

# CICS Transaction Server for z/OS Monitoring and Statistics

Chris Baker  
CICS Development

Session 4932A

impact·venture \*

© IBM Corporation 2007. All Rights Reserved.

The workshops, sessions and materials have been prepared by IBM or the session speakers and reflect their own views. They are provided for informational purposes only, and are neither intended to, nor shall have the effect of being, legal or other guidance or advice to any participant. While efforts were made to verify the completeness and accuracy of the information contained in this presentation, it is provided AS IS without warranty of any kind, express or implied. IBM shall not be responsible for any damages arising out of the use of, or otherwise related to, this presentation or any other materials. Nothing contained in this presentation is intended to, nor shall have the effect of, creating any warranties or representations from IBM or its suppliers or licensors, or altering the terms and conditions of the applicable license agreement governing the use of IBM software.

References in this presentation to IBM products, programs, or services do not imply that they will be available in all countries in which IBM operates. Product release dates and/or capabilities referenced in this presentation may change at any time at IBM's sole discretion based on market opportunities or other factors, and are not intended to be a commitment to future product or feature availability in any way. Nothing contained in these materials is intended to, nor shall have the effect of, stating or implying that any activities undertaken by you will result in any specific sales, revenue growth or other results.

Performance is based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput or performance that any user will experience will vary depending upon many factors, including considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve results similar to those stated here.

All customer examples described are presented as illustrations of how those customers have used IBM products and the results they may have achieved. Actual environmental costs and performance characteristics may vary by customer.

The following are trademarks of the International Business Machines Corporation in the United States and/or other countries. For a complete list of IBM trademarks, see [www.ibm.com/legal/copytrade.shtml](http://www.ibm.com/legal/copytrade.shtml)  
AIX, CICS, CICSplex, DB2, DB2 Universal Database, IBM, the IBM logo, IMS, Lotus, MQSeries, OMEGAMON, OS/390, Parallel Sysplex, QMF, RACF, Redbooks, Sametime, SupportPac, System z, Tivoli, WebSphere, z/OS, and zSeries.

Java and all Java-based trademarks are trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.  
Microsoft and Windows are trademarks of Microsoft Corporation in the United States, other countries, or both.  
Intel and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.  
UNIX is a registered trademark of The Open Group in the United States and other countries.  
Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

Other company, product, or service names may be trademarks or service marks of others.

## Presentation Overview

- What's New in Monitoring and Statistics in CICS TS V3.2
- System Initialization Parameters
- Monitoring Control Table (MCT)
- Monitoring Data Enhancements
  - New/Changed Performance Class data
- Statistics Data Enhancements
  - Library, IP Connectivity, WebSphere MQ Connection, ...
- Interface to Statistics and Monitoring Data
  - EXEC CICS COLLECT / EXTRACT STATISTICS commands
- Sample Programs and Utilities Enhancements
  - DFH\$MOLS, DFH0STAT, DFHSTUP, ...
  - DFH0STXR – Statistics Event Reporter
- Summary

## New in Monitoring and Statistics in CICS TS V3.2

- Monitoring Data Enhancements
  - Monitoring Clock field precision and capacity
  - Monitoring SMF 110 Record Compression support
- New CICS Supplied Transaction - CEMN
- New/Updated Monitoring Data
  - IP Connectivity, Transaction Origin Data, WebSphere MQ, ...
- New/Updated Statistics Data
  - Library, IP Connectivity, WebSphere MQ Connection, ...
  - Doctemplate, Storage Manager, Loader, Programs, ...
- Utilities
  - DFH\$MOLS – Expand Function, Report Format Enhancements
  - DFH0STAT/DFHSTUP – New/Updated Reports

## System Initialization Parameters - Statistics

- STATRCD=OFF|ON
  - Only prevents Interval Statistics (INT) records being written to SMF!
  - End-of-Day Statistics (EOD) records and ...
  - Unsolicited Statistics (USS) records and ...
  - Requested Statistics (REQ and RRT) records ...
    - Are always written to SMF!
- STATINT=hhmmss (0-235959)
  - Statistics Interval - Default 030000 (3 Hrs)
- STATEOD=hhmmss (000100-240000)
  - Statistics End-of-Day - Default 000000 (Midnight)
- CEMT or EXEC CICS INQ|SET STATISTICS
  - OFF|ON, RESetnow, RECordnow, Interval, Endofday
- Ensure that the Statistics collection intervals are consistent with your reporting requirements!

## System Initialization Parameters - Monitoring

- System Initialization Parameters ...
  - MCT=NO (means "default" MCT)
  - MN=OFF|ON
  - MNEXC=OFF|ON, MNRES=OFF|ON and MNPER=OFF|ON
  - MNCONV=NO|YES and MNSYNC=NO|YES
  - MNTIME=GMT|LOCAL
  - MNFREQ=0|000100-240000
- CEMT INQ|SET .. EXEC CICS INQ|SET MONITOR
- CEMT INQ or EXEC CICS INQUIRE MONITOR
  - Time

## Monitoring Control Table (MCT)

- Defines additional Monitoring options ...
  - Application Naming support
  - Resource Manager Interface (RMI) Extensions support
  - Resource Class Monitoring ...
    - File and Tsqueue Resource Limit values
  - Monitoring SMF 110 Record Compression support (V3.2)
  - EXCLUDE or INCLUDE any performance class data fields
  - User Event Monitoring Points (EMPs), DBCTL EMPs, ...
- Sample Monitoring Control Tables (MCT) provided
  - TOR, AOR, AOR with DBCTL, FOR, ...

