, SG24-6351

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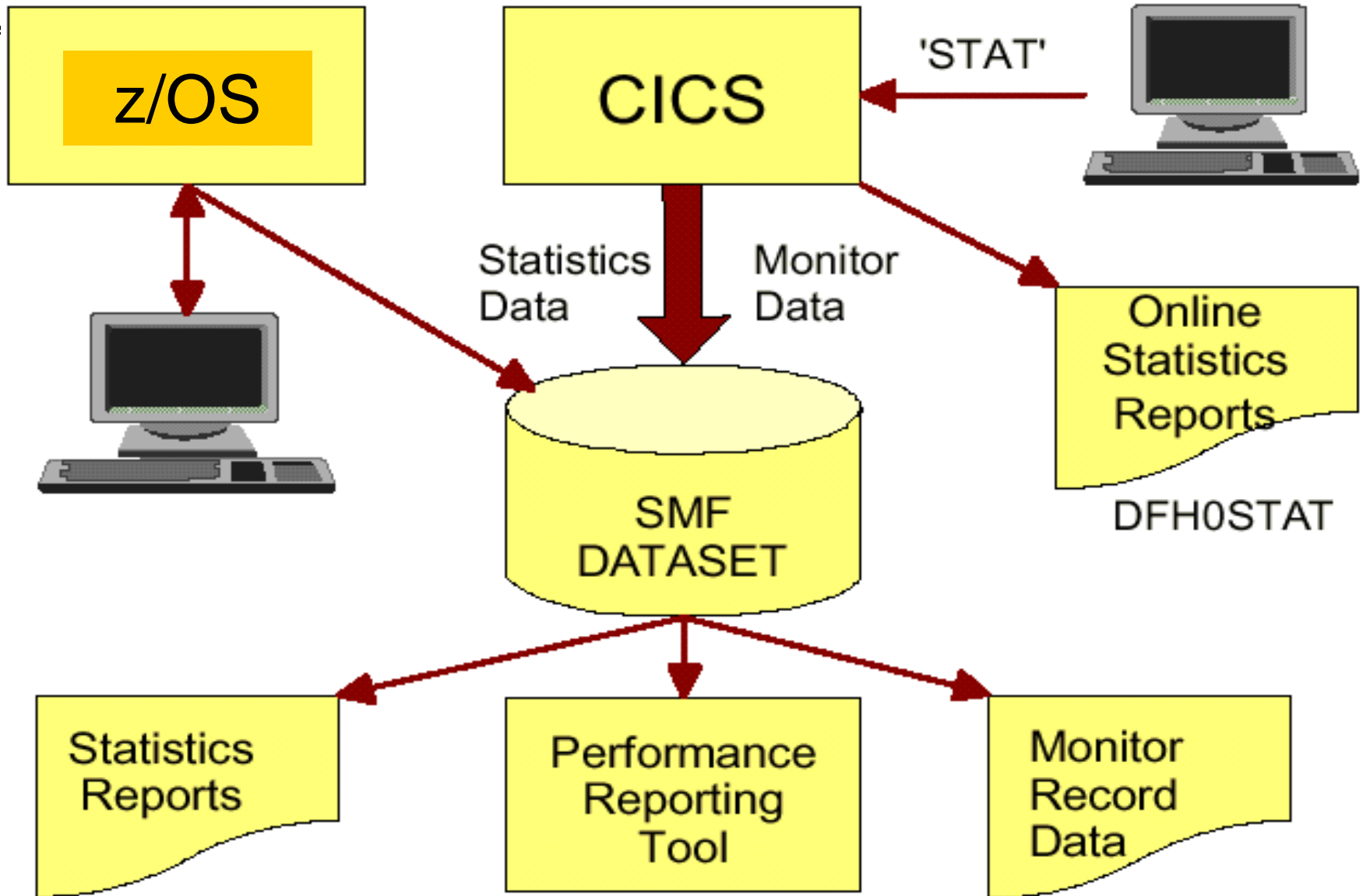


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Performance Monitoring



Source: Chris Baker, IBM Hursley, UK

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Measurement Data Sources

- **Resource Measurement Facility (RMF)**
 - System wide resource level details: CPU disks, storage, workload performance, and summary
- **System Management Facility (SMF)**
 - Address space level details for: batch, STC, CICS, etc. + resource level details/address space
 - VSAM file and DB2 object level activity details
- **CICS end-of-day and interval statistics**
 - CICS Region level statistics and resource counters for: CPU, IO, storage, transactions, connections, etc...
- **CICS Monitoring Facility (CMF)**
 - Transaction level details. All the details!





Processor Performance Analysis

- **Three** dispatchers involved in making physical processor time available to a CICS task:
 - PR/SM dispatches tasks of LPARs
 - z/OS dispatches tasks within LPAR, and
 - CICS dispatches tasks within the region
- LPAR **weights** based shares are enforced by PR/SM only when the processor is at or near 100% busy **or** LPAR is capped





CEC Level Processor Analysis

- LPAR weight and the guaranteed CPU share

LPAR	Weight	% Share	Guaranteed # of CPs
PRODHOT1	225	45%	7.2
PRODHOT2	225	45%	7.2
PRODWARM	50	10%	1.6
Totals	500	100%	16

- Effective Dispatch Time from PR/SM view
- Partition Dispatch Time from z/OS view
- Short CPUs = task may get a **fraction** of one CP





RMF Partition Data Report

PARTITION DATA REPORT															PAGE																													
z/OS V1R10			SYSTEM ID S59			DATE 07/28/2009			INTERVAL 15.00.010																																			
			RPT VERSION V1R10 RMF			TIME 17.00.00			CYCLE 1.000 SECONDS																																			
M/S PARTITION NAME	S59		NUMBER OF PHYSICAL PROCESSORS			26		GROUP NAME			N/A																																	
IMAGE CAPACITY	1127		CP			20		LIMIT			N/A																																	
NUMBER OF CONFIGURED PARTITIONS	12		AAP			2																																						
WAIT COMPLETION	NO		IFL			0																																						
DISPATCH INTERVAL	DYNAMIC		ICF			2																																						
			IIP			2																																						
----- PARTITION DATA -----															-- LOGICAL PARTITION PROCESSOR DATA --															-- AVERAGE PROCESSOR UTILIZATION PERCENTAGES --														
			----MSU----			-CAPPING--			PROCESSOR-			----DISPATCH TIME DATA----			LOGICAL PROCESSORS			--- PHYSICAL PROCESSORS ---																										
NAME	S	WGT	DEF	ACT	DEF	WLM%	NUM	TYPE	EFFECTIVE	TOTAL	EFFECTIVE	TOTAL	LPAR MGMT	EFFECTIVE	TOTAL	EFFECTIVE	TOTAL																											
S59	A	801	0	502	NO	0.0	20.0	CP	02.13.34.022	02.13.34.604	44.52	44.53	0.00	44.52	44.53																													
S50	A	500	0	0	NO	0.0	20.0	CP	00.00.00.000	00.00.00.000	0.00	0.00	0.00	0.00	0.00																													
S51	A	100	0	53	NO	0.0	3.0	CP	00.13.58.918	00.14.00.016	31.07	31.11	0.01	4.66	4.67																													
S55	A	101	0	68	NO	0.0	20.0	CP	00.18.01.114	00.18.01.538	6.01	6.01	0.00	6.01	6.01																													
S58	A	999	0	493	NO	0.0	20.0	CP	02.11.06.315	02.11.06.763	43.70	43.70	0.00	43.70	43.70																													
PHYSICAL										00.00.04.264		0.02		0.02																														
TOTAL										04.56.40.370		04.56.47.186		0.04		98.89		98.93																										
S59	A	150					2	AAP	00.00.00.373	00.00.00.419	0.02	0.02	0.00	0.02	0.02																													
S50	A	150					2	AAP	00.00.00.000	00.00.00.000	0.00	0.00	0.00	0.00	0.00																													
S51	A	150					2	AAP	00.00.00.737	00.00.00.770	0.04	0.04	0.00	0.04	0.04																													
S55	A	150					2	AAP	00.00.00.283	00.00.00.327	0.02	0.02	0.00	0.02	0.02																													
S58	A	150					2	AAP	00.00.00.317	00.00.00.359	0.02	0.02	0.00	0.02	0.02																													
PHYSICAL										00.00.00.993		0.06		0.06																														
TOTAL										00.00.01.713		00.00.02.870		0.06		0.10		0.16																										

