

CICS Performance Tuning Primer – Using DFH0STAT

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- YMMV
- Remember the Political Factor
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Agenda

- **CICS Resources and Tools**
- **What is DFH\$STAT?**
- **Using the STAT Transaction**
- **Report Review**
- **Closing**

CICS Tuning Resources

- CICS provides a series of tools with the basic CICS package that can be used to tune your on-line system
 - End of Day Statistics (EOD)
 - Can be collected at intervals
 - Can be quite bulky
 - STAT transaction
 - Sometimes referred to as “the poor man’s performance tool”
 - CICS supplied transactions
 - For example, CEMT and CETR
 - *Used to display/alter resources and other functions*

What is DFH0STAT?

- DFH\$STAT is the CSD group that contains a series of resources that can be used to print out a CICS statistics report on demand
 - Installation – CEDA INST G(DFH\$STAT)
 - Transaction = STAT
 - Several programs and maps
 - Over 60 different reports can be produced
- Reports spooled to JES
 - SPOOL=YES in SIT
- Information about DFH0STAT reports can be found in the CICS Performance Guide Chapter 38 (CICSTS41)
- **Note: the information provided by the STAT transaction is of value only for the measurement interval**

Using the STAT Transaction

• Sample Program - CICS Statistics Print
07/14/2010 14:57:33

• Type in destination fields if required. Press Enter to print

• Jobname. . . : CICSTS41
• Applid . . . : CICSTS41
• Sysid. . . : CT41

• Node * Type in a valid Node. * is default
• Userid * Type in a valid Userid. * is default
• Class. . . . A Type in a valid Class. A is default

• Abbreviated. . B Type U or N for abbreviated report. B is default

• Current Statistics Settings

• Statistics Recording. : ON Collection Interval . . . : 03:00:00
• Last Reset Time . . . : 12:00:00 Elapsed Time Since Reset. : 02:57:32
• Next Collection . . . : 15:00:00 End-of-Day Time : 00:00:00

• F1=Help F2=Refresh F3=Exit **F4=Report** Selection F5=Print

Key in “STAT”

Important information regarding when statistics are taken and certain fields reset – provides the timing of the information obtained by the STAT transaction

Using the STAT Transaction

```

I STAT
STATUS: RESULTS - OVERTYPE TO MODIFY
Sta On      Int( 030000 ) End( 000000 ) Nex(180000)

RESPONSE: NORMAL          SYSID=CT41 APPLID=CICSTS41
                           TIME: 16.35.38 DATE: 07/11/10
PF 1 HELP   3 END    5 VAR    7 SBH 8 SFH 9 MSG 10 SB 11 SF
  
```

CEMT I STAT

SIT Parameters (Defaults)

STATEOD=0

STATINT=030000

STATRCD=OFF (SET to ON)

Using the STAT Transaction

- Sample Program - CICS Statistics Print Report Selection 07/14/2010 15:03:46
-
- Select the statistics reports required and press 'Enter' to validate
-
- System Status. Y Page Index N
- Storage Manager. Y Dispatcher Y
- Storage Subpools Y Dispatcher MVS TCBS. N
- Loader Y
- Transaction Manager. Y LIBRARYS N
- Transactions N Program Definitions. N
- Transaction Classes. N Programs N
- Programs by DSA and LPA. N
- DFHRPL and LIBRARY Analysis. N
- Temporary Storage. Y Transient Data Y
- Temporary Storage Queues N Transient Data Queues. N
- Temporary Storage Queues by Pool . N
- Temporary Storage Models N
- Logstream Global (System Logs) . . Y
- Files. N Logstreams N
- Data Set Names N Journals N
- LSR Pools. N Coupling Fcty Data Table Pools . . N
-
- F1=Help F3=Return to Print F8=Forward F10=Save F12=Restore

Using the STAT Transaction

- Sample Program - CICS Statistics Print Report Selection 07/14/2010 15:05:33
-
- Select the statistics reports required and press 'Enter' to validate
-
- DB2 Connection N WebSphere MQ Connection. N
- DB2 Entries. N
-
- JVM Pool and Class Cache N Program Autoinstall. N
- JVMs N Terminal Autoinstall and VTAM. N
- JVM Profiles N Connections and Modenames. N
- JVM Programs N TCP/IP N
- JVMSERVERS N TCP/IP Services. N
-
- IPCONNS. N
-
- BUNDLES. N URIMAPS. N
-
- Event Processing N Virtual Hosts. N
- EVENTBINDINGS. N ATOMSERVICES N
- CAPTURESPECS N PIPELINES. N
-
- WEBSERVICES. N
-
- DOCTEMPLATES N
-
- XMLTRANSFORMS. N
-
-
- F1=Help F3=Return to Print F7=Back F8=Forward F10=Save F12=Restore



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Using the STAT Transaction

- Sample Program - CICS Statistics Print
- 07/14/2010 15:10:18
- Type in destination fields if required. Press Enter to print
- Jobname. . . : CICSTS41
- Applid . . . : CICSTS41
- Sysid. . . : CT41
- Node * Type in a valid Node. * is default
- Userid * Type in a valid Userid. * is default
- Class. . . . A Type in a valid Class. A is default
- Abbreviated. . B Type U or N for abbreviated report. B is default
- Current Statistics Settings
- Statistics Recording. : ON Collection Interval . . . : 03:00:00
- Last Reset Time . . . : 15:00:00 Elapsed Time Since Reset. : 00:10:17
- Next Collection . . . : 18:00:00 End-of-Day Time : 00:00:00
- Statistics print successfully completed
- F1=Help F2=Refresh F3=Exit F4=Report Selection F5=Print

Once report selection is made, press PF5 to spool the report to JES

Using the STAT Transaction

```

.
.  Display Filter View Print Options Help
.
.  -----
.  SDSF JOB DATA SET DISPLAY - JOB CICSTS41 (STC02699)   LINE 1-15 (15)
.  COMMAND INPUT ==>                                SCROLL ==> CSR
.  NP   DDNAME   StepName ProcStep DSID Owner    C Dest                Rec-Cnt Page
.
.      JESMSG LG JES2              2 CICSTS41 W                170
.      JESJCL   JES2              3 CICSTS41 W                217
.      JESYSMSG JES2              4 CICSTS41 W                301
.      SYSPRINT CICSTS41          101 CICSTS41 W                 32
.      SYSPRINT CICSTS41          102 CICSTS41 W                 32
.      DFHCXRF  CICSTS41          103 CICSTS41 W                  0
.      MSGUSR   CICSTS41          105 CICSTS41 W             6,082
.      CEEMSG   CICSTS41          106 CICSTS41 W                  0
.      CEEOUT   CICSTS41          107 CICSTS41 W                  0
.      SYSPRINT CICSTS41          109 CICSTS41 W                  0
.      COUT     CICSTS41          119 CICSTS41 W                  0
.      CRPO     CICSTS41          120 CICSTS41 W                  0
.      S0000001 CICSTS41          121 CICSTS41 A LOCAL          1,677
.      S0000003 CICSTS41          123 CICSTS41 A LOCAL          2,426
.      S0000004 CICSTS41          124 CICSTS41 A LOCAL          1,687
.
.  F1=HELP   F2=SPLIT  F3=END    F4=RETURN  F5=IFIND   F6=BOOK
.  F7=UP     F8=DOWN   F9=SWAP   F10=LEFT  F11=RIGHT  F12=RETRIEVE

```

General Report Information

- **Initial reports provide general information about:**
 - System Status
 - Monitoring and Statistics
 - Trace and Dump
- **More detailed performance information**
 - Transaction Manager (XM)
 - Dispatcher (several reports)
 - Storage Manager
 - TCLASS
 - Resource Definition
 - TS and TD
 - LSR and File Control
 - Data Tables
 - DB2

System Status

```

System Status
+-----+
0 MVS Product Name. . . . . : MVS/SP7.0.9
0 CICS Startup. . . . . : COLD
  CICS Status. . . . . : ACTIVE

  VTAM Open Status. . . . . : OPEN
  IRC Status. . . . . : OPEN
  IRC XCF Group Name. . . . . : DFHIR000

Storage Protection. . . . . : ACTIVE
Transaction Isolation. . . . . : INACTIVE
Reentrant Programs. . . . . : PROTECT
Exec storage command checking : ACTIVE

Force Quasi-Reentrant. . . . . : No

Program Autoinstall. . . . . : INACTIVE
Terminal Autoinstall. . . . . : ENABLED

Activity Keypoint Frequency. . . . . : 4,000
Logstream Deferred Force Interval. . . . . : 5

DB2 Connection Name. . . . . : RCTP1
DB2 Connection Status. . . . . : CONNECTED

CICS Transaction Server Level. . . : 04.01.00
MVS Workload Manager (WLM) Mode. . : Goal
WLM Server. . . . . : Yes
WLM Workload Name. . . . . : CICS
WLM Service Class. . . . . : CICSHIV
WLM Report Class. . . . . :
WLM Resource Group. . . . . :
WLM Goal Type. . . . . : Velocity
WLM Goal Value. . . . . : 90
WLM Goal Importance. . . . . : 1
WLM CPU Critical. . . . . : Yes
WLM Storage Critical. . . . . : No

RLS Status. . . . . : RLS=NO
RRMS/MVS Status. . . . . : RRMS=NO

TCP/IP Status. . . . . : OPEN

Max IP Sockets. . . . . : 1,024
Active IP Sockets. . . . . : 2

WEB Garbage Collection Interval. . : 60
Terminal Input Timeout Interval. . : 5