## Monitoring Control Table (MCT) ...

- Monitoring Control Table (MCT) ...
  - Application Naming and RMI Extensions support ...  
DFHMCT TYPE=INITIAL,APPLNAME=NO|YES,RMI=NO|YES
  - File and Tsqueue Resource Limit values ...  
DFHMCT TYPE=INITIAL,FILE=8|nn,TSQUEUE=8|nn
  - File Resource Limit maximum value of 64 files
  - Tsqueue Resource Limit maximum value of 64 tsqueues

```
DFHMCT TYPE=INITIAL, SUFFIX=xx, APPLNAME=YES, RMI=YES, FILE=32, TSQUEUE=8
...
DFHMCT TYPE=EMP, CLASS=PERFORM, ID=entryname.number,
PERFORM=(option1,option2,...)
...
DFHMCT TYPE=FINAL
```

### Note ...

- If the Resource Class is activated (MNRES=ON) and (File=0 and Tsqueue=0) there will be NO Resource Class data output!

## Resource Manager Interface (RMI) Extensions Support

- Allows more granular identification of the CICS Resource Managers (thru the CICS RMI) used by a transaction
- New optional CMF Performance field group - DFHRMI
  - Option on the DFHMCT TYPE=INITIAL,RMI=NO|YES
- New Performance Class RMI data fields (8 in total) ...
  - Total, Other, DB2, DBCTL, WebSphere MQ, ...
  - TCP/IP Sockets, ...
- Complements existing RMI performance data fields ...
  - RMI Elapsed time (RMITIME)
  - RMI Suspend time (RMISUSP)

## Monitoring Data – CICS TS V3.2

- Monitoring Clock Field Precision and Capacity
  - CICS TS V3.1 (and earlier) ...
    - Clock Field size – 8 bytes (4 byte time and 4 byte count)
    - Time measured in 16ms units
  - CICS TS V3.2 ...
    - Clock Field size – 12 bytes (8 byte time and 4 byte count)
    - Time measured in full STCK units
  - Increased CMF Performance record size!
  - Consider using ...
    - Monitoring SMF 110 Record Compression (New in CICS TS V3.2)
    - Monitoring Control Table (MCT) Field Exclude/Include options



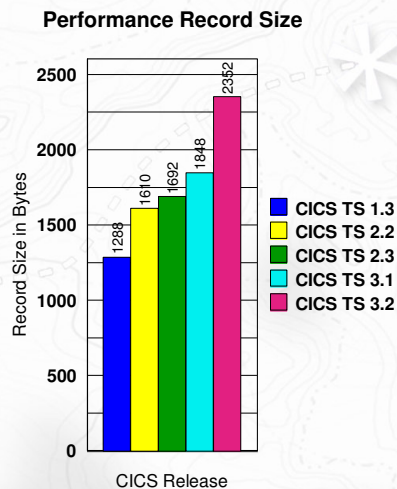
## Monitoring SMF 110 Record Compression Support

- Monitoring SMF 110 Record Compression support
  - DFHMCT TYPE=INITIAL,...,COMPRESS=NO|YES
  - z/OS Compression and Expansion Service - CSRCESTRV
    - Run Length Encoding Algorithm used
      - Exploits the occurrence of repeated characters in a data stream
  - SMF 110 Header and Product Section are **not** compressed!
    - Product Section contains Compressed record length field

```
DFHMCT TYPE=INITIAL, SUFFIX=xx, COMPRESS=YES
...
DFHMCT TYPE=EMP, CLASS=PERFORM, ID=entryname.number, C
      PERFORM=(option1,option2,...)
...
DFHMCT TYPE=FINAL
```

## Monitoring Control Table (MCT) ...

- Performance Record Size ...
  - Consider using the MCT Exclude/Include options
    - **But use with care!**
- Sample Monitoring Control Tables provided ...
  - TOR
  - AOR
  - AOR with DBCTL
  - FOR



## Monitoring Control Table (MCT) ...

- MCT Performance Record Field Exclude examples ...

- FEPI Support (48 bytes)

```
DFHMCT TYPE=RECORD, CLASS=PERFORM, C
      EXCLUDE=(DFHFEPI)
```

- CICS EJB Support (192 bytes)

```
DFHMCT TYPE=RECORD, CLASS=PERFORM, C
      EXCLUDE=(DFHEJBS, 192, 193, 194, 199)
```

- CICS Business Transaction Services (BTS) Support (260 bytes)

```
DFHMCT TYPE=RECORD, CLASS=PERFORM, C
      EXCLUDE=(DFHCBTS, 195, 196)
```

- CICS Java Support (84 bytes)

```
DFHMCT TYPE=RECORD, CLASS=PERFORM, C
      EXCLUDE=(253, 254, 260, 267, 273, 275, 277)
```

## Monitoring Control Table (MCT) – Notes ...

The previous slide shows a number of examples of the Monitoring Control Table (MCT) definitions that can be used to exclude data fields from the performance data record in order to reduce the data volume written by the CICS Monitoring Facility (CMF) to SMF.