Source: RMF V1R10 Report Analysis

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RMF CPU Activity Report

CPU ACTIVITY

z/OS V1R10 SYSTEM ID S59 DATE 07/28/2009 INTERVAL 14.
RPT VERSION V1R10 RMF TIME 16.45.00 CYCLE 1.000

CPU 2097 MODEL 720 H/W MODEL E26 SEQUENCE CODE 0000 00005C34F HIPERDISPATCH=YES

---CPU---		----- TIME % -----				LOG PROC	-- I/O INTERRUPTS--	
NUM	TYPE	ONLINE	LPAR BUSY	MVS BUSY	PARKED	SHARE %	RATE	% VIA TPI
0	CP	100.00	99.96	100.0	0.00	100.0	95.31	0.03
1	CP	100.00	99.60	100.0	0.00	100.0	0.00	0.00
2	CP	100.00	99.58	99.97	0.00	100.0	0.00	0.00
3	CP	100.00	99.58	99.97	0.00	100.0	0.00	0.00
4	CP	100.00	99.58	99.98	0.00	100.0	0.00	0.00
5	CP	100.00	78.17	100.0	0.00	70.3	0.00	0.00
6	CP	100.00	78.10	100.0	0.00	70.3	0.00	0.00
7	CP	100.00	0.01	0.00	100.00	0.0	0.00	0.00
8	CP	100.00	0.01	0.00	100.00	0.0	0.00	0.00
9	CP	100.00	0.01	0.00	100.00	0.0	0.00	0.00
A	CP	100.00	0.01	0.00	100.00	0.0	0.00	0.00
B	CP	100.00	0.01	0.00	100.00	0.0	0.00	0.00
C	CP	100.00	0.01	0.00	100.00	0.0	0.00	0.00
D	CP	100.00	0.01	0.00	100.00	0.0	0.00	0.00
E	CP	100.00	0.01	0.00	100.00	0.0	0.00	0.00
F	CP	100.00	0.01	0.00	100.00	0.0	0.00	0.00
10	CP	100.00	0.01	0.00	100.00	0.0	0.00	0.00
11	CP	100.00	0.00	0.00	100.00	0.0	0.00	0.00
12	CP	100.00	0.00	0.00	100.00	0.0	0.00	0.00
13	CP	100.00	0.00	0.00	100.00	0.0	0.00	0.00
TOTAL/AVERAGE			32.76	34.99		640.6	95.31	0.03
16	AAP	100.00	0.03	0.03	0.00	40.0		
17	AAP	100.00	0.01	0.00	100.00	0.0		
TOTAL/AVERAGE			0.02	0.03		40.0		
14	IIP	100.00	0.02	0.02	0.00	40.0		
15	IIP	100.00	0.01	0.00	100.00	0.0		
TOTAL/AVERAGE			0.02	0.01		40.0		

Source: RMF V1R10 Report Analysis

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RMF Monitor III Processor Delays - 1

RMF V1R8 Processor Delays

Line 1 of 138
Scroll ==> HALF

Command ==>

Samples: 60 System: MVS1 Date: 10/31/06 Time: 09.10.00 Range: 60 Sec

Jobname	CX	Service Class	CPU Type	DLY %	USG %	EApp1 %	Holding Job(s)					
							%	Name	%	Name	%	Name
WSWS7	O	OMVS	CP	11	46	59.4	9	*ENCLAVE	7	DBS3DIST	7	WSP1S2F
WSP1S2FS	SO	WASCR	CP	4	4	42.5	2	DBS3DIST	2	WSWS7	2	VTAM44
			AAP	6	0	98.4	6	*ENCLAVE				
WSP1S6FS	SO	WASCR	CP	0	0	5.3						
			AAP	6	0	7.7	6	*ENCLAVE				
DBS3DBM1	S	DB2HIGH	CP	2	6	0.8	2	XCFAS	2	DBS3DIST	2	WSP1S2F
WSP1S6F	SO	WASCR	CP	0	2	1.9						
			AAP	2	2	0.7	2	*ENCLAVE				
U078069	O	OMVS	CP	2	4	1.2	2	WSWS7	2	DBS3DIST	2	U078069
WSP1S4F	SO	WASCR	CP	0	0	0.1						
			AAP	2	0	0.4	2	WSP1S6F				
U078068	O	OMVS	CP	2	0	0.2	2	XCFAS	2	WSWS7	2	*ENCLAVE
DBS3DIST	SO	DB2HIGH	CP	0	78	111.0						
			IIP	0	2	21.3						
XCFAS	S	SYSTEM	CP	0	28	24.1						

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RMF Monitor III Processor Delays - 1

NOTES

Processor delays report identifies who is delayed and by ABOUT how much.

1. $DLY \% = (\# \text{ of Delay Samples} / \# \text{ of Samples}) * 100$ is % of time task is delayed from getting CPU time
2. $USG \% = (\# \text{ Using Samples} / \# \text{ Samples}) * 100$ is % of time the task is receiving CPU service
3. Holding Job(s) – up to three tasks that most contributed to delay

Note that delays are collected via statistical sampling!