```

Protection Parameters

Provides general information on how your system was initialized and how WLM is going to handle your system

Monitoring and Statistics

Monitoring	Statistics
Monitoring : ON	Statistics Recording : OFF
Exception Class . . : OFF	Statistics Last Reset Time . . : 06:00:52
Performance Class . . : ON	Elapsed Time Since Reset . . . : 09:00:02
Resource Class . . . : OFF	Statistics Interval : 03:00:00
Identity Class . . . : OFF	Next Statistics Collection . . : 00:00:14
Data Compression Option . . . : NO	Statistics End-of-Day Time . . : 00:00:14
Application Naming : NO	Statistics Start Date and Time . . : 04/05/2010 06:00:53.120
RMI Option : YES	Statistics SMF Records : 812
Converse Option : YES	Statistics SMF Writes Suppressed . : 0
Syncpoint Option : NO	Statistics SMF Errors : 0
Time Option : GMT	
DPL Resource Limit : 0	
File Resource Limit : 8	
Tsqueue Resource Limit : 8	
Exception Class Records : 0	
Exception Records Suppressed : 0	
Performance Class Records : 320,112	
Performance Records Suppressed : 0	
Resource Class Records : 0	
Resource Records Suppressed : 0	
Identity Class Records : 0	
Identity Records Suppressed : 0	
Monitoring SMF Records : 2,208	
Monitoring SMF Errors : 0	
Monitoring SMF Records Compressed : 0	Average Compressed Record Length : 0
Monitoring SMF Records Not Compressed . . : 2,208	Average Uncompressed Record Length . . . : 0
Percentage of SMF Records Compressed . . : 0.00%	Average Record Compression Percentage . . : 0.00%

Provides information about how the monitor options are set and how the statistics collection interval is set

Monitoring and Statistics

```

- Monitoring
+
0 Monitoring . . . . . : ON
  Exception Class . . . : OFF
  Performance Class . . : ON
  Resource Class . . . . : OFF
  Identity Class . . . . : OFF

  Data Compression Option . . . : NO

  Application Naming . . . . . : NO
  RMI Option . . . . . : YES

  Converse Option . . . . . : YES
  Syncpoint Option . . . . . : NO
  Time Option . . . . . : GMT
  DPL Resource Limit . . . . . : 0
  File Resource Limit . . . . . : 8
  Tqueue Resource Limit . . . . : 8

  Exception Class Records . . . . . : 0
  Exception Records Suppressed . . . . : 0
  Performance Class Records . . . . . : 320,112
  Performance Records Suppressed . . . . : 0
  Resource Class Records . . . . . : 0
  Resource Records Suppressed . . . . . : 0
  Identity Class Records . . . . . : 0
  Identity Records Suppressed . . . . . : 0
0 Monitoring SMF Records . . . . . : 2,208
  Monitoring SMF Errors . . . . . : 0
0 Monitoring SMF Records Compressed . . . : 0
  Monitoring SMF Records Not Compressed . : 2,208
  Percentage of SMF Records Compressed . : 0.00%

```

```

Statistics

Statistics Recording . . . . . : OFF
Statistics Last Reset Time . . . : 06:00:52
Elapsed Time Since Reset . . . . : 09:00:02

Statistics Interval . . . . . : 03:00:00
Next Statistics Collection . . . : 00:00:14
Statistics End-of-Day Time . . . : 00:00:14

Statistics Start Date and Time . . : 04/05/2010 06:00:53.120

Statistics SMF Records . . . . . : 812
Statistics SMF Writes Suppressed . . : 0
Statistics SMF Errors . . . . . : 0

Average Compressed Record Length . . . : 0
Average Uncompressed Record Length . . : 0
Average Record Compression Percentage . : 0.00%

```

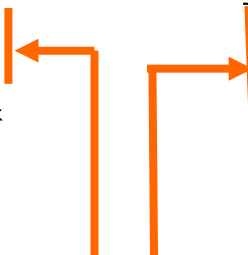
Provides information about how the monitor options and the statistics collection interval is set. Also, you get information regarding the SMF collection records

Trace and Dump Information

Trace Status	Dumps
Internal Trace Status : STARTED	System Dumps : 0
Auxiliary Trace Status. . . . : STOPPED	System Dumps Suppressed. . . . : 0
GTF Trace Status. : STOPPED	
Internal Trace Table Size . . : 4,096K	Transaction Dumps. : 0
Current Auxiliary Dataset . . : A	Transaction Dumps Suppressed . : 0
Auxiliary Switch Status . . . : NEXT	

Trace and Dump Information

Trace Status		Dumps	
+			
0	Internal Trace Status : STARTED		System Dumps : 0
	Auxiliary Trace Status. . . . : STOPPED		System Dumps Suppressed. . . . : 0
	GTF Trace Status. : STOPPED		Transaction Dumps. : 0
	Internal Trace Table Size . . : 4,096K		Transaction Dumps Suppressed . : 0
	Current Auxiliary Dataset . . : A		
	Auxiliary Switch Status . . . : NEXT		



Unneeded trace(s) or excessive
dumps can result in wasted
CPU cycles

Transaction Manager

Provides a picture of how many transactions/second you were handling in the system during the period

```

-Transaction Manager
+
0 Total Accumulated transactions so far. . . : 319,411
0 Accumulated transactions (since reset) . . : 319,411
0 Maximum transactions allowed (MXT) . . . : 42
  Times at MXT . . . . . : 0
  Current Active User transactions . . . . : 10
  Peak Active User transactions. . . . . : 41
  Total Active User transactions . . . . : 319,363
0 Current Running transactions . . . . . : 3
  Current Dispatchable transactions. . . . : 3
  Current Suspended transactions . . . . : 4
  Current System transactions. . . . . : 0
0 Transactions Delayed by MXT. . . . . : 0
  Total MXT queueing time. . . . . : 00:00:00.00000
  Average MXT queueing time. . . . . : 00:00:00.00000
0 Current Queued User transactions . . . . : 0
  Peak Queued User transactions. . . . . : 0
  Total Queueing time for current queued . : 00:00:00.00000
  Average queueing time for current queued : 00:00:00.00000
  
```

Transaction Rate per second. . : 9.85

Used to determine if your MXT is set correctly

General ROTs:

- 1) Peak Tasks should be between 60 and 80% of MXT
- 2) Times at MXT should be less than 1% of Total transactions

Can be used to determine the MXT setting

Dispatcher

- -Dispatcher
- +_____
- 0 Current ICV time :
- Current ICVR time. :
- Current ICVTSD time. :
- Current PRTYAGING time :
- 0 MRO (QR) Batching (MROBTCH) value. :
- 0 Concurrent Subtasking (SUBTSKS) value. :
- - Current number of CICS Dispatcher tasks. :
- Peak number of CICS Dispatcher tasks :
- 0 Current number of TCBs attached. :
- Current number of TCBs in use. :
- 0 Number of Excess TCB Scans :
- Excess TCB Scans - No TCB Detached :
- Number of Excess TCBs Detached :
- Average Excess TCBs Detached per Scan. :
- - Number of CICS TCB MODES :
- 0 Number of CICS TCB POOLS :

200ms
2,500ms
200ms
32,768ms
1
0
29
59
28
13
107
82
62
0
21
5

ICV Values that can
affect CPU time

General ICV ROTs

- 1) ICVR < 1000
- 2) ICV > 3000 or more
- 3) ICVTSD = 0

Do you really want to use these?