If for example, you do not have applications that use CICS functions such as the Front End Programming Interface (FEPI), CICS Enterprise Java Bean (EJB) support, CICS Business Transaction Services (BTS), CICS Java support, XPLink, DB2 support, IMS support, or MQ support, then the CMF data fields that provide performance related information on the application usage of these CICS functions can be safely excluded from the performance record.

Below is a complete MCT definition using the field exclude examples shown ...

```
DFHMCT TYPE=INITIAL, SUFFIX=CB, COMPRESS=YES, C
      APPLNAME=NO, RMI=YES, FILE=16, TSQUEUE=12
DFHMCT TYPE=RECORD, CLASS=PERFORM, C
      EXCLUDE=(DFHFEPI)
DFHMCT TYPE=RECORD, CLASS=PERFORM, C
      EXCLUDE=(DFHEJBS, 192, 193, 194, 199)
DFHMCT TYPE=RECORD, CLASS=PERFORM, C
      EXCLUDE=(DFHCBTS, 195, 196)
DFHMCT TYPE=RECORD, CLASS=PERFORM, C
      EXCLUDE=(253, 254, 260, 267, 273, 275, 277)
DFHMCT TYPE=RECORD, CLASS=PERFORM, C
      EXCLUDE=(271, 272, 282)
DFHMCT TYPE=RECORD, CLASS=PERFORM, C
      EXCLUDE=(179, 180, 186, 187, 188, 189, 395, 396)
DFHMCT TYPE=FINAL
```

## CICS Supplied Transactions – CICS TS V3.2

- CEMT INQ and SET MONITOR ...
  - Changed to Expanded Format
  - Compression Status added
    - Can be changed dynamically – but not restored on Restart!
- CEMN ...
  - New CICS Supplied Transaction
  - Currently same functions as CEMT INQ and SET MONITOR
  - Help Screens available

## CICS Supplied Transaction – CEMN (CICS TS V3.2)

CEMN CICS Monitoring Control Facility CJB3 IYK2Z1V3

Type in your choices. When finished, press ENTER.

Item	Choice	Possible choices
Monitoring Status	====> <u>ON</u>	ON, OFF
Exception Class	====> <u>ON</u>	ON, OFF
Performance Class	====> <u>ON</u>	ON, OFF
Resource Class	====> <u>ON</u>	ON, OFF
File Resource Limit	====> 10	0, 1-64 Files
Tsqueue Resource Limit	====> 12	0, 1-64 Tsqueues
Application Naming Status	====> YES	No, Yes
Compression Status	====> <u>YES</u>	No, Yes
Converse Status	====> <u>NO</u>	No, Yes
RMI Status	====> YES	No, Yes
Syncpoint Status	====> <u>NO</u>	No, Yes
Frequency	====> 000000	0, 000100-240000 (hhmmss)
Time Option	====> LOCAL	Gmt, Local

PF1=Help 3=End

9=Error List



## Performance Class – New Data in CICS TS V3.1 ...

- Dispatcher – Open Transaction Environment
  - L9, X8 and X9 TCB Mode CPU time
  - Max XPLink TCB Delay time, Max SSL TCB Delay time
  - CICS TCB Change Mode Delay time
- Program Control
  - Program Requests with CHANNEL option
    - XCTL, LINK, DPL, and RETURN requests, including data lengths
  - Channel Container Requests
    - Get, Put, Move, Browse, Total, Get and Put Container data lengths
- CICS Web Support (CICS as an HTTP client)
  - Receive, Send and Converse Requests and data lengths
  - Read, Write, Browse httpheader, and Parse Url Requests, ...
- Web Services
  - Invoke Webservice Request count

## Performance Class – New Data in CICS TS V3.2

- IP Connectivity
  - IPConn name, IS I/O wait, IS Allocate count, ...
  - Telnet Client (TNADDR) IP Address and Port number, ...
- WebSphere MQ
  - GETWAIT wait time, MQ Request count
- Transaction Origin (Association) Data ...
  - Networkid, Applid, Start Time, Taskno, Tran, Userid, ...
  - TCP/IP Service and Port, Client IP Address and Port, ...
  - User Correlation data, ...

Note: This origin data is passed across IPIC connections only!
- Channels and Containers
  - Container Storage HWM

## CICS Monitoring Facility (CMF) Data - Review

- Performance Class
  - Transaction Identification and Analysis
    - Transaction id, Userid, Transaction Route Sysid, ...
  - Transaction Timing
    - Dispatch, CPU, Suspend, Dispatch Wait, ..., I/O Wait times, ...
  - Transaction Storage Usage
    - User Storage, Shared Storage, Program Storage
  - Transaction Request Analysis
    - File, Program, Temporary Storage, Transient Data, ...
- Resource Class
  - Resource usage by Task
    - Provides data on File and Tsqueue usage by Task
- Exception Class
  - Identifies CICS resource bottlenecks affecting response time