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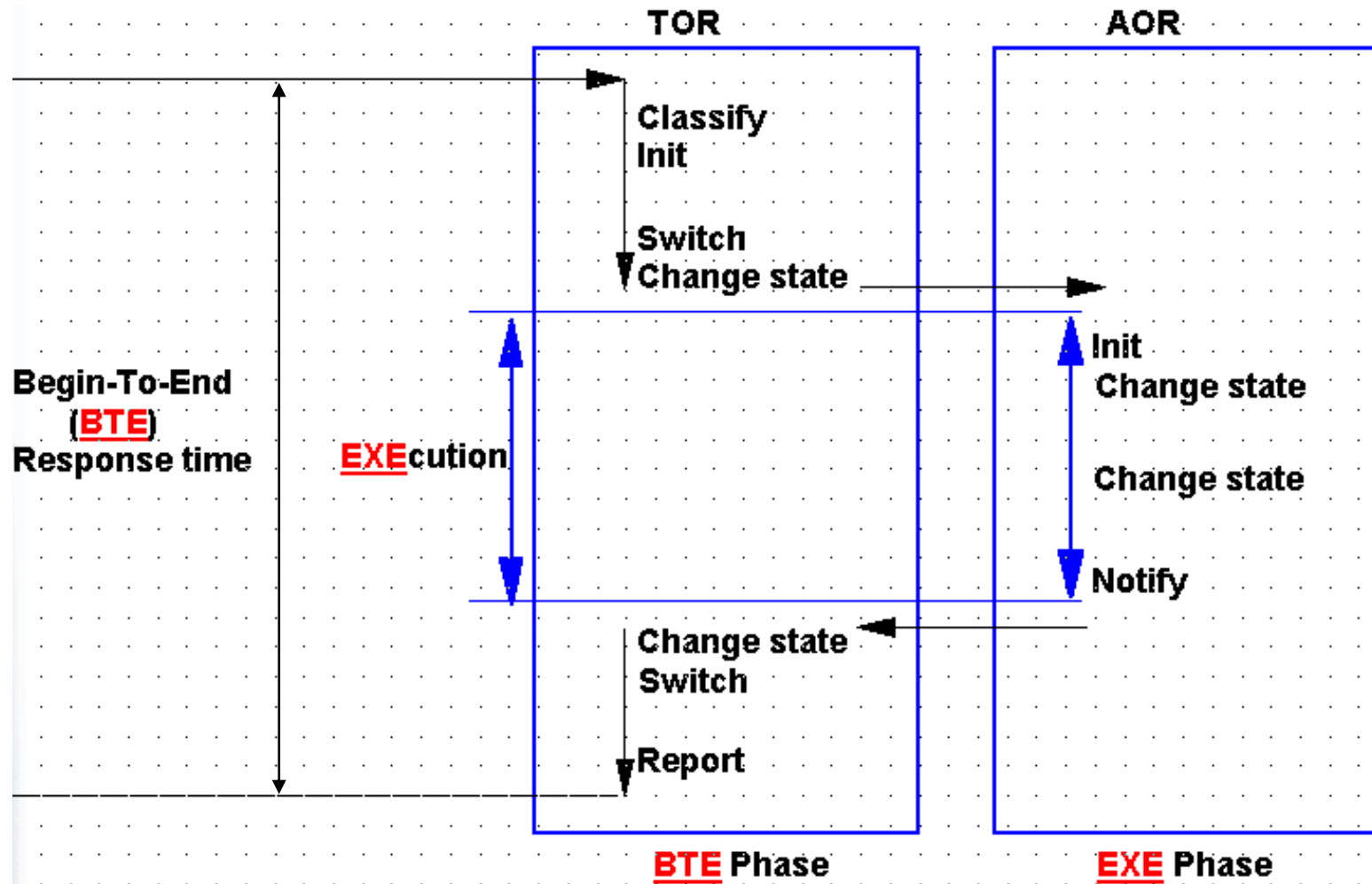


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RMF CICS Measurements



Source: Chris Baker, IBM Hursley, UK

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RMF Workload Activity

WORKLOAD ACTIVITY

PAGE 1

z/OS V1R10

SYSPLEX SVPLEX3
RPT VERSION V1R10 RMF

DATE 07/28/2009
TIME 12.00.00

INTERVAL 14.59.995 MODE = GOAL

POLICY ACTIVATION DATE/TIME 11/01/2007 10.12.11
- WORKLOAD & SERVICE CLASS PERIODS -

----- SERVICE CLASS(ES)

REPORT BY: POLICY=BASEPOL WORKLOAD=STC_WLD SERVICE CLASS=STCHIGH RESOURCE GROUP=*NONE
CRITICAL =NONE
DESCRIPTION =High priority for STC workloads

-TRANSACTIONS-	TRANS-TIME	HHH.MM.SS.TTT	--DASD I/O--	---SERVICE---	SERVICE TIME	---APPL %---	--PROMOTED--	----STORAGE----
AVG 0.00	ACTUAL	62	SSCHRT 0.0	IOC 0	CPU 0.000	CP 0.00	BLK 0.000	AVG 695.77
MPL 0.00	EXECUTION	62	RESP 0.0	CPU 0	SRB 0.015	AAPCP 0.00	ENQ 0.000	TOTAL 1.49
ENDED 62	QUEUED	0	CONN 0.0	MSO 0	RCT 0.009	IIPCP 0.00	CRM 0.000	SHARED 0.00
END/S 0.03	R/S AFFIN	0	DISC 0.0	SRB 2933	IIT 0.000			
#SWAPS 62	INELIGIBLE	0	Q+PEND 0.0	TOT 2933	HST 0.000	AAP 0.00		
EXCTD 0.00	CONVERSION	0	IOSQ 0.0	/SEC 2	AAP 0.000	IIP 0.00		
AVG ENC 0.00	STD DEV	482						
REM ENC 0.00				ABSRPTN 759				
MS ENC 0.00				TRX SERV 757				

-PAGE-IN RATES-	
SINGLE	0.0
BLOCK	0.0
SHARED	0.0
HSP	0.0

PER IMPORTANCE	PERF	INDX	---TRANSACTIONS---	-----RESPONSE TIME-----	-EX VEL%	TOTAL	-EXE--
			-NUMBER- -%	-----GOAL----- ---ACTUAL---	TOTAL GOAL ACT	USING%	DELAY%
1 1	0.5		62 100	00.00.00.500 80% 98.4%	98.4%	0.0	0.0
2 2	N/A		0 0	00.00.05.000 80% 0.0%	N/A	0.0	0.0
3 3	N/A		0 0	00.00.15.000 AVG 00.00.00.000	N/A	0.0	0.0

TOTAL 62 100

REPORT BY: POLICY=BASEPOL WORKLOAD=STC_WLD SERVICE CLASS=STCLOW RESOURCE GROUP=*NONE
CRITICAL =NONE
DESCRIPTION =Low priority for STC workloads

-TRANSACTIONS-	TRANS-TIME	HHH.MM.SS.TTT	--DASD I/O--	---SERVICE---	SERVICE TIME	---APPL %---	--PROMOTED--	----STORAGE----
AVG 0.12	ACTUAL	5.341	SSCHRT 0.1	IOC 250903	CPU 14.636	CP 0.82	BLK 0.000	AVG 679.09
MPL 0.12	EXECUTION	5.341	RESP 2.7	CPU 2046K	SRB 0.032	AAPCP 0.00	ENQ 0.000	TOTAL 81.44

Source: RMF V1R10 Report Analysis

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Notes- RMF Workload Activity

CP Percentage of CPU time used by transactions running on standard CPs in the service or report class period.