If Multiprocessor and VSAM write activity

Dispatcher TCB Modes

TCB Mode	TCBs Attached Current	TCBs Attached Peak	Op. System Waits	Op. System Wait Time	Total TCB Dispatch Time	Total TCB CPU Time	DS TCB CPU Time	TCB CPU/disp Ratio	
0	QR	1	1	24,655,400	0006:23:43.062844	0002:36:18.878064	0002:20:07.468911	0000:03:41.466361	89.6%
	RO	1	1	7,181	0008:58:11.313279	0000:01:50.254182	0000:00:12.550765	0000:00:00.120018	
	CO	0	0	0	0000:00:00.000000	0000:00:00.000000	0000:00:00.000000	0000:00:00.000000	
	SZ	0	0	0	0000:00:00.000000	0000:00:00.000000	0000:00:00.000000	0000:00:00.000000	
	RP	0	0	0	0000:00:00.000000	0000:00:00.000000	0000:00:00.000000	0000:00:00.000000	
	FO	1	1	35,142	0008:52:58.416138	0000:06:47.944607	0000:00:16.950334	0000:00:00.213123	
	SL	1	1	11,159	0008:59:58.443061	0000:00:00.228605	0000:00:00.244073	0000:00:00.129149	
	SO	1	1	290,320	0008:59:25.747502	0000:00:32.923886	0000:00:22.140969	0000:00:01.748812	
	SP	1	1	11	0008:40:26.118153	0000:00:00.025195	0000:00:00.000477	0000:00:00.000224	
	EP	1	1	2	0000:00:00.167656	0000:00:00.000010	0000:00:00.000100	0000:00:00.000100	
	TP	0	0	0	0000:00:00.000000	0000:00:00.000000	0000:00:00.000000	0000:00:00.000000	
	D2	1	1	1,069	0008:59:18.293244	0000:00:01.528309	0000:00:00.354856	0000:00:00.011713	
	JM	0	0	0	0000:00:00.000000	0000:00:00.000000	0000:00:00.000000	0000:00:00.000000	
	S8	2	4	338,753	0036:49:20.424921	0000:01:20.129743	0000:00:27.990805	0000:00:01.878690	
	L8	18	35	33,328,108	0214:40:38.514865	0028:14:32.195820	0000:56:55.425445	0000:03:28.376878	
	L9	0	0	0	0000:00:00.000000	0000:00:00.000000	0000:00:00.000000	0000:00:00.000000	
	J8	0	0	0	0000:00:00.000000	0000:00:00.000000	0000:00:00.000000	0000:00:00.000000	
	J9	0	0	0	0000:00:00.000000	0000:00:00.000000	0000:00:00.000000	0000:00:00.000000	
	X8	0	0	0	0000:00:00.000000	0000:00:00.000000	0000:00:00.000000	0000:00:00.000000	
	X9	0	0	0	0000:00:00.000000	0000:00:00.000000	0000:00:00.000000	0000:00:00.000000	
	T8	0	0	0	0000:00:00.000000	0000:00:00.000000	0000:00:00.000000	0000:00:00.000000	

Things that can affect the CPU to Dispatch Ratio:

- 1) z/OS Priority
- 2) Paging
- 3) Use of z/OS services (SVC)
- 4) Competition from other TCBs in the address space

$\frac{\text{Total TCB CPU Time}}{\text{Total TCB Dispatch time}} * 100$

General CPU to Dispatch Ratio ROT
80%+

Dispatcher MVS TCB Summary

```

• Dispatcher - MVS TCBs
• +-----+
• 0 Dispatcher Start Time and Date . . . . . : 06:00:52.602628 04/05/2010
• 0 Address Space Accumulated CPU Time . . . . : 0003:18:24.029833 (Not Reset)
• Address Space Accumulated SRB Time . . . . : 0000:01:42.455870 (Not Reset)
• 0 Address Space CPU Time (Since Reset) . . . : 0003:18:24.042773
• Address Space SRB Time (Since Reset) . . . : 0000:01:42.453753
• 0
• 0 Current number of CICS TCBs . . . . . : 32
• Current CICS TCB CPU time . . . . . : 02:45:06.88351
• Current CICS TCB Private Stg below 16MB . . . . : 7,712K
• Current CICS TCB Private Stg below 16MB in use . . : 7,610K
• Current CICS TCB Private Stg above 16MB . . . . : 150,148K
• Current CICS TCB Private Stg above 16MB in use . . : 149,287K
• 0 Current number of non-CICS TCBs . . . . . : 5
• Current non-CICS TCB CPU time . . . . . : 00:00:01.10647
• Current non-CICS TCB Private Stg below 16MB . . . . : 880K
• Current non-CICS TCB Private Stg below 16MB in use : 808K
• Current non-CICS TCB Private Stg above 16MB . . . . : 21,196K
• Current non-CICS TCB Private Stg above 16MB in use : 21,067K

```

Provides an overall picture
of the CPU time used by
the region and the virtual
storage usage



Dispatcher MVS TCB Detail

	TCB	CICS		Current TCB		-Private Stg Below 16MB-		-Private Stg Above 16MB-		Task	Tran	Task
	Address	TCB Name	TCB	TCB	CPU Time	Allocated	In Use	Allocated	In Use	Number	ID	Status
+												
0	009FF358	non-cics	No	00:00:00.41246	37.2%	720K	674K	20,488K	20,488K	None		
	009FF040	DFHSIP	Yes	00:00:00.14358	0.0%	7,472K	7,435K	149,148K	149,148K	None		
	009D7898	FO	Yes	00:00:16.95087	0.1%	160K	139K	116K	116K	None		
	009D7570	RO	Yes	00:00:12.55220	0.1%	36K	18K	28K	28K	None		
	009D6968	DFHTRTCB	Yes	00:00:00.00001	0.0%	0K	0K	0K	0K	None		
	009D7248	QR	Yes	02:20:07.52713	84.8%	32K	17K	120K	120K	19,372	STAT	Run
	0097C3F0	DFHSKTSK	Yes	00:00:00.01087	0.0%	8K	0K	8K	8K	None		
	00976160	L8024	Yes	00:00:28.08144	0.2%	0K	0K	24K	24K	None		
	0096ACD8	L801Z	Yes	00:00:33.18823	0.3%	0K	0K	24K	24K	None		
	00913168	L801W	Yes	00:00:53.72164	0.5%	0K	0K	28K	28K	None		
	0090B1E8	L801V	Yes	00:00:55.69113	0.5%	0K	0K	24K	24K	None		
	009120C8	L801T	Yes	00:01:00.31443	0.6%	0K	0K	24K	24K	None		
	00913540	L801S	Yes	00:01:02.81742	0.6%	0K	0K	28K	28K	None		
	0098D040	L801R	Yes	00:00:49.28361	0.4%	0K	0K	24K	24K	None		
	009139A8	L801N	Yes	00:00:43.23549	0.4%	0K	0K	24K	24K	None		
	0097ECD8	L801K	Yes	00:00:44.29004	0.4%	0K	0K	24K	24K	None		
	00912BE0	L801E	Yes	00:00:52.17127	0.5%	0K	0K	24K	24K	None		
	00912538	L801D	Yes	00:00:46.16435	0.4%	0K	0K	24K	24K	None		
	0090B6C8	L801C	Yes	00:01:14.16324	0.7%	0K	0K	24K	24K	None		
	00912300	L8014	Yes	00:02:43.14998	1.6%	0K	0K	24K	24K	None		
	00912770	L8012	Yes	00:02:42.86530	1.6%	0K	0K	24K	24K	None		
	00913BE0	L800T	Yes	00:02:40.05364	1.6%	0K	0K	24K	24K	None		
	0096AE88	L800K	Yes	00:03:29.33088	2.1%	0K	0K	24K	24K	None		
	0097C588	non-cics	No	00:00:00.30631	27.6%	68K	67K	8K	8K	None		
	0097E0F8	non-cics	No	00:00:00.31965	28.8%	68K	65K	8K	8K	None		
	0097E880	L8009	Yes	00:00:00.72501	0.0%	0K	0K	20K	20K	52	CSKL	Run
	00975270	L8005	Yes	00:02:20.05676	1.4%	0K	0K	48K	48K	53	CSK2	Run
	00997180	non-cics	No	00:00:00.05057	4.5%	4K	0K	4K	4K	None		
	00997330	D2000	Yes	00:00:00.35529	0.0%	0K	0K	0K	0K	None		
	00997988	EP	Yes	00:00:00.00010	0.0%	0K	0K	0K	0K	None		
	0099E868	SP	Yes	00:00:00.00054	0.0%	0K	0K	0K	0K	None		
	0099E630	non-cics	No	00:00:00.01745	1.5%	20K	0K	688K	688K	None		
	0099ECD8	SO	Yes	00:00:22.14109	0.2%	4K	0K	140K	140K	None		
	009137F8	S8005	Yes	00:00:02.06147	0.0%	0K	0K	60K	60K	None		
	0099EE88	SL	Yes	00:00:00.24407	0.0%	0K	0K	8K	8K	None		
	00913300	S8004	Yes	00:00:05.59536	0.0%	0K	0K	60K	60K	None		
	009ABDA0	CQ	Yes	00:00:00.00174	0.0%	0K	0K	0K	0K	None		