## Performance Class – Transaction Timing

- Transaction Start time and Stop time
- Transaction Dispatch and CPU time
  - Measured on "**ALL**" the CICS TCBs (QR, RO, CO, ..)
    - Including SL, SO, SP, D2, J8, J9, L8, L9, S8, X8 and X9 CICS TCBs
  - RLS File request CPU (SRB) time
- Transaction Suspend time
  - Includes "**ALL**" the transaction wait (suspend) time
- Transaction Dispatch Wait time
  - QR TCB Mode Dispatch Wait time (QR Mode Delay)
  - CICS TCB Change Mode Delay time
- First Dispatch Delay
  - TRANCLASS and MXT Delays

## Performance Class – Transaction Timing – Notes

The CMF performance class record provides detailed timing information for each transaction as it is processed by CICS. A transaction can be represented by one or more performance class records depending on the monitoring options selected. The key transaction timing data fields are:-

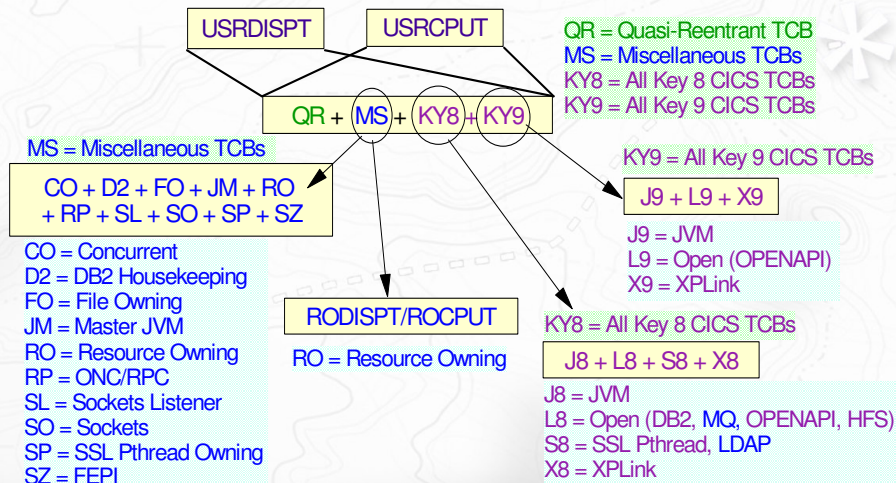
- the Transaction Start time and Stop time represent the start and end of a transaction measurement interval. This is normally the period between transaction attach and detach but the performance class record could represent a part of a transaction depending on the monitoring options selected (CONV, SYNC, etc.). "Transaction Response Time" can be calculated by subtracting the transaction start time from the stop time.
  - the Transaction Dispatch time is the time the transaction was dispatched.
  - the Transaction CPU time is the portion of dispatch time when the task is using processor cycles on each CICS TCB (QR, RO, CO, SZ, RP, FO, SL, SO, D2, JM, etc). It does not include any processor (CPU) time consumed by the user task on TCBs for other resource managers such as DBCTL.
  - the Transaction Suspend time is the total time the task was suspended and includes:
    - all task suspend (wait) time, which includes:-
      - the wait time for redispach (dispatch wait)
      - the wait time for first dispatch (first dispatch delay, including TRANCLASS and MXT delay)
      - the total I/O wait and other wait times.
  - the Transaction Dispatch Wait time is the total wait time for which a user task waited after each event completion and the user task being redispached by the CICS Dispatcher. In CICS Transaction Server for OS/390 Release 3, a new field was introduced which enables analysis of the amount of the dispatch wait time that was attributable to waiting for the CICS QR TCB.
- For detailed information on the CMF performance class data fields, see the CICS Performance Guide.

## Performance Class – Transaction Timing ...

- Open Transaction Environment (OTE)
  - Dispatch and CPU time by CICS TCB Mode (QR and MS)
  - Dispatch and CPU time by CICS TCB Mode (RO)
  - Dispatch and CPU time by CICS TCB Mode (Key 8 TCBs)
  - Dispatch and CPU time by CICS TCB Mode (Key 9 TCBs)
  - CPU time by CICS TCB Mode (J8, J9, L8, L9, S8, X8 and X9)
  - QR TCB Mode Dispatch Delay time (aka Dispatch Wait time)
  - CICS TCB Change Mode Delay time
  - CICS TCB Attaches, CICS TCB High-Water-Mark, ...
  - Max Open TCB Attach Delay time (@ Max Open TCBs)
  - Max JVM TCB Attach Delay time (@ Max JVM TCBs)
  - Max SSL TCB Attach Delay time (@ Max SSL TCBs)
  - Max XPLink TCB Attach Delay time (@ Max XP TCBs)

## Performance Class – Transaction Timing ...

User Task Dispatch and CPU time = "ALL" CICS TCBs



## Performance Class - Transaction Timing ...

### Open Transaction Environment (OTE) ...

- DB2 - With DB2 7.1 or later ...
  - CPU time is now measured in the CICS CPU time fields!
    - User CPU time - Total CICS TCB CPU time
    - L8 CPU time will contain the DB2 CPU time
  - Create thread CPU time is also now accounted for
  - DB2 Wait time will be 0!
    - The Reason - No CICS Dispatcher Waits!
  - If the application is threadsafe ...
    - L8 CPU time will also contain application CPU time
    - QR CPU time will decrease!
    - Reduced QR TCB contention!