The calculation is:

$$\text{APPL\% CP} = \frac{\text{CPU} + \text{SRB} + \text{RCT} + \text{IIT} + \text{HST} - \text{AAP} - \text{IIP}}{\text{Interval length}} * 100$$

Notes:

1. The interval length in a sysplex is the common interval length.
2. The AAP and IIP times may be normalized from a faster zAAP or zIIP.

AAPCP

Percentage of CPU time used by zAAP eligible transactions running on standard CPs. This is a subset of APPL% CP.

IIPCP Percentage of CPU time used by zIIP eligible transactions running on standard CPs. This is a subset of APPL% CP.

AAP Percentage of CPU time used by transactions executed on zAAPs in the service or report class period.

IIP Percentage of CPU time used by transactions executed on zIIPs in the service or report class period.

Source: RMF V1R10 Report Analysis

AAPCP and IIPCP will forecast ZAAP and ZIIP potential utilization with PROJECTCPU option specified in IEAOPT member of PARMLIB

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RMF Workload Activity

REPORT BY: POLICY=BASEPOL WORKLOAD=CICS_WLD SERVICE CLASS=CICSLOW RESOURCE GROUP=*NONE PERIOD=1 IMPORTANCE=4
 CRITICAL =NONE

```

-TRANSACTIONS-  TRANS-TIME HHH.MM.SS.TTT
AVG      0.00 ACTUAL           0
MPL      0.00 EXECUTION       0
ENDED    893 QUEUED           0
END/S    0.50 R/S AFFIN        0
#SWAPS   0   INELIGIBLE       0
EXCTD    0   CONVERSION       0
AVG ENC  0.00 STD DEV         0
REM ENC  0.00
MS ENC   0.00
  
```

SUB	P	RESP TIME (%)	STATE SAMPLES BREAKDOWN (%)				-----STATE-----					
			---ACTIVE--	READY	IDLE	-----WAITING FOR-----	SWITCHED	SAMPL (%)	LOCAL			
TYPE			SUB	APPL		MISC	TIME					
CICS	BTE	0.0	0.0	0.0	0.0	6.7	88.9	4.4				
CICS	EXE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

GOAL: RESPONSE TIME 000.00.30.000 FOR 75%

SYSTEM	RESPONSE TIME ACTUAL%	EX VEL%	PERF INDX
*ALL	100	N/A	0.5
CB8B	100	N/A	0.5
CB86	100	N/A	0.5
CB87	100	N/A	0.5
CB88	100	N/A	0.5
CB89	100	N/A	0.5

-----RESPONSE TIME DISTRIBUTION-----

TIME	NUMBER OF TRANSACTIONS	PERCENT
HH.MM.SS.TTT	CUM TOTAL	CUM TOTAL
< 00.00.15.000	893	100
<= 00.00.18.000	893	100
<= 00.00.21.000	893	100

Save CPU time and money! Get the Goal and Response time Distribution from RMF. No CICS transaction level data collection required to get this!

Source: RMF V1R10 Report Analysis

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RMF Workload Activity - 2

REPORT BY: POLICY=HPTSPOL1 WORKLOAD=PRODWKLD SERVICE CLASS=CICSHR RESOURCE GROUP=*NONE PERIOD=1
IMPORTANCE=HIGH

-TRANSACTIONS--	TRANSACTION TIME	HHH.MM.SS.TTT	← Response time
AVG	0.00	ACTUAL	000.00.00.114
MPL	0.00	QUEUED	000.00.00.036
ENDED	216	EXECUTION	000.00.00.078
END/SEC	0.24	STANDARD DEVIATION	000.00.00.270
#SWAPS	0		
EXECUTD	216		

-----RESPONSE TIME BREAKDOWN IN PERCENTAGE-----														-----STATE-----				
SUB	P	TOTAL	ACTIVE	READY	IDLE	-----WAITING FOR-----										SWITCHED TIME (%)		
TYPE						LOCK	I/O	CONV	DIST	LOCAL	SYSPL	REMOT	TIMER	PROD	MISC	LOCAL	SYSPL	REMOT
CICS	BTE	93.4	10.2	0.0	0.0	0.0	0.0	83.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	83.3	0.0	0.0
CICS	EXE	67.0	13.2	7.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	46.7	0.0	0.0	0.0	0.0

Time in DB2 or
IMS or MQ

This is a sample RMF post processor (ERBRMFPP) output with option SYSRPTS(WLMGL(SCPER))

Source: Chris Baker, IBM Hursley, UK

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CICS Statistics

- Written to SMF
- Control:
CEMT SET STATISTICS
INTERVAL(hhmmss) **default = 3 hrs.**
ENDOFDAY(hhmmss) **default = 000000**
- Can be requested via CEMT for any one of the over 20 specific areas of CICS
- Reports via DFHSTUP and DFH0STAT





CICS Statistics - 2

- **Recommendation:** INTERVAL(hhmmss)
Make the interval **match** the RMF – SMF data collection interval's duration.
Same use as DFHSIT STATINT.
- Enables effective analysis of resource utilization statistics collected by SMF- RMF in conjunction with the CICS statistics.





CICS Statistics - 3

- **Recommendation:** Modify ENDOFDAY(hhmmss) **default = 000000**
Modify default to eliminate chance of performance problems at every midnight.
Same use as DFHSIT STATEOD.
- Offsetting ENDOFDAY by just a few seconds ($\leq 2 * \text{nr. Of CPUs}$) for limited groups of regions is the recommended solution.





CICS Statistics – 4

- **Requested** statistics produced by:
CEMT PERFORM STATISTICS RECORD ALL or
for over 20 specific domains
- **Requested** RESET statistics produced by:
CEMT PERFORM STATISTICS RECORD ALL
RESETNOW or for specific domains
- **Unsolicited** statistics are produced for dynamically
managed resources: buffer pools, terminals, files,
etc...





Dispatcher Domain -1

- Current MXT limit
- ☠ Nr. Of Times MXT reached
- Peak tasks??
- TRANCLASS limit by class
- ☠ TRANCLASS limit reached by class

NOTE: Limits should only be hit intentionally, and watch out for excessive (about 25% above HWM) MXT as cause of increased WLM /SRM CPU needs!