Provides a breakdown
of CPU and storage use
by TCB



44% of DSA size

% of what is currently allocated
What is important is that the current DSA size is less than the current DSA Limit

SHARE in Boston

Storage Manager -- Above

```

-Storage ABOVE 16Mb
+
0 Private Area Region size above 16Mb . . . . . : 1,860,608K
  Max LSQA/SWA storage allocated above 16Mb (SYS) . . : 22,288K
  Max User storage allocated above 16Mb (EXT) . . . : 167,104K
  Private Area storage available above 16Mb . . . . : 1,671,216K

MVS EPVT Size . . . . . : 1,860,608K
MVS ECSA Size / Allocated . . : 131,724K / 64,528K
MVS ESQA Size / Allocated . . : 22,024K / 16,315K

Requests for MVS storage causing waits . . : 0
Total time waiting for MVS storage . . . : 00:00:00.00000
Current EDSA Limit. . . . . : 131,072K
Current Allocation for EDSAs . : 94,208K
Peak Allocation for EDSAs . . : 94,208K

CICS Trace table size . . . . . : 4,096K
EXT minus Current EDSA Limit. . . . . : 36,032K

-
+
      ECDSA      EUDSA      ESDSA      ERDSA      Totals
Current DSA Size. . . . . : 27,648K      47,104K      1,024K      18,432K      94,208K
Current DSA Used. . . . . : 26,228K      576K      176K      17,828K      44,808K
Current DSA Used as % of DSA. : 94%      1%      17%      96%      47% of EDSA Size
* Peak DSA Used . . . . . : 27,148K      42,112K      272K      17,828K
Peak DSA Size . . . . . : 27,648K      47,104K      1,024K      18,432K
Cushion Size. . . . . : 128K      0K      128K      256K
Free Storage (inc. Cushion) . : 1,420K      46,528K      848K      604K
* Peak Free Storage . . . . . : 1,888K      46,912K      1,024K      1,024K
* Lowest Free Storage . . . . : 500K      4,992K      752K      604K
Largest Free Area . . . . . : 428K      39,936K      848K      604K
Largest Free Area as % of DSA : 1%      84%      82%      3%
Largest Free/Free Storage . . : 0.30      0.85      1.00      1.00
0 Current number of extents . . : 27      5      1      12      45
  Number of extents added . . : 27      5      1      12      45
  Number of extents released. . : 0      0      0      0      0
0 Getmain Requests. . . . . : 16,282,450      68,097,799      16,649      859
Freemain Requests . . . . . : 16,187,258      68,097,765      16,638      9
0 Current number of Subpools. . : 388      21      13      4      426
  Add Subpool Requests. . . . : 319,782      319,415      13      4
  Delete Subpool Requests . . : 319,394      319,394      0      0
0 Times no storage returned . . : 0      0      0      0
  Times request suspended . . : 0      0      0      0
  Current requests suspended. . : 0      0      0      0
  Peak requests suspended . . : 0      0      0      0
  Requests purged while waiting : 0      0      0      0
0 Times Cushion released. . . . : 0      0      0      0      0
  Times Short-On-Storage. . . . : 0      0      0      0      0
Total time Short-On-Storage . : 00:00:00.00000      00:00:00.00000      00:00:00.00000      00:00:00.00000
Average Short-On-Storage time : 00:00:00.00000      00:00:00.00000      00:00:00.00000      00:00:00.00000
0 Storage Violations. . . . . : 0      0      0      0      0
0 Access. . . . . : CICS      USER      USER      READONLY
0 '*' indicates values reset on last DSA Size change

```

Storage Manager -- MEMLIMIT

```

-Storage ABOVE 2GB
+
0 MEMLIMIT Size . . . . . : 3,072M
  MEMLIMIT Set By . . . . . : SMFPRM
0 GETSTOR request size. . . . . : 3,072M
0 Current Address Space active. . . . . : 4M
  Peak Address Space active . . . . . : 4M
0 Current GDSA Active . . . . . : 4M
  Peak GDSA Active. . . . . : 4M
0 Above the bar Cushion Limit . . . . . : 2,918M
  Allocates into the cushion. . . . . : 0
-
+
Current DSA Size. . . . . : 3M
Peak DSA Size . . . . . : 3M
0 Getmain Requests. . . . . : 548,971
  Freemain Requests . . . . . : 548,970
0 Current number of Subpools. . . . . : 4
  Add Subpool Requests. . . . . : 4
  Delete Subpool Requests . . . . . : 0
0 Times no storage returned . . . . . : 0
  Times request suspended . . . . . : 0
  Current requests suspended. . . . . : 0
  Peak requests suspended . . . . . : 0
  Requests purged while waiting : 0
0 Times Short-On-Storage. . . . . : 0
  Total time Short-On-Storage . . . . . : 00:00:00.00000
  Average Short-On-Storage time : 00:00:00.00000
0 Storage Violations. . . . . : 0
0 Access. . . . . : CICS

```

95% of GETSTOR requested (5% available)

There is not much use Above the Bar today. Only one GDSA (GCDSA) is being used. Some of the current subpools are:

- 1) CPSM_64
- 2) EP_64
- 3) ML64GNRL
- 4) PGCSDB
- 5) WU_64

TCLASS

```

-Transaction Classes
+
0  Tclass  Trans Attach Class At  Cur  Peak  Purge  At  Cur  Peak  Accept Accept Purged Purge  Total  Avg.  Avg. Cur
   Name    in TcI in TcI Limit Limit Active Active Thresh Thresh Queued Queued Immed  Queued Immed  Queued Queued Que Time Que Time
+
0  DFHCOMCL 2  0  10  0  0  0  0  0  0  0  0  0  0  0  0  0  00:00.00 00:00.00
   DFHEDFTC 0  0  10  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00:00.00 00:00.00
   DFHTCIND 0  0  10  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00:00.00 00:00.00
   DFHTCL01 1  310 15  0  0  5  0  0  0  0  0  310  0  0  0  0  0  00:00.00 00:00.00
   DFHTCL02 4  0  1  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00:00.00 00:00.00
   DFHTCL03 8  0  2  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00:00.00 00:00.00
   DFHTCL04 0  0  1  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00:00.00 00:00.00
   DFHTCL05 1  438 5  0  0  2  0  0  0  0  0  438  0  0  0  0  0  00:00.00 00:00.00
   DFHTCL06 1 44,957 20 22 1 20 0 0 0 0 25 44,667 290 0 0 290 00:00.35 00:00.00
   DFHTCL07 0  0  10  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00:00.00 00:00.00
   DFHTCL08 2 91,319 10 142 2 10 0 0 0 0 64 90,250 1,069 0 0 1,069 00:02.75 00:00.00
   DFHTCL09 0  0  15  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00:00.00 00:00.00
   DFHTCL10 0  0  1  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00:00.00 00:00.00
   DFHTSDEL 1  0  25  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00:00.00 00:00.00
   NTCLS322 2  0  1  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00:00.00 00:00.00
   NTCLS323 1  0  1  0  0  0  0  0  0  0  0  0  0  0  0  0  0  00:00.00 00:00.00
   NTCLS325 1  52 1  52 0  1  0  0  0  0  0  52  0  0  0  0  0  00:00.00 00:00.00
   NTCLS327 1  9,551 1 6,220 0  1  0  0  0  0  7  6,220 3,331 0 0 3,331 00:00.81 00:00.00
   NTCLS330 1  32 1  32 0  1  0  0  0  0  0  0  0  0  0  0  0  00:00.00 00:00.00
+
Totals 26 46,659
0Transaction Classes : 19
  
```

146,659—truncation error

Verify that the current environment corresponds to the possible historical (inherited) TCLASS definitions

- 1) If peak is consistently below 50% of the class limit, is it needed?
- 2) If system resources are available, is/are the TCLASS needed or should the class limit be increased?
- 3) If class limit is increased, remember to increase available resources such as (E) DSA Limits, strings etc.