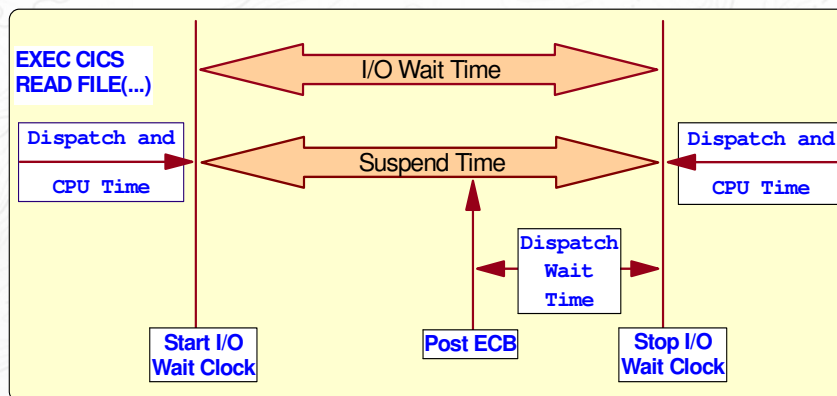
## Performance Class – Transaction Timing ...

### Open Transaction Environment (OTE) ...

- Transaction Dispatch and CPU time
  - Measured on "**ALL**" the CICS TCBs (QR, RO, CO, ..)
    - Including SL, SO, SP, D2, J8, J9, L8, L9, S8, X8 and X9 CICS TCBs
- DB2 V7.1 or later
  - DB2 CPU time now included!
- IP CICS Sockets (z/OS V1.7 or later)
  - Open TCBs can optionally be used
- WebSphere MQ V5.3.1 or later (CICS TS V3.2)
  - MQ CPU time now included!
- CICS Open Transaction Environment – [Session 4092](#)

## Performance Class - Transaction Timing ...

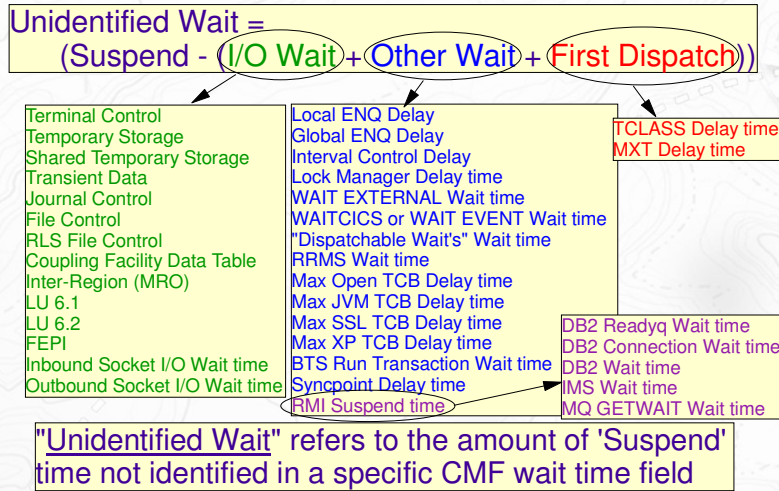
### I/O Wait and Suspend Time Relationship - CICS TS



I/O Wait = (File Control + Transient Data + Temporary Storage + Inter-Region + ...)  
 Other Wait = (Enqueue Delay + Interval Control + Dispatchable Wait's + ...)  
 Unidentified Wait = (Suspend - (I/O Wait + Other Wait + First Dispatch))



## Performance Class - Transaction Timing ...



## Performance Class - Transaction Timing – Notes

The CMF performance class record also provides a more detailed breakdown of the transaction suspend (wait) time into separate data fields. These include:-

- File I/O wait time, RLS File I/O wait time, Coupling Facility Data Table I/O wait time,
- Transient Data I/O wait time, Temporary Storage I/O wait time,
- Shared Temporary Storage I/O wait time, Journal (Logger) I/O wait time,
- Inter-Region (MRO) I/O wait time, Interval Control (IC) delay time, Terminal I/O wait time,
- LU 6.1 I/O wait time, LU 6.2 I/O wait time, FEPI suspend time, Socket I/O wait time,
- Outbound Socket I/O wait time, Local ENQ delay time, Global ENQ delay time,
- Lock Manager (LM) delay time, EXEC CICS WAIT EXTERNAL wait time,
- EXEC CICS WAITCICS and WAIT EVENT wait time, "Dispatchable Wait's" wait time,
- Coupling Facility Server Syncpoint wait time, RRMS/MVS Indoubt wait time,
- Run CICS BTS Process/Activity Synchronous wait time, Syncpoint delay time,
- @Max Open TCB delay time, @Max JVM TCB delay time, @Max SSL TCB delay time,
- @Max XP TCB delay time, RMI suspend time, DB2 Connection wait time, DB2 Readyq wait time,
- DB2 wait time, IMS (DBCTL) wait time, MQ GETWAIT wait time, and JVM suspend time.