Dispatcher Domain –2

Processor timings by modes of TCB in CICS V4.1:

QR = Quasi-reentrant (system & **applications**)

CO = Concurrent (VSAM) mode TCB if SUBTSKS is 1

FO = File Owning (VSAM)

RO = Resource Owning

D2 = Used to stop DB2 protected threads

SZ = Used by FEPI interface

RP = Used to make ONC/RPC calls

EP = Runs event processing (new in v4.1)

J8 = Run JVM in CICS key

J9 = Run JVM in user key

JM = Shared class cache management





Dispatcher Domain – 3

Processor timings by modes of TCB in CICS V4.1:

L8 = OPENAPI option and EXECKEY=CICS programs

L9 = OPENAPI option and EXECKEY=USER programs

SO = Used for calls to TCP/IP sockets interface

SL = Used to wait for activity on a set of listening sockets

S8 = Secure Sockets Layer (SSL) or LDAP request

SP = Used for socket pthread owning task

T8 = Used by tasks to perform system processing in JVM server (new in v4.1)

TP = Owns and manages the LE enclave, JVM, THRD TCB pool, and T8 TCB of JVM server (new in v4.1)

X8 = Used by tasks which call C or C++ program compiled with XPLINK option and defined with EXECKEY=CICS

X9 = Used by tasks which call C or C++ program compiled with XPLINK option and defined with EXECKEY=USER

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Dispatcher Domain -4

- Number of MVS waits /TCB
- Accum. time in MVS wait /TCB
- Accum. Time dispatched /TCB
- Accum. CPU time /TCB
- **Track & Note:**
 - Total CPU & consumption rate of region
 - Wait-for-dispatch (incl. measurement distortions) = 3 – 4 (w/o capture ratio)





Dispatcher Statistics – Summary

DISPATCHER STATISTICS

Dispatcher Start Date and Time.	: 11/24/2002 09:22:44.7563
Address Space CPU Time.	: 02:11:34.1901
Address Space SRB Time.	: 00:02:24.3700
Peak number of dispatcher tasks	: 149
Peak ICV time (msec).	: 1000
Peak ICVR time (msec)	: 150000
Peak ICVTS time (msec)	: 250
Peak PRTYAGE time (msec).	: 0
Peak MRO (QR) Batching (MROBTCH) value.	: 1
Number of Excess TCB Scans.	: 1030792M ☒
Excess TCB Scans - No TCB Detached.	: 901943M ☒
Number of Excess TCBs Detached.	: 222681M ☒
Average Excess TCBs Detached per Scan	: 0

Notes/Recommendations:

- Excess TCB scans and detaches increase unproductive overhead.
- Tune number of TCB-s allocated to minimize overhead.

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Dispatcher Statistics – V4.1 Summary

DISPATCHER STATISTICS

Dispatcher Start Date and Time.	: 08/23/2009 06:03:32.6499
Address Space CPU Time.	: 00:05:27.182061
Address Space SRB Time.	: 00:00:06.130045
Peak number of dispatcher tasks	: 69
Peak ICV time (msec).	: 1000
Peak ICVR time (msec)	: 2500
Peak ICVTSD time (msec)	: 500
Peak PRTYAGE time (msec).	: 0
Peak MRO (QR) Batching (MROBTCH) value.	: 1
Number of Excess TCB Scans.	: 239
Excess TCB Scans - No TCB Detached.	: 231
Number of Excess TCBs Detached.	: 12
Average Excess TCBs Detached per Scan	: 0
Number of CICS TCB MODEs.	: 21 
Number of CICS TCB POOLs.	: 5

Note: Three new TCB modes in V4.1: EP, T8, TP

Report Source: Steve Ware, from UFL Test Region

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Dispatcher Statistics – Time by TCB Mode

DISPATCHER STATISTICS (Note: Columns 2 - 5 deleted to improve legibility)

TCB Mode	MVS Waits	Total Time in MVS wait	Total Time Dispatched	Total CPU Time / TCB
QR	13051397	000-18:18:33.24	000-01:49:46.74	000-01:12:02.27
RO	48658	000-20:05:12.28	000-00:02:46.27	000-00:01:00.80
CO	0	000-00:00:00.00	000-00:00:00.00	000-00:00:00.00
SZ	0	000-00:00:00.00	000-00:00:00.00	000-00:00:00.00
RP	0	000-00:00:00.00	000-00:00:00.00	000-00:00:00.00
FO	800	000-19:00:52.61	000-00:00:44.05	000-00:00:06.50
SL	1	000-00:00:00.00	000-00:00:00.00	000-00:00:00.00
SO	2	000-00:00:00.00	000-00:00:00.00	000-00:00:00.00
S8	0	000-00:00:00.00	000-00:00:00.00	000-00:00:00.00
D2	2419	000-20:18:01.28	000-00:00:03.26	000-00:00:00.43
L8	16952578	007-03:07:31.31	000-05:36:18.48	000-01:13:35.37
H8	0	000-00:00:00.00	000-00:00:00.00	000-00:00:00.00
J8	0	000-00:00:00.00	000-00:00:00.00	000-00:00:00.00

Recommendation: If QR TCB “Total Time Dispatched” is more than 1.25 times “Total CPU Time/TCB,” determine response time degradation and seek increased importance in WLM Service Policy if degradation is significant.

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READ I/O Performance

Performance factors:

- IOS queuing
- Channel utilization
- Amount of cache
- Device utilization
- Intra-file contention
- Inter-file contention
- Path utilization
- I/O pend request handling by CPU





WRITE I/O Performance

Performance factors:

- IOS queuing
- Channel utilization
- Amount of NVS cache
- Contention with other writers
- Disk device utilization
- Intra-file contention
- Inter-file contention
- I/O path utilization
- I/O pend request handling by CPU.





I/O Device Activity (RMF PP Report)