Resource Definitions -- TXD

	Tran	Tran	Program	Dynamic	Isolate	Task Data	Attach	Restart	Dynamic	---	Counts	Remote	Storage
0	id	Class	Name			Location/Key	Count	Count	Local	-	Remote	Starts	Viols
+													
0	MI0U		RAMI0U00	Static	Yes	Below/USER	0	0	0	0	0	0	0
	MI0V		RAMI0V00	Static	Yes	Below/USER	0	0	0	0	0	0	0
	MI0W		RAMI0W00	Static	Yes	Below/USER	0	0	0	0	0	0	0
	MI0X		RAMI0X00	Static	Yes	Below/USER	0	0	0	0	0	0	0
	MI0Z		RAMI0Z00	Static	Yes	Below/USER	0	0	0	0	0	0	0
	MI00	DFHTCL06	RAMI0000	Static	Yes	Below/USER	144,960	0	0	0	0	0	0
	MI01		RAMI0100	Static	Yes	Below/USER	0	0	0	0	0	0	0
	MI02		RAMI0200	Static	Yes	Below/USER	0	0	0	0	0	0	0
	MI03		RAMI0300	Static	Yes	Below/USER	0	0	0	0	0	0	0
	MI04		RAMI0400	Static	Yes	Below/USER	0	0	0	0	0	0	0
	MI05	DFHTCL05	RAMI0500	Static	Yes	Below/USER	438	0	0	0	0	0	0
	MI06		RAMI0600	Static	Yes	Below/USER	0	0	0	0	0	0	0
	MI08		RAMI0800	Static	Yes	Below/USER	0	0	0	0	0	0	0
	MI1A		RAMI1A00	Static	Yes	Below/USER	0	0	0	0	0	0	0
	MI1B		RAMI1B00	Static	Yes	Below/USER	0	0	0	0	0	0	0
	MI1D		RAMI1D00	Static	Yes	Below/USER	0	0	0	0	0	0	0
	MI1G		RAMI1G00	Static	Yes	Below/USER	0	0	0	0	0	0	0
	MI1O		RAMI1O00	Static	Yes	Below/USER	0	0	0	0	0	0	0
	MI1S		RAMI1S00	Static	Yes	Below/USER	0	0	0	0	0	0	0
	MI1T		RAMI1T00	Static	Yes	Below/USER	0	0	0	0	0	0	0
	MI11		RAMI1100	Static	Yes	Below/USER	0	0	0	0	0	0	0
	MI12		RAMI1200	Static	Yes	Below/USER	0	0	0	0	0	0	0
	MI14		RAMI1400	Static	Yes	Below/USER	0	0	0	0	0	0	0
	MI2A		RAMI2A00	Static	Yes	Below/USER	0	0	0	0	0	0	0
	MI2B		RAMI2B00	Static	Yes	Below/USER	0	0	0	0	0	0	0
	MI2C		RAMI2C00	Static	Yes	Below/USER	0	0	0	0	0	0	0
	MI2E		RAMI2E00	Static	Yes	Below/USER	0	0	0	0	0	0	0
	MI2I		RAMI2I00	Static	Yes	Below/USER	0	0	0	0	0	0	0
	MI2J		RAMI2J00	Static	Yes	Below/USER	0	0	0	0	0	0	0
	MI2K		RAMI2K00	Static	Yes	Below/USER	0	0	0	0	0	0	0
	MI2N		RAMI2N00	Static	Yes	Below/USER	0	0	0	0	0	0	0
	MI2P		RAMI2P00	Static	Yes	Below/USER	0	0	0	0	0	0	0
	MI2Q		RAMI2Q00	Static	Yes	Below/USER	0	0	0	0	0	0	0

Basic information regarding the transaction definitions including TCLASS assignment, task data location and key, statistics, program associated with the transaction and if any SV exist

Resource Definitions -- TXD

•	-Transaction Totals				
•	+				
•	0	Isolate	Task Data Location/Key	Subspace Usage	Transaction Count Attach Count
•	+				
•	0	Yes	Below/CICS	None	36 149
•		Yes	Any/CICS	None	101 2,159
•		Yes	Below/USER	Unique	2,529 224,899
•		Yes	Any/USER	Unique	327 92,204
•	0	No	Below/CICS	Common	0 0
•		No	Any/CICS	Common	1 2
•		No	Below/USER	Common	2 0
•		No	Any/USER	Common	21 6
•	+				
•		Totals			3,017 319,419

This summary can be used to identify below the line transaction volumes – 70.5% of the transaction executed run below the line

- 1) TCLASS Usage
- 2) Monitor DSA usage below the line
- 3) TRANISO and EXTENT fragmentation (UDSA) below the line

Resource Definition -- Programs

0	Program Name	Concurrency Status	API Status	Times Used	Times Fetched	Total Fetch Time	Average Fetch Time	Libdsn Offset	Times Newcopy	Times Removed	Program Size	Program Location
0	RASI2N00	Quasirent	CICS	734	1	00:00:00.00563	00:00:00.00563	23	0	0	11,080	ERDSA
	RASI2000	Quasirent	CICS	2,022	1	00:00:00.00529	00:00:00.00529	23	0	0	9,128	ERDSA
	RASI2P00	Quasirent	CICS	40	1	00:00:00.02380	00:00:00.02380	23	0	0	2,720	ERDSA
	RASI2Q00	Quasirent	CICS	38,709	1	00:00:00.00200	00:00:00.00200	17	0	0	1,624	ERDSA
	RASI2T00	Quasirent	CICS	4,031	1	00:00:00.00744	00:00:00.00744	17	0	0	7,792	ERDSA
	RASI2W00	Quasirent	CICS	687	1	00:00:00.00916	00:00:00.00916	23	0	0	8,240	ERDSA
	RASI2X00	Quasirent	CICS	2,115	1	00:00:00.39369	00:00:00.39369	23	0	0	7,112	ERDSA
	RASI2Y00	Quasirent	CICS	364	1	00:00:00.00411	00:00:00.00411	23	0	0	10,872	ERDSA
	RASI2Z00	Quasirent	CICS	360	1	00:00:00.00686	00:00:00.00686	23	0	0	12,192	ERDSA
	RASI2100	Quasirent	CICS	90,262	1	00:00:00.00808	00:00:00.00808	17	0	0	15,640	ERDSA
	RASI2200	Quasirent	CICS	755	1	00:00:00.01328	00:00:00.01328	23	0	0	5,984	ERDSA
	RASI2300	Quasirent	CICS	2	1	00:00:00.00936	00:00:00.00936	23	0	0	3,992	ERDSA
	RASI2400	Quasirent	CICS	3,040	1	00:00:00.02072	00:00:00.02072	23	0	0	5,048	ERDSA
	RASI2800	Quasirent	CICS	37	1	00:00:00.00832	00:00:00.00832	23	0	0	4,056	ERDSA
	RASI2900	Quasirent	CICS	5,906	1	00:00:00.01142	00:00:00.01142	17	0	0	18,168	ERDSA
	RASI3A00	Quasirent	CICS	72	1	00:00:00.02667	00:00:00.02667	23	0	0	8,736	ERDSA
	RASI3B00	Quasirent	CICS	662	1	00:00:00.01521	00:00:00.01521	23	0	0	2,168	ERDSA
	RASI3C00	Quasirent	CICS	661	1	00:00:00.01235	00:00:00.01235	23	0	0	3,536	ERDSA
	RASI3D00	Quasirent	CICS	87	1	00:00:00.35411	00:00:00.35411	23	0	0	12,312	ERDSA

In case you want to reduce possible TCB switching on L8 TCBs

A good indication that SOS is around the corner (Early Warning System) when:

- 1) Times fetched > 1
- 2) Times removed > 0

Temporary Storage

-Temporary Storage	
+	
0 Put/Putq main storage requests	2,179,233
Get/Getq main storage requests	2,963,822
Peak storage used for TS Main.	4,693K
Current storage used for TS Main	4,377K
Put/Putq auxiliary storage requests.	270,133
Get/Getq auxiliary storage requests.	270,133
Times temporary storage queue created.	469,227
Peak temporary storage queues in use	966
Current temporary storage queues in use.	925
Items in longest queue	4,297
Control interval size.	4,096
0 Control intervals in the DFHTEMP dataset :	2,699
Peak control intervals used.	13
Current control intervals in use	2
Available bytes per control interval	4,032
Segments per control interval.	63
Bytes per segment.	64
Writes bigger than control interval size :	72
Largest record length written.	6,240
Times auxiliary storage exhausted.	0
Number Temporary storage compressions.	1,404
Put auxiliary / compression ratio.	192.40
0 Temporary storage strings.	20
Peak Temporary storage strings in use.	0
Temporary storage string waits	0
Peak users waiting on string	0
Current users waiting on string.	0
0 Temporary storage buffers.	50
+	
Temporary storage buffer waits	0
Peak users waiting on buffer.	0
Current users waiting on buffer.	0
Temporary storage buffer reads	0
Temporary storage buffer writes.	0
Forced buffer writes for recovery.	0
Format writes.	0
I/O errors on the DFHTEMP dataset.	0
0 Shared Pools defined	0
Shared Pools currently connected	0
Shared temporary storage read requests	0
Shared temporary storage write requests.	0