It is possible to perform various calculations on the suspend time, for example, the "Total I/O Wait Time" can be calculated as:-

$$\text{Total I/O Wait Time} = (\text{TC} + \text{TS} + \text{TS Shared} + \text{TD} + \text{JC} + \text{FC} + \text{RLS} + \text{CFDT} + \text{IR} + \text{LU6.1} + \text{LU6.2} + \text{FEPI} + \text{SO})$$

The "Total Other Wait Time" could be calculated as:-

$$\text{Total Other Wait Time} = (\text{Interval Control Delay} + \text{Local ENQ Delay} + \text{Global ENQ Delay} + \text{LM Delay} + \text{Wait External} + \text{WAITCICS/WAIT EVENT} + \text{Dispatchable Wait} + \text{RRMS} + \text{Run Transaction Wait} + \text{Syncpoint Delay} + \text{@Max Open TCB Delay} + \text{@Max JVM TCB Delay} + \text{@Max SSL TCB delay time} + \text{@Max XP TCB delay time})$$

## Resource Class

- Provides data on File and Tsqueue Usage by Task
  - CMF Resource Class (5) outputs data at Task Detach
    - Only for those tasks that have done File and/or Tsqueue requests
- Setup ...
  - System Initialization Parameter ...
    - MNRES=OFF|ON
  - CEMT and EXEC CICS INQ/SET MONITOR support ...
    - RESRCECLASS option
    - Filelimit and Tsqueue limit options (INQUIRE only!)
  - File and Tsqueue Resource Limit values ...
    - Options on the DFHMCT TYPE=INITIAL,FILE=8|nn,TSQUEUE=8|nn
      - File Resource Limit maximum value of 64 files
      - Tsqueue Resource Limit maximum value of 64 tsqueues
  - Note ...
    - Specifying FILE=0 or TSQUEUE=0 will suppress that type of resource data

## Resource Class ...

- File data entry ...
  - For each file used by a transaction ...
    - Filename
    - Request elapsed time and count fields for ...
      - Get, Put, Browse, Add, Delete and Total requests
    - Access Method request count
    - File I/O Wait time, RLS File I/O Wait time, CFDT I/O Wait time
- Tsqueue data entry ...
  - For each tsqueue used by a transaction ...
    - Tsqname
    - Request elapsed time and count fields for ...
      - Get, Put Aux, Put Main, Total requests
    - Get, Put Aux and Put Main Item lengths
    - Auxiliary TS I/O Wait time, Shared TS I/O Wait time

## Resource Class ...

VIR3M0 CICS Performance Analyzer  
Transaction Resource Usage List

RESU0001 Printed at 15:18:36 6/19/2003 Data from 14:49:42 6/19/2003 Page 7

Tran	Userid	SC	TranType	Term	LUName	Request Type	Program	Fcty T/Name	Conn Name	NETName	APPLID	UOW R	Task Seq T	Stop Time	Response Time
AUPD	CBAKER	TP	U	TC28	IYCWTC28	AP:	DFHGALL	T/TC28		GBIBMIYA.IYCWTC28	IYK221V1	91	1	T 15:13:39.474	.0072
***** FC Calls *****															
File						Get	Put	Browse	Add	Delete	Total	File	RLS	CFDT	AccMeth Requests
FILEA						.0001	.0047	.0000	.0000	.0000	.0048	.0032	.0000	.0000	4
						Count	1	1	0	0	0	2	1	0	0
***** I/O Waits *****															
CECI	CBAKER	TO	U	TC05	IYCWTC05	AP:	DFHECIP	T/TC05		GBIBMIYA.IYCWTC05	IYK221V1	69	1	T 15:14:26.435	266.7346
***** FC Calls *****															
File						Get	Put	Browse	Add	Delete	Total	File	RLS	CFDT	AccMeth Requests
FILEA						.0000	.0000	.0001	.0000	.0000	.0002	.0000	.0000	.0000	7
						Count	0	0	5	0	0	6	0	0	0
***** I/O Waits *****															
TSQueue						Get	Put_Aux	Put_Main	Total	TS	Shr_TS	***** TS Item *****			
TESTQ1						.0000	.0000	.0017	.0017	.0000	.0000	Length	0	0	360
						Count	0	0	3	3	0	0	0	0	0
TESTQ2						.0000	.0000	.0000	.0000	.0000	.0000	Length	0	120	0
						Count	0	2	0	2	0	0	0	0	0
Total						.0000	.0000	.0017	.0017	.0000	.0000	Length	0	120	360
						Count	0	2	3	5	0	0	0	0	0

© 2007 IBM Corporation 31

## Statistics Collection Overview

- Interval Statistics versus Shutdown Statistics
  - Statistics Reporting and Analysis Requirements
  - Continued direction towards dynamic CICS Resources ...
    - RDO and Autoinstall
    - Minimize the statistics data loss if a system crash
- Statistics Collection ...
  - System
    - Interval, End-of-Day, Unsolicited
  - User
    - Requested, Requested Reset
- Ensure that the Statistics collection intervals are consistent with your reporting requirements!