DIRECT ACCESS DEVICE ACTIVITY

z/OS VIR8

SYSTEM ID SYS1
RPT VERSION VIR8 RMF

DATE 11/28/2006
TIME 16.30.00

INTERVAL 14.59.946
CYCLE 1.000 SECONDS

TOTAL SAMPLES = 900 IODF = A3 CR-DATE: 07/21/2006 CR-TIME: 07.42.20 ACT: POR

STORAGE GROUP	DEV NUM	DEVICE TYPE	VOLUME SERIAL	PAV	LCU	DEVICE ACTIVITY RATE	AVG RESP TIME	AVG IOSQ	AVG CMR DLY	AVG DB DLY	AVG PEND TIME	AVG DISC TIME	AVG CONN TIME	% DEV CONN	% DEV UTIL	% DEV RESV	AVG NUMBER ALLOC	% ANY ALLOC	% MT PEND
	0401	3380K	SYSLIB		0032	1.246	4.6	0.0	0.0	2.2	2.5	0.1	2.0	0.25	0.26	0.0	89.6	100.0	0.0
	0402	3380K	SYSUSR		0032	0.250	1.4	0.0	0.0	0.1	0.3	0.0	1.0	0.03	0.03	0.1	14.0	100.0	0.0
	040F	3380K	SCL338		0032	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.0	100.0	0.0
			LCU		0032	1.496	4.1	0.0	0.0	1.0	2.1	0.1	1.8	0.07	0.07	0.0	104	100.0	0.0
	044F	3380K	MVSPG1		0033	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.0	100.0	0.0
	0460	3380K	RMFLIB		0033	0.036	6.1	0.0	0.0	0.3	1.5	0.0	4.6	0.02	0.02	0.0	0.0	100.0	0.0
	047F	3380K	MVSPLX		0033	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.0	100.0	0.0
			LCU		0033	0.036	6.1	0.0	0.0	0.3	1.5	0.0	4.6	0.00	0.00	0.0	4.0	100.0	0.0
	0500	33903	MVSLIB		0034	0.082	22.6	0.0	0.0	13.0	16.2	0.3	6.1	0.05	0.05	0.0	20.4	100.0	0.0
	0501	33903	MVSSCF		0034	0.012	1.6	0.0	0.0	0.0	0.5	0.0	1.0	0.00	0.00	0.0	4.6	100.0	0.0
	0502	33903	MVSCI2		0034	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.0	100.0	0.0
OMVSSYS	0503	33903	MVSOP2		0034	0.008	19.2	0.0	0.0	0.0	0.8	0.0	18.4	0.01	0.01	0.0	0.0	100.0	0.0
	0705	33909	15CY09		0035	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.0	100.0	0.0
	0707	33909	16RJ02		0035	0.036	55.2	0.0	0.0	36.7	44.6	0.0	10.6	0.04	0.04	0.0	0.0	100.0	0.0
	0708	33909	15CYX9		0035	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.0	100.0	0.0

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RMF Monitor III- Device Delays

RMF V1R8 Device Delays

Line 1 of 57
Scroll ==> HALF

Command ==>

Samples: 100 System: MVS1 Date: 10/31/06 Time: 10.03.20 Range: 100 Sec

Jobname	C	Service Class	DLY %	USG %	CON %	Main Delay Volume(s)			
						% VOLSER	% VOLSER	% VOLSER	% VOLSER
MARYPATM	B	NRPRIME	70	51	54	70 TSOL11	1 DUMP00		
MICHAELL	B	NRPRIME	39	15	14	39 BPXLK1			
MCPDUMP	S	SYSSTC	36	18	20	36 D24PK2			
CHARLESR	B	NRPRIME	33	13	13	28 BPXLK1	3 HSML02	2 BPXSSK	
DFHSM	S	SYSSTC	30	83	35	10 HSML17	5 SMS026	4 HSMOCD	4 HSMBCD
SHUMA3	T	TSOPRIME	18	52	53	13 D83ID0	5 HSML02		
DAVEP	T	TSOPRIME	16	9	10	4 HSM009	3 HSM005	2 HSML06	1 SMS013
CATALOG	S	SYSTEM	9	15	21	2 CLR007	1 HSM036	1 HSM018	1 HSM011
DB2MDBM1	S	SYSSTC	9	7	5	7 DB2MS2	1 DB2MD0	1 DB2MS0	
GINNI	T	TSOPRIME	8	10	9	3 HSML17	2 CLR010	1 HSM032	1 NATPK1
TREVORJ	T	TSOPRIME	6	10	11	2 HSM022	1 HSM001	1 RESPK1	1 HSM024
RHANSON	T	TSOPRIME	6	9	8	4 HSML17	1 RESPK1	1 NATPK1	
KOCH	T	TSOPRIME	6	3	3	2 HSML17	1 CLR010	1 HSM018	1 HSM043

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RMF- File I/O Tuning – VSAM LRU

RMF V1R8 VSAM LRU Overview - SYSPLEX

Line 1 of 2

Command ==>

Scroll == => HALF

Samples: 120 Systems: 2 Date: 10/31/06 Time: 13.25.00 Range: 120 Sec

MVS System	Avg CPU Time	- Buffer Goal	Size High	- Accel %	Reclaim %	----- BMF%	Read CF%	----- DASD%
SYS4								
Below 2GB	0.023	MAX	1M	0.0	0.0	0.0	0.0	0.0
Above 2GB	3.543	MAX	1M	0.0	0.0	97.5	0.0	2.5
SYS5								
Below 2GB	4.457	MAX	1M	0.0	0.0	0.0	0.0	0.0

- Buffer goal limit defaults to 100 MB; can be 1.5 GB max; see IGDSMxx in your PARMLIB for details
- ☹ “Accel %” when LRU aging algorithms were accelerated;
- ☹☹ “Reclaim %” when aging algorithms were to reclaim buffers
- ☺☺☺ “Read BMF%” data found in local buffers
- ☺☺ “Read CF%” data found in Coupling Facility (CF) cache
- ☹ “Read DASD%” data read from DASD

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M3- File I/O Tuning – VSAM RLS

RMF VIR8 VSAM RLS Activity - SYSPLEX Line 1 of 20
Command ==> Scroll == => HALF

Samples: 120 Systems: 2 Date: 10/31/06 Time: 13.25.00 Range: 120 Sec

< 2GB / > 2GB
LRU Status : Good / Accel
Contention % : 0.0 / 0.0
False Cont % : 0.0 / 0.0

VSAM RLS activity by data set.
Also available by Storage Class.

Sphere/DS	Access	Resp Time	----- Read Rate	BMF%	CF%	DASD%	----- Valid%	BMF False	----- Write Rate
BMAI.VSAMIN.MEGA									
BMAI.VSAMIN.MEGA.AIX.DATA									
Below 2GB	DIR	0.003	0.01	0.0	0.0	100	0.0	0.00	0.00
	SEQ	0.000	0.00	0.0	0.0	0.0	0.0	0.00	0.00
Above 2GB	DIR	0.003	0.01	0.0	0.0	100	0.0	0.00	0.00
	SEQ	0.000	0.00	0.0	0.0	0.0	0.0	0.00	0.00
BMAI.VSAMIN.MEGA.AIX.INDEX									
Below 2GB	DIR	0.003	0.03	50.0	0.0	50.0	100	0.00	0.00
	SEQ	0.000	0.00	0.0	0.0	0.0	0.0	0.00	0.00
Above 2GB	DIR	0.003	0.03	50.0	0.0	50.0	100	0.00	0.00
	SEQ	0.000	0.00	0.0	0.0	0.0	0.0	0.00	0.00
BMAI.VSAMIN.MEGA.DATA									
Below 2GB	DIR	0.000	7.45	83.2	0.0	16.8	100	0.00	0.00
	SEQ	0.000	0.00	0.0	0.0	0.0	0.0	0.00	0.00

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NOTES: File I/O Tuning – VSAM RLS

- “**LRU Status**” status of local buffers under Buffer Manager Facility (BMF) control
 - ☺ GOOD = BMF at or below goal
 - ☹ ACCELERATED = buffer aging algorithms accelerated because BMF is over goal
 - ☹☹ RECLAIMED = buffer aging bypassed accelerated because BMF is over goal
- “**BMF Valid %**” percent of BMF reads that were valid
NOTE: BMF read hits are sum of valid and invalid hits. Buffers can be invalid because (A) data altered, or (B) CF lost track of buffer status
 - $\text{BMF READ HIT\%} = \text{BMF READ\%} / \text{BMF VALID\%} * 100$
 - $\text{BMF INVALID READ HIT\%} = \text{BMF READ HIT\%} - \text{BMF READ\%}$