Things to Monitor:

- 1) % Peak CI in Use = ((Peak CI Used/CIs in DFHTEMP)* 100)
- 2) For DFHTEMP – the look-aside hit ratio
 - 1) ((TS Buffer Reads + TS Buffer Writes) / (PUTQ + GETQ Requests) * 100) – 1
- 3) Writes GT DFHTEMP CISZ
 - 1) (Writes GT than CISZ / PUTQ Requests) * 100

'TSBUFFRS' Storage Subpool	
Storage Subpool Location.	ECDSA
Getmain Requests.	50
Freemain Requests	0
Current Elements	50
Current Element Storage	204,800
Current Page Storage.	200K
% of ECDSA.	0.72%
Peak Page Storage	200K

Note: With an investment of 200K of VS, you got a 100% look-aside hit ratio for 540K PUTQ/GETQ requests – Simulated TS MAIN

Recommended ROTs:

- 1) Look-aside hit ratio > 80%
- 2) Less than 1% (Depends on tolerance level)
 - 1) Wait on strings
 - 2) Wait on buffers
 - 3) Writes GT CISZ
- 3) Format writes = 0%
- 4) Peak CIs in use < 80%
- 5) I/O errors = 0%

Transient Data

•	-Transient Data		
•	+		
•	0	Transient data reads.	0
•		Transient data writes	0
•		Transient data formatting writes.	0
•	0	Control interval size	4,096
•		Control intervals in the DFHINTRA dataset . . .	180
•		Peak control intervals used	1
•		Times NOSPACE on DFHINTRA occurred.	0
•	0	Transient data strings.	3
•		Times Transient data string in use.	0
•		Peak Transient data strings in use.	0
•		Times string wait occurred.	0
•		Peak users waiting on string.	0
•	0	Transient data buffers.	3
•		Times Transient data buffer in use.	0
•		Peak Transient data buffers in use.	0
•		Peak buffers containing valid data.	0
•		Times buffer wait occurred.	0
•		Peak users waiting on buffer.	0
•	0	I/O errors on the DFHINTRA dataset.	0

LSR POOL – General Statistics

```

-LSR Pools
+
0 Pool Number : 1      Time Created : 06:01:30.16572
+
0 Maximum key length . . . . . : 255
  Total number of strings . . . . : 50
  Peak concurrently active strings : 19
  Total requests waited for string : 0
  Peak requests waited for string : 0
0 Buffer Totals
+
0 Data Buffers . . . . . : 264
  Hipspace Data Buffers . . . . : 0
    Successful look asides . . . : 14,435,465
    Buffer reads . . . . . : 3,242,233
    User initiated writes . . . . : 1,249,222
    Non-user initiated writes . . : 91
    Successful Hipspace CREADS . . : 0
    Successful Hipspace CWRITES . . : 0
    Failing Hipspace CREADS . . . : 0
    Failing Hipspace CWRITES . . . : 0
  Index Buffers . . . . . : 264
  Hipspace Index Buffers . . . . : 0
    Successful look asides . . . : 28,749,115
    Buffer reads . . . . . : 1,532,816
    User initiated writes . . . . : 36,682
    Non-user initiated writes . . : 0
    Successful Hipspace CREADS . . : 0
    Successful Hipspace CWRITES . . : 0
    Failing Hipspace CREADS . . . : 0
    Failing Hipspace CWRITES . . . : 0

```

Look-Aside Hit Ratio: (Data/Index and Combined)

$LAHR = ((\text{Successful Look-Asides} / (\text{Successful Look-Asides} + \text{Buffer Reads})) * 100$

$LAHR (\text{Data}) = ((14435465 / (14435465 + 3242233)) * 100 = 81.7\%$

$LAHR (\text{Index}) = ((28749115 / (28749115 + 1532816)) * 100 = 94.9\%$

$LAHR (\text{Combined}) = (((14435465 + 28749115) / (17677698 + 30281931)) * 100 = 90.0\%$

Recommended ROTs:

Data LAHR > 80%

Index LAHR > 95%

Combined LAHR > 93%

LSR Pool – Buffer Statistics

Data Buffer Statistics										
	Buffer Size	No. of Buffers	Hiperspace Buffers	Look Asides	Buffer Reads	User Writes	Non-User Writes	Look-Aside Ratio	Successful CREADS/CWRITES	Failing CREADS/CWRITES
0	512	16	0	91,544	52,553	0	0	63.5%	0	0
+	1024	32	0	30,269	8,362	9,218	0	78.3%	0	0
0	2048	16	0	26	13	4	0	66.6%	0	0
+	4096	128	0	10,259,628	2,242,816	402,277	0	82.0%	0	0
0	8192	16	0	1,236,457	18,910	2,691	0	98.4%	0	0
+	12288	32	0	1,655,653	617,212	3,877	0	72.8%	0	0
0	16384	4	0	16	3	0	0	84.2%	0	0
+	20480	8	0	632,653	1,625	629,759	0	99.7%	0	0
0	24576	4	0	4,224	6,837	228	0	38.1%	0	0
+	28672	4	0	10,262	19,358	21	0	34.6%	0	0
0	32768	4	0	514,733	274,544	201,147	91	65.2%	0	0

Which buffers should you adjust in order to improve the overall LAHR for the data?
Two choices:

- 1) Improve those buffers that are not meeting the ROT % (80%)
- 2) Improve those buffers that have the highest number of buffer reads

Note: Not meeting an LAHR may not necessarily indicate that more buffers are needed to improve the situation. For example, the 2K buffer only has a 66.6% LAHR with 16 buffers defined. As there were only 13 buffer reads, adding more buffers will have no effect as the problem lies in increased activity against this buffer

LSR Pool – Buffer Statistics

0	Index Buffer Statistics									
+										
0	Buffer Size	No. of Buffers	Hiperspace Buffers	Look Asides	Buffer Reads	User Writes	Non-User Writes	Look-Aside Ratio	Successful CWRITES/CREADS	Failing CREADS/CWRITES
+										
0	512	64	0	9,655,849	446,933	24,625	0	95.5%	0	0
•	1024	32	0	6,163,105	93,115	36	0	98.5%	0	0
•	2048	96	0	7,543,377	956,306	9,163	0	88.7%	0	0
•	4096	32	0	4,520,461	25,930	2,361	0	99.4%	0	0
•	8192	16	0	847,119	10,530	497	0	98.7%	0	0
•	12288	4	0	19,204	2	0	0	99.9%	0	0
•	16384	4	0	0	0	0	0	0.0%	0	0
•	20480	4	0	0	0	0	0	0.0%	0	0
•	24576	4	0	0	0	0	0	0.0%	0	0
•	28672	4	0	0	0	0	0	0.0%	0	0
•	32768	4	0	0	0	0	0	0.0%	0	0

Which buffers should you adjust in order to improve the overall LAHR for the index?
Two choices:

- 1) Improve those buffers that are not meeting the ROT % (95%)
- 2) Improve those buffers that have the highest number of buffer reads

File Statistics

Files													
+													
0	Filename	Access Method	File Type	Remote Filename	Remote System	LSR Pool	RLS	Data Table Type	CFDT PoolName	Table Name	Recovery Status	Str-ings	<- Buffers-> Index Data
+													
0	ACPS00	VSAM				1	No				NotRecoverable	1	0 0
	ACPS01	VSAM				1	No				NotRecoverable	1	0 0
	ACPS02	VSAM				1	No				NotRecoverable	1	0 0
	ACRA00	VSAM	KSDS			1	No				NotRecoverable	1	0 0
	ACRA02	VSAM	KSDS			1	No				NotRecoverable	3	0 0
	ACSC00	VSAM				1	No				NotRecoverable	2	0 0
	AJRD10	VSAM				1	No				NotRecoverable	2	0 0
	AJRD10A	VSAM				1	No				NotRecoverable	2	0 0
	AJRD20	VSAM				1	No				NotRecoverable	1	0 0
	AJRD20A	VSAM				1	No				NotRecoverable	1	0 0
	AJRD30	VSAM				1	No				NotRecoverable	2	0 0
	ALDB10	VSAM				1	No				NotRecoverable	1	0 0
	APDB01	VSAM				1	No				NotRecoverable	1	0 0
	APDB02	VSAM				1	No				NotRecoverable	1	0 0
	APDB03	VSAM				1	No				NotRecoverable	1	0 0
	APDB04	VSAM				1	No				NotRecoverable	1	0 0
	APDB05	VSAM				1	No				NotRecoverable	1	0 0
	APDB06	VSAM				1	No				NotRecoverable	1	0 0
	APDB07	VSAM				1	No				NotRecoverable	1	0 0
	AWDB00	VSAM	KSDS			1	No				NotRecoverable	1	0 0
	AWDB01	VSAM	KSDS			1	No				NotRecoverable	1	0 0
	AWDB02	VSAM	KSDS			1	No				NotRecoverable	1	0 0
	AWDB03	VSAM	KSDS			1	No				NotRecoverable	1	0 0
	AWDB04	VSAM	KSDS			1	No				NotRecoverable	1	0 0
	AWDB05	VSAM	KSDS			1	No				NotRecoverable	1	0 0