## Statistics Collection - Unsolicited

- Collected for dynamic CICS resources ...
  - Autoinstall terminals at logoff, DBCTL at disconnect
  - Files at close, LSRPOOLS at close of the last file in the pool
  - Transactions, Classes and Programs at discard
  - Connection, Modename and Session at discard
  - TDQueue at discard or close for an Extrapartition TDQueue
  - Journalname at discard, Logstream at discard or disconnect
  - DB2 Connection at disconnect
  - DB2 Entry at discard or at disconnect of the DB2 Connection
  - TCP/IP Services at close
  - Urimap, Pipeline and Webservice at Discard (CICS TS V3.1)
  - Doctemplate and Ipconn at Discard, Library at Disable (V3.2)
- Required for complete "shutdown" view of statistics data

## Statistics Data – CICS Transaction Server V3.1

- Dispatcher
  - New TCB Pools
    - SSL (SSL – S8 Pthread TCBs)
    - XP (XPLink – X8 and X9 TCBs)
  - New/Changed TCB Modes – SP, S8, L9, X8 and X9
    - S8 TCB Mode is now an Open mode (MAXSSLTCBS)
- Connections
  - Transaction Routing and Function Shipping Requests
    - Using the CHANNEL option – Bytes Sent and Received
- URIMAP
  - Global
    - URIMAP reference, Host/Path no match / match counts, ...
    - Disabled, Redirected, Analyzer used counts, ...
    - Static content and Dynamic content delivered counts

## Statistics Data – CICS Transaction Server V3.1 ...

- URIMAP ...
  - Host and Path names, ...
  - TCP/IP Service, Pipeline, and Webservice names, ...
  - Analyzer, Converter, Transaction ID, Program name, ...
  - Redirection type, Location for redirection, ...
  - Reference, Disabled and Redirected counts
- PIPELINE
  - Configuration file name, Shelf directory, ...
  - WSDIR pickup directory, Pipeline reference count
- WEBSERVICE
  - Program interface, message validation, Pipeline name, ...
  - Urimap name, WSBind file, WSDL file, WSDL binding, ...
  - Endpoint URI, Program name, Webservice reference count

## Statistics Data – CICS Transaction Server V3.2

- New Statistics Data
  - LIBRARY – Program Libraries
  - IPCONN – IP Connectivity
  - MQCONN – WebSphere MQ Connection
  - DOCTEMPLATE – Document Templates
- Updated Statistics Data
  - Loader, Program, ...
  - Storage Manager - 64-bit storage
    - DSAs and Domain Subpools
  - MVS TCB Storage, Monitoring, ...
  - TCP/IP Service, File, Pipeline, JVMProfile, ...



## Statistics Data – CICS Transaction Server V3.2

- **LIBRARY Resources ...**
  - Library name, Search Position, Ranking, Critical, ...
  - Enable Status, Program Loads, ...
  - Number of Dsnames, Dataset Names, ...
- **IPCONN (IP Connectivity) Resources ...**
  - Ipconn name, Applid, Network ID, Host name, ...
  - Port number, TCP/IP Service name, ...
  - Security settings, Ipconn session definition and usage, ...
  - Usage statistics ...
    - Transaction attach count, ...
    - Program function shipping requests and data send/receive lengths

## Statistics Data – CICS Transaction Server V3.2

- **MQCONN (WebSphere MQ Connection) ...**
  - Connection name, status, release, ...
  - MQ API request counts, ...
  - Unit-of-work and syncpoint activity information
- **DOCTEMPLATE Resources ...**
  - Doctemplate information ...
    - Template name, Type, Contents, ...
  - Usage information ...
    - Cache size, Use count, New copy count, Cache copy use, ...

## Interface to Monitoring and Statistics Data ...

- Online Interface to Statistics Data
  - EXEC CICS EXTRACT STATISTICS ...**
  - SPI Commands, Returns to an application program ...  
the current statistics for a named resource type
  - or
  - the current statistics for a single named resource

```
EXEC CICS EXTRACT STATISTICS
  {DOCTEMPLATE RESID(8-character data-value) | <- CICS TS 3.2
  IPCONN RESID(8-character data-value) | <- CICS TS 3.2
  LIBRARY RESID(8-character data-value) | <- CICS TS 3.2
  MQCONN | <- CICS TS 3.2
  PIPELINE RESID(8-character data-value) |
  URIMAP |
  URIMAP RESID(8-character data-value) |
  WEBSERVICE RESID(32-character data-value) }
SET(ptr-ref)
```

## Sample Programs and Utilities – CICS TS V3.2

- Monitoring Sample Program – DFH\$MOLS
  - Report Format Enhancements, Revised Totals Page, ...
  - New Function – EXPAND
- Statistics Sample Program – DFH0STAT
  - Pre-compiled version of DFH0STAT now provided ...
    - as from CICS TS Version 2.1
  - New and Enhanced Reports in CICS TS V3.2
- Statistics Utility program – DFHSTUP
  - New and Enhanced Reports in CICS TS V3.2
  - DFH0STXR – Statistics Event Reporter
- DFH0STAT versus DFHSTUP
  - Why DFH0STAT is NOT necessarily the answer!