CICS File Control Statistics

- FC Calls total by the 7 types: Get, Get Upd, Browse, Update, Add, Delete, Brws Upd
- VSAM Data component physical I/Os
- VSAM Index component physical I/Os

Recommendation: Tuning Objective is to Maximize ratio of:

Σ FC Calls / (Data + Index I/Os)





CICS VSAM File Control Statistics

File Name	Get Requests	Get Upd Requests	Browse Requests	Update Requests	Add Requests	Delete Requests	Brws Upd Requests	VSAM EXCP Data	Requests Index	RLS req Timeouts
AAAB2SP	34238	0	0	0	0	0	0	22	1	0
BBBACTV	0	27	0	27	376636	0	0	382501	0	0
CCCFNDD	65928	0	0	0	0	0	0	15089	6228	0
DDDIAFD	4767	0	25159	0	0	0	0	12609	148	0
EEEINTX	27088	0	8124	0	0	0	0	3	2	0 ☺
FFFPNDD	17969	5310	0	5310	166	0	0	9905	799	0
GGGSCRX	488	0	0	0	0	0	0	18	59	0
HHHSEGH	33043	43	1712	43	43	0	0	1597	841	0 ☺
IIISEG1	48931	6925	531	2810	6739	4115	0	15537	2862	0
JJJSEG2	23634	745	0	205	745	540	0	1291	1	0
KKKTBLs	537	0	75997	0	0	0	0	525	26	0 ☺
LLLTEST	0	0	0	0	41741	0	0	43761	0	0
MMMULHD	54891	43	0	43	0	0	0	806	453	0 ☺
NNNUNLD	32679	1640	0	1586	53	0	0	7319	2670	0
OOOPCFIL	37752	0	0	0	0	0	0	21	1	0 ☺
TOTALS	427489	18626	155690	13864	459660	4655	0	536868	15546	0

Notes & Recommendations:

1. Totals are greater than all files shown because many files deleted from sample.
2. Focus your tuning to minimize/eliminate VSAM EXCP Requests.
3. ☺ shown next to files with superior performance (least EXCP-s/Request).
4. BBB tuning options: faster IO service, application changes, file attributes,...
5. CCC, DDD, III, NNN appear to be good candidates for data in memory tuning.

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CICS LSR Buffer Pools

- Buffer size
- Number of buffers
- Look-aside hits (This = saved I/Os)
- Buffer reads (I/Os required)
- User-initiated buffer writes (bad for LSR!)
- ☠ Number of requests waited for strings

Recommendation: Maximize 3 & minimize 4 by adding buffers; isolate 5s; minimize 6s!!!





CICS LSR Pools Statistics

LSRPOOLS

Total number of pools built : 17
Peak requests that waited for string : 2
Total requests that waited for string : 125 ☹️ ☠️
Peak concurrently active strings : 6

Shared Buffers

<u>Pool Number</u>	<u>Look- asides</u>	<u>Reads</u>	<u>User writes</u>	<u>Non-user writes</u>
1	644389	48039	4596	0
2	53249	824	0	0 ☺️
3	234800	2568	139	0 ☺️
4	83125	5164	5620	0
5	187335	21327	1658	0
6	23980	10	24460	0
7	397988	7033	12882	0 ☺️
8	86917	1443	1507	0
TOTALS	1711783	86408	50862	0

Recommendations: (1) Minimize/eliminate waits for strings. (2) Add buffers until reads are being reduced significantly. (3) Use multiple LSR pools to separate data from index, and good from poor buffer candidates.

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SMF Type 42 Details - 1

DASD/Xpert

File Help

Analysis | Datasets by Volume | Database by Volume | Cache | Databases | Partitions | Tuning Summary

Volumes

Volume	IO Intensity	IO Chit%	IO Resp	IO Conn	IO Pend	IO Disc	IO Queue	IO Count	Cache Cand	Cache Hits	IO/Sec	Cache Ratio	Write Cand	Write Hits	Write Ratio
DAS137	1.7062	64	28	4	0	13	11	240889	175485	154498	38.2363	88	1165	1110	95
DAS247	0.3747	98	11	3	0	6	2	214629	214127	210581	34.6810	98	736	728	98
DAS143	0.8266	84	21	4	0	11	6	212550	184434	178316	39.3611	96	141	134	95
DAS134	0.7370	92	25	4	0	15	6	185712	179908	171261	29.4781	95	992	966	97
DAS112	0.7701	51	30	3	0	14	13	161711	156953	82467	25.6684	52	83	79	95
DAS117	0.4516	85	16	3	0	8	5	152424	136737	129899	28.2267	94	1737	1730	99
DAS39G	0.3790	80	16	3	0	7	6	127905	109975	102143	23.6861	92	8428	8284	98
DAS108	0.7114	44	36	5	0	11	20	124498	64014	54794	19.7616	85	2937	2934	99
DAS118	0.5528	51	28	6	0	12	10	124380	92395	63461	19.7429	68	489	453	92
DAS39F	0.4028	74	21	3	0	10	8	120843	106381	89830	19.1814	84	4084	3915	95
DAS138	4.2508	87	33	6	0	18	9	109775	96728	95062	121.9722	98	22	20	90
DAS152	0.3421	69	20	3	0	10	7	107770	86877	74073	17.1063	85	2747	2673	97
DAS39S	0.8023	95	7	2	0	2	3	103149	99646	98015	114.6100	98	1598	1539	96
DAS39Q	0.1277	80	8	2	0	2	4	100566	83702	80886	15.9629	96	1557	1477	94
DAS39P	0.1716	89	8	2	0	3	3	96524	88289	85913	21.4498	97	2748	2648	96
DAS144	0.2932	90	20	3	0	12	5	92364	86214	82966	14.6610	96	581	575	98
DAS39N	0.1169	84	8	3	0	3	2	92076	80156	77517	14.6152	96	2618	2491	95

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SMF Type 42 Details - 2

Datasets on volume DAS137:

Database	Object	File	Partition	IO Intensity	IO Chit%	IO Resp	IO Conn	IO Pend	IO Disc	IO Queue	IO Count	Cache Card	Cache Hits	IO/Sec	Cache Ratio	Write Card	Write Hits	Write Ratio
DPOLBQM0	SPURCHS	I0001	A001	0.6052	50	27	8	0	7	12	141223	83180	70355	22.4163	84	929	878	94
DRCLBQM0	SRECDIS	I0001	A014	0.0114	55	26	7	0	8	11	2774	1967	1528	0.4403	77	125	123	98
DCRLBQM0	SCKACTV	I0001	A016	0.0022	51	28	1	0	16	11	485	483	245	0.0770	50	85	84	98
DAPLBQM0	SPREQIT	I0001	A027	0.0007	35	36	1	0	20	15	123	122	43	0.0195	35	22	21	95
DBSTPROD	SSKST	I0001	A007	0.2547	86	18	2	0	5	11	89162	83252	76556	14.1527	91	3	3	100
DRCLBQM0	SRECITM	I0001	A006	0.0010	49	31	5	0	21	5	203	166	99	0.0322	59	1	1	100
DAPLBQM0	SVNDINV	I0001	A009	0.0000	0	43	1	0	33	9	1	1	0	0.0011	0	0	0	0
DEPLBQM0	ITEPITMH	I0001	A002	0.0008	16	39	17	0	17	5	19	5	3	0.0211	60	0	0	0
DMLLBQM0	SWKSCLS	I0001	A039	0.0517	82	27	6	0	4	17	6899	6309	5669	1.9164	89	0	0	0

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SMF Type 42 + RMF Type 74 Details - 1

Total Serv./IO Intensity (mins)	% of Current Total Service	Cummul. % of Current Service	DATA NAME	VOL SER	Sum of All Activity / CPU / File within the Sysplex								
					VOL RATE	FILE UTL	VOL UTL	ALL UTL	RESP MS	CONN MS	DISC MS	PEND MS	IOSQ MS
13.71	6.68%	6.68%	A	1	77.6	45.7	48.8	48.8	16.1	3.6	2.3	0.3	10
6.81	3.32%	10.00%	B	2	40.3	22.7	23.1	23.1	6.5	3.6	2	0.3	0.6
5.88	2.86%	12.86%	C	3	12.2	19.6	19.8	24.4	23.4	3.5	12.7	1	6.3
4.89	2.38%	15.24%	D	4	36.4	16.3	23	23	6.7	1.2	3.3	0.3	1.9
4.65	2.27%	17.51%	E	5	22.4	15.5	15.8	15.8	11.6	4	2.9	0.6	4.1
4.53	2.21%	19.72%	F	6	29.5	15.1	15.3	15.3	8.6	2.2	2.9	0.3	3.2
4.29	2.09%	21.81%	G	7	28	14.3	14.5	14.5	7.6	2.3	2.8	0.4	2
4.29	2.09%	23.90%	H	8	6.4	14.3	14.7	14.7	26.9	2.8	19.5	0.5	4.1
4.23	2.06%	25.96%	I	9	8.9	14.1	14.2	30.7	24.4	3.8	11.9	3.3	5.4
4.20	2.05%	28.00%	J	10	8.9	14	14.2	31.2	26.5	3.8	11.9	3.7	7
4.11	2.00%	30.01%	K	11	36.8	13.7	15.9	15.9	5.2	1.3	2.4	0.3	1.3

Physical IO Activity Details by Sysplex Member																					
VOL SER	VOL RT2	PCT BY2	RSP TM2	IOQ TM2	CON TM2	DISC TM2	PND TM2	VOL RT4	PCT BY4	RSP TM4	IOQ TM4	CON TM4	DISC TM4	PND TM4	VOL RT5	PCT BY5	RSP TM5	IOQ TM5	CON TM5	DISC TM5	PND TM5
1	78.7	48.8	16.5	9.9	3.6	2.6	0.4	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
2	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	40.3	23.1	6.3	0.2	3.7	2.1	0.4
3	0.0	0.0	67.4	0.0	32.7	7.9	26.9	1.0	2.0	26.7	0.5	3.6	15.3	7.3	12.2	19.8	22.0	4.7	3.6	12.7	1.0
4	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	72.5	23.0	5.6	2.1	1.3	1.9	0.4
5	22.4	15.8	10.9	3.1	4.0	3.1	0.7	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
6	29.5	15.3	8.3	2.7	2.2	3.0	0.3	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
7	28.0	14.5	7.4	1.9	2.3	2.8	0.4	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
8	6.6	14.7	26.6	3.7	3.1	19.2	0.6	0.0	0.0	0.7	0.0	0.4	0.0	0.2	0.0	0.0	0.6	0.0	0.4	0.0	0.3
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.8	8.4	22.7	2.8	3.8	10.6	5.5	8.9	14.2	23.6	4.4	3.9	12.0	3.4
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.7	8.6	27.2	5.6	3.9	11.2	6.5	8.9	14.2	24.3	4.6	3.9	12.0	3.7
11	61.3	15.9	4.0	1.1	1.1	1.5	0.4	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

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SMF Type 42 + RMF Type 74 Details - 2

Same analysis is now easier and possible with SMF type 40 and 60 records.

How was this one done?

SMF type 42, file activity records, were collected for durations meaningful for this performance study

RMF type 74, disk activity records, were also collected for durations meaningful for this performance study

For each file activity record, on each OS/390 instance within the Sysplex, a summary record was produced by adding all the specific volume activity segments

The final report was sorted by data name, descending by IO intensity to produce the “80/20” report we were seeking

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The 80/20 of I/O Tuning Analysis

Plan Name	Total Elapsed	Total CPU	CPU / Elapsed	Freq.	Total Time	@25% IOs Saved
P09GI0032	120	18	15%	100	12,000	-2,550
P09GI0003	240	44	18%	100	24,000	-4,900
P09GI0009	80	48	60%	1000	80,000	-8,000
P09GI0018	310	53	17%	100	31,000	-6,425

- In what order would you focus your efforts? Why?
- How many votes for the sequence of 9, 18, 3, 32?
- How many votes for the sequence of 32, 3, 9, 18?





Case of Unstable Performance - 1

- If CPU utilization increased to over 95% during any 30 minute period, DB2 response time would begin to wildly fluctuate.
- CICS, DB2 involved
- Significant DB2 activity generated directly from Internet as well as CICS regions





Case of Unstable Performance – 2

- Where to look?
 - CPU activity reports from various sources showed that utilization was at 100% a lot of the time
 - Degradation analysis reports from various incidents of degradation showed virtually every task within the system as THE suspect cause of the problem
 - IO activity reports did not show unusual activity between the good v. the bad periods





Case of Unstable Performance – 3

So who done it? The Butler of course! In plain view!

WLM Service policy did it!

- All service classes regardless of importance, had velocity goals, and
- The sum of velocity goals of the active service class periods exceeded processor capacity

The fix:

- Introduced response time goals for some service classes
- Used CPU Critical attribute for importance 1 work
- Reduced velocity goals of lower importance work





References

- CICS Information Center – IBM CICS Transaction Server for z/OS Version 4.1
- CICS Performance Guide, SC34-6009
- CICS Performance Management Guide, SC33-1699
- Videos On YouTube (follow CICSfluff):
 - Performance comparison between CICS TS V3.2 and CICS TS V4.1 and CICS TS V4.1 with WLM
 - Threadsafe Analysis with the CICS Explorer and CICS Tools





Be @Next SHARE / Questions?

Join us at the next SHARE in the Spring of 2011.
There will be a plethora of sessions about the latest CICS performance news and the views of the expert presenters.



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