General File Information

Missing information such as total number of records, CISZ (data and index) to be useful for tuning purposes

File Statistics

0	Filename	Read Requests	Get Update Requests	Browse Requests	Browse Updates	Add Requests	Update Requests	Delete Requests	RLS Req. Timeouts	<--- String Waits --->	Total	HMM
+												
0	COUNTY	429	0	0	0	0	0	0	0	0	0	0
	CRACAD	0	0	0	0	0	0	0	0	0	0	0
	CRACORSE	0	0	0	0	0	0	0	0	0	0	0
	CRDBAF	0	0	0	0	0	0	0	0	0	0	0
	CRDBAS	0	0	0	0	0	0	0	0	0	0	0
	CRDBAU	0	0	0	0	0	0	0	0	0	0	0
	CRDBA1	0	0	1,816	0	0	0	0	0	0	0	0
	CRDBA1P	7	0	281	0	0	0	0	0	0	0	0
	CRDBA2	0	0	0	0	0	0	0	0	0	0	0
	CRDBA3	0	0	0	0	0	0	0	0	0	0	0
	CRDBA4	0	0	0	0	0	0	0	0	0	0	0
	CRDBA5	0	0	0	0	0	0	0	0	0	0	0
	CRDBA7	0	0	0	0	0	0	0	0	0	0	0
	CRDBA8	0	0	0	0	0	0	0	0	0	0	0
	CRDBA9	0	0	0	0	0	0	0	0	0	0	0
	CRDBB1	0	0	0	0	0	0	0	0	0	0	0
	CRDBB2	0	0	0	0	0	0	0	0	0	0	0
	CRDBB3	0	0	0	0	0	0	0	0	0	0	0
	CRDBB4	0	0	0	0	28	0	0	0	0	0	0
	CRDBB5	5	0	0	0	0	0	0	0	0	0	0
	CRDBB6	3	0	0	0	0	0	0	0	0	0	0
	CRDBB7	8	0	0	0	0	0	0	0	0	0	0
	CRDBB9	0	0	832	0	0	0	0	0	0	0	0
	CRDBC1	0	0	0	0	0	0	0	0	0	0	0
	CRDBC2	0	0	0	0	0	0	0	0	0	0	0
	CRDBC3	0	0	0	0	0	0	0	0	0	0	0
	CRDBC3P	0	0	0	0	0	0	0	0	0	0	0
	CRDBC4	327	0	327	0	0	0	0	0	0	0	0
	CRDBC7	0	0	0	0	0	0	0	0	0	0	0
	CRDBC8	957,040	132	448	0	1	14	0	0	0	0	0

Missing EXCP (data and index) information for tuning purposes

File Statistics

0	Filename	Read Requests	Get Update Requests	Browse Requests	Browse Updates	Add Requests	Update Requests	Delete Requests	RLS Req. Timeouts	<--- String Waits ---> Total	HMM
+	CRDB00	115	7	22	0	0	7	0	0	0	0
	CRDBPR	15	0	0	0	0	0	0	0	0	0
	CRDBSA	0	0	0	0	0	0	0	0	0	0
	CRDBSC	0	0	0	0	0	0	0	0	0	0
	CRDBSF	2,599,426	8,422	9	0	0	7,078	0	0	0	0
	CRDBSS	25,880	156	1	0	0	155	0	0	0	0
	CRDBSU	837,215	3,042	54	0	0	2,666	0	0	0	0
	CRDB02	8,248	260	0	0	50	176	0	0	0	0
	CRDB03	2	0	0	0	0	0	0	0	0	0
	CRDB06	0	0	0	0	0	0	0	0	0	0
	CRDB07	80,844	2,284	2	0	4	2,095	6	0	0	0
	CRDB09	0	0	0	0	0	0	0	0	0	0
	CRDB10	13	10	0	0	0	2	0	0	0	0
	CRDB11	0	0	0	0	0	0	0	0	0	0
	CRDB12	14,533	80	7	0	39	65	2	0	0	0
	CRDB14	5,292	0	0	0	0	0	0	0	0	0
	CRDB15	35	10	0	0	0	1	0	0	0	0
	CRDB17	0	0	0	0	0	0	0	0	0	0
	CRDB18	35	10	0	0	0	0	0	0	0	0

Without EXCP counts makes it difficult to identify poorly buffered files

Data Tables

0	Filename	Read Requests	Get Update Requests	Browse Requests	Browse Updates	Add Requests	Update Requests	Delete Requests	RLS Req. Timeouts	<--- String Waits --->	
										Total	HMM
	EZACACHE	0	0	4	0	0	0	0	0	0	0
0	Filename	Successful Reads	Records Not Found	Adds via Read	Adds via API	Adds Rejected	Adds Full	Rewrite Requests	Delete Requests	Read Retries	Chng Resp/ Lock Waits
+											
0	EZACACHE	5,139	0	0	5	0	0	85	0	0	0
0	Filename Type	Current Records	Peak Records	<----- Total ----->		<----- Entries ----->		<----- Index ----->		<----- Data ----->	
				Storage Allocated	Storage In-Use	Storage Allocated	Storage In-Use	Storage Allocated	Storage In-Use	Storage Allocated	Storage In-Use
+											
0	EZACACHE USER	8	8	192	5	32	3	32	1	128	1

DB2 Connection

```

DB2 Connection
+
0 DB2 Connection Name . . . . . : RCTP1
  DB2 Group Id . . . . . :
  DB2 Sysid . . . . . : DB0P
  DB2 Release . . . . . : 8.1.0
0 DB2 Connection Status . . . . . : CONNECTED
  DB2 Connection Error . . . . . : SQLCODE
  DB2 Standby Mode . . . . . : RECONNECT
0 DB2 Pool Thread Plan Name . . . . . : WHATPLAN
  DB2 Pool Thread Dynamic Plan Exit Name . . . . . :
0 Pool Thread Authtype . . . . . : USERID
  Pool Thread Authid . . . . . :
0 Signid for Pool/Entry/Command Threads . . . . . : NERCICS
  Create Thread Error . . . . . : ABEND
  Protected Thread Purge Cycle . . . . . : 00.30
  Deadlock Resolution . . . . . : ROLLBACK
  Non-Terminal Intermediate Syncpoint . . . . . : NORELEASE
  Pool Thread Wait Setting . . . . . : WAIT
0 Pool Thread Priority . . . . . : LOW
0 Current Connection Limit (TCB Limit) . . . . . : 50
  Current number of Connections with a TCB . . . . . : 1
  Peak number of Connections with a TCB . . . . . : 28
0 Current number of tasks on Conn Readyq . . . . . : 0
  Peak number of tasks on Conn Readyq . . . . . : 0
0 Pool Thread Limit . . . . . : 12
  Current number of Pool Threads . . . . . : 0
  Peak number of Pool Threads . . . . . : 5
  Number of Pool Thread Waits . . . . . : 0
  Current number of Pool Tasks . . . . . : 0
  Peak number of Pool Tasks . . . . . : 0
  Current Total number of Pool Tasks . . . . . : 0
  Current number of Tasks on Pool Readyq . . . . . : 0
  Peak number of Tasks on Pool Readyq . . . . . : 0
  Current number of DSNB Command threads . . . . . : 0
  Peak number of DSNB Command threads . . . . . : 0
  DSNB Command Thread Limit . . . . . : 1

Resync Group Member . . . . . : N/A

DB2 Connect Date and Time . . . : 04/05/2010 06:01:29.87862

Command Thread Authtype . . . . . : USERID
Command Thread Authid . . . . . :
Message TD Queue 1 . . . . . : CSMT
Message TD Queue 2 . . . . . :
Message TD Queue 3 . . . . . :
Statistics TD Queue . . . . . : CSSL
DB2 Accounting records by . . . . . : TXID

Current number of Connections without a TCB : 26

Number of Calls using Pool Threads . . . . . : 0
Number of Pool Thread Signons . . . . . : 0
Number of Pool Thread Partial Signons . . . . . : 0
Number of Pool Thread Commits . . . . . : 0
Number of Pool Thread Aborts . . . . . : 0
Number of Pool Thread Single Phase . . . . . : 0
Number of Pool Thread Creates . . . . . : 14,039
Number of Pool Thread Reuses . . . . . : 0
Number of Pool Thread Terminates . . . . . : 14,039

Number of DSNB Command Calls . . . . . : 0
Number of DSNB Command Signons . . . . . : 0
Number of DSNB Command Thread Creates . . . . . : 0
Number of DSNB Command Thread Terminates . . . . . : 0
Number of DSNB Command Thread Overflows . . . . . : 0

```

DB2 Entries

```

DB2 Entries
+-----+
0 DB2Entry Name. . . . . : BASJ001P
  DB2Entry Static Plan Name. . . . . : BASJ001P
  DB2Entry Dynamic Plan Exit Name. . . . . :
  Dynamic Plan Exit Concurrency Status . . . . . :
0 DB2Entry Authtype. . . . . : N/A
  DB2Entry Authid. . . . . : O@BY6#M

  DB2Entry Thread Wait Setting . . . . . : POOL
  DB2Entry Thread Priority . . . . . : LOW
  DB2Entry Thread Limit. . . . . : 0
  Current number of DB2Entry Threads . . . . . : 0
  Peak number of DB2Entry Threads . . . . . : 0

  DB2Entry Protected Thread Limit. . . . . : 0
  Current number of DB2Entry Protected Threads . . . . . : 0
  Peak number of DB2Entry Protected Threads . . . . . : 0
0 Current number of DB2Entry Tasks . . . . . : 0
  Peak number of DB2Entry Tasks . . . . . : 5
  Current Total number of DB2Entry Tasks . . . . . : 11,358
0 Current number of Tasks on DB2Entry Readyq . . . . . : 0
  Peak number of Tasks on DB2Entry Readyq . . . . . : 0

DB2Entry Status . . . . . : ENABLED
DB2Entry Disabled Action. . . . . : POOL
DB2Entry Deadlock Resolution. . . . . : ROLLBACK

DB2Entry Accounting records by. . . . . : TXID

  Number of Calls using DB2Entry. . . . . : 212,124
  Number of DB2Entry Signons. . . . . : 2,504
  Number of DB2Entry Partial Signons. . . . . : 2,240
  Number of DB2Entry Commits. . . . . : 0
  Number of DB2Entry Aborts . . . . . : 0
  Number of DB2Entry Single Phase . . . . . : 40,170
  Number of DB2Entry Thread Creates . . . . . : 0
  Number of DB2Entry Thread Reuses. . . . . : 0
  Number of DB2Entry Thread Terminates. . . . . : 0
  Number of DB2Entry Thread Waits/Overflows . . . . . : 11,358

```

Average # of CALLs = (# of CALLs using DB2Entry / Current # of DB2ENTRY Tasks)

Avg. # of CALLs = 212124 / 11368 = 18.66

DB2 Entries

```

-DB2 Entries
+
0 DB2Entry Name. . . . . : RASIGATA
  DB2Entry Static Plan Name. . . . . : RASIGATA
  DB2Entry Dynamic Plan Exit Name. . . . . :
  Dynamic Plan Exit Concurrency Status . . . . . :
0 DB2Entry Authtype. . . . . : USERID
  DB2Entry Authid. . . . . :

  DB2Entry Thread Wait Setting . . . . . : POOL

  DB2Entry Thread Priority . . . . . : LOW
  DB2Entry Thread Limit. . . . . : 6
  Current number of DB2Entry Threads . . . . . : 1
  Peak number of DB2Entry Threads. . . . . : 6

  DB2Entry Protected Thread Limit. . . . . : 3
  Current number of DB2Entry Protected Threads . . . : 2
  Peak number of DB2Entry Protected Threads. . . . : 3
0 Current number of DB2Entry Tasks . . . . . : 1
  Peak number of DB2Entry Tasks. . . . . : 8
  Current Total number of DB2Entry Tasks . . . . . : 74,252
0 Current number of Tasks on DB2Entry Readyq . . . : 0
  Peak number of Tasks on DB2Entry Readyq. . . . . : 0

DB2Entry Status . . . . . : ENABLED
DB2Entry Disabled Action. . . . . : POOL
DB2Entry Deadlock Resolution. . . . . : ROLLBACK

DB2Entry Accounting records by. . . . . : TXID

Number of Calls using DB2Entry. . . . . : 750,289
Number of DB2Entry Signons. . . . . : 53,886
Number of DB2Entry Partial Signons. . . . . : 543
Number of DB2Entry Commits. . . . . : 0
Number of DB2Entry Aborts . . . . . : 0
Number of DB2Entry Single Phase . . . . . : 74,258
Number of DB2Entry Thread Creates . . . . . : 356
Number of DB2Entry Thread Reuses. . . . . : 73,895
Number of DB2Entry Thread Terminates. . . . . : 353
Number of DB2Entry Thread Waits/overflows . . . : 1

```

Using protected threads increases the Reuse count and reduces the number of thread waits/overflow count

User Exit Programs

<---- Global Area ---->											
Program Name	Entry Name	Entry Name	Length	Use Count	No. of Exits	Program Status	Exit Program Use Count	LIBRARY Name	LIBRARY Dataset Name		
0	DFHEDP	DLI	0	0	0	Started	0				
0	DFHLETRU	DFHQSTRU	0	0	0	Started	0	DFHRPL	CICS.USER.SDFHLOAD		
0	DFHD2EX1	DSNCSQL	16	1	0	Started	14,222,338				
0	KOCOME00	KOCOME00	108	1	0	Started	639,032	DFHRPL	CICS.OMON.PROD.AUTH		
0	KOCOME00	GLUEEXIT	128	1	1	Started	320,232	DFHRPL	CICS.OMON.PROD.AUTH		
0	DFHXTENF	DFHXTENF	0	0	2	Started	16	DFHRPL	CICS.USER.SDFHLOAD		
0	GEXTSRQ6	GEXTSRQ6	0	0	1	Started	7,257,413	DFHRPL	CICS.INT.V660.LOADLIB3		
0	EZACIC01	EZACIC01	568	1	0	Started	10,047,715	DFHRPL	SYS1.SEZATCP		

Program Name	Entry Name	API	Program Concurrency	Concurrency Status	Qualifier	Length	<----- Task Related User Exit Options ----->					
							Taskstart	EDF	Shutdown	Indoubt	SPI	Purgeable
0	DFHEDP	DLI	Cics	Quasirent	Quasirent	284	No	No	No	No Wait	No	No
0	DFHLETRU	DFHQSTRU	open	Threadsafe	Threadsafe	32	No	No	No	No Wait	No	No
0	DFHD2EX1	DSNCSQL	open	Quasirent	Threadsafe	222	No	Yes	Yes	Wait	Yes	Yes
0	KOCOME00	KOCOME00	Cics	Threadsafe	Threadsafe	1,392	Yes	No	Yes	No Wait	No	No
0	KOCOME00	GLUEEXIT	Cics	Threadsafe	Threadsafe	0	No	No	No	No Wait	No	No
0	DFHXTENF	DFHXTENF	Cics	Quasirent	Quasirent	0	No	No	No	No Wait	No	No
0	GEXTSRQ6	GEXTSRQ6	Cics	Threadsafe	Threadsafe	0	No	No	No	No Wait	No	No
0	EZACIC01	EZACIC01	open	Quasirent	Threadsafe	828	No	No	Yes	No Wait	No	No



Threadsafe is important to reduce TCB switching

Global Exit Programs

• +_Global User Exits

0	Exit Name	Program Name	Entry Name	<----- Global Area -----> Entry Name Length Use Count	Number of Exits	Program Status	Program Concurrency	Concurrency Status
+								
0	XMNOUT	KOCOME00	GLUEEXIT	GLUEEXIT 128 1	1	Started	Threadsafe	Threadsafe
0	XALTENF	DFHXTEF	DFHXTEF	0 0	2	Started	Quasirent	Quasirent
0	XICTENF	DFHXTEF	DFHXTEF	0 0	2	Started	Quasirent	Quasirent
0	XTSEREQ	GEXTSRQ6	GEXTSRQ6	0 0	1	Started	Threadsafe	Threadsafe



Threadsafe is important to reduce TCB switching

Closing

- There are many other reports not covered in this presentation
- The information provided helps with some basic tuning
 - Some of the tuning decisions would require the review of several DFH0STAT reports
 - Can be very voluminous if the individual resources are printed, especially in a large system
- Recommend that specific reports be selected
 - Depending on the circumstance, you may have to alter the interval period
- Remember, you are only reviewing the information since the last statistics reset