## Sample Programs and Utilities - DFH\$MOLS

- Prints the Monitoring Data from ...
  - CICS TS Version 1.3 and later Only!
- SMF Unloaded data set - IFASMFDP Utility
  - Requires the use of a "SORT" product
- Record Selection by ...
  - CLASS - Performance, Resource and/or Exception
  - DATE, TIME
  - APPLID, TRANID, TERMID, USERID, TASKNO
- Timestamp field formatting option ...
  - OPTION GMT|LOCAL

## Sample Programs and Utilities - DFH\$MOLS ...

- Unload Performance class records to a flat file ...
  - UNLOAD {DDNAME=xxxxxxx}
  - CICS TS Version 3.2 Only!
- Expand Compressed SMF 110 Data Set
  - EXPAND {DDNAME=xxxxxxx,[NEWDCB]}
  - Output data set DCB Attributes ...
    - Default – LRECL and BLKSIZE taken from input data set
    - If NEWDCB – LRECL and BLKSIZE taken from JCL
    - If LRECL=0 specified – default to 32767 (same as IFASMFDP)
- Hints and Tips ...
  - Be aware that the default is to print "EVERYTHING"!
  - Specify "OPTION LOCAL"
  - Use the DFH\$MOLS program from highest CICS TS Release!

## Sample Programs and Utilities - DFH\$MOLS

FIELD-NAME	UNINTERPRETED	INTERPRETED	145
DFHTASK C001	TRAN C3C5D4E3	CEMT	
DFHTERM C002	TERM E2C1D4C1	SAMA	
DFHCICS C089	USERID C3C2C1D2 C5D94040	CBRAKER	
DFHTASK C004	TTYTYPE E3D60000	TO	
DFHCICS T005	START BEFF476C84C8792E	2006/06/23 14:26:07.714183	
DFHCICS T006	STOP BEFF476CC5F50580	2006/06/23 14:26:07.981136	
DFHTASK P031	TRANNUM 0000039C	39	
DFHTASK A109	TRANPRI 000000FF	255	
DFHTERM C111	LUNAME 40404040 40404040		
DFHPROG C071	PGMNAME C4C6C8C5 D4E3D740	DFHEMTP	
DFHTASK C097	NETUOWFX C7C2C9C2 D4C9E8C1 4BC9E8D2 F2E9F1E5 F3000000	GB1B1MIYA.IYK2Z1V3	
DFHTASK C098	NETUOWSX FF476C84CD7B0001		
...			
DFHTASK S007	USRDISPT 0000000011EB0D9C00000009	000 00:00:00.073392	9
DFHTASK S008	USRCPUT 000000002A2A61300000009	000 00:00:00.010794	9
DFHTASK S014	SUSPTIME 000000002F417EB600000009	000 00:00:00.193559	9
DFHTASK S102	DISPWT 000000002EBC9E36000000008	000 00:00:00.191433	8
DFHTASK S255	QRDISPT 0000000000A6C0FA000000006	000 00:00:00.002668	6
DFHTASK S256	RCPUT 0000000004EAE0000000006	000 00:00:00.001258	6
DFHTASK S257	MSDISPT 0000000011444CA2000000003	000 00:00:00.070724	3
DFHTASK S258	MSCPUT 0000000002540533000000003	000 00:00:00.009536	3
DFHTASK S269	RODISPT 0000000011444CA2000000003	000 00:00:00.070724	3
DFHTASK S270	ROCPUT 0000000002540533000000003	000 00:00:00.009536	3
...			
DFHTASK S249	QRMODDLY 000000000015E720000000005	000 00:00:00.000350	5
DFHTASK S247	DSCHMDLY 0000000002EBA34F6000000006	000 00:00:00.191395	6
DFHPROG S115	PCLOADTM 0000000004435A78000000003	000 00:00:00.017461	3
DFHTASK S125	DSPDELAY 0000000000193000000000001	000 00:00:00.000025	1
DFHSYNC S173	SYNCTIME 0000000000024C40000000001	000 00:00:00.000036	1
...			

## Sample Programs and Utilities - DFH0STAT ...

- Written as an aid to CICS and MVS storage usage
- Command Level, VS COBOL II and Assembler
- Illustrates the use of the EXEC CICS API commands
  - EXEC CICS INQUIRE and COLLECT STATISTICS
  - Statistics Report output using the CICS interface to JES
  - DFH0STAT can be invoked ...
    - from a Terminal or Console
    - from the PLTPI or PLTSD
    - as a START'ed transaction or as a DPL'ed transaction
  - Save/Restore report selections in temp storage ...
    - When DFH0STAT run from Terminal (Not Consoles)
  - Abbreviated Report selection - (Transactions, Programs)
- Provides a 'Snapshot' on the Statistics Data
- Caution! - if used as replacement for "shutdown" statistics

## Sample Programs and Utilities - DFH0STAT ...

The statistics sample program DFH0STAT consists of eight programs. The DFH0STAT program itself acts as the initial program, handles the BMS screen processing and the spool file open/close.

It then LINKs to DFH0STLK with a commarea that has various print report control information along with the report selections. The DFH0STLK program then LINKs to the DFH0STSY, DFH0STTP, DFH0STPR, DFH0STEJ, DFH0STDB and DFH0STGN programs in turn passing the same commarea, regardless of the report selections, DFH0STLK then produces the page index (if selected) and finally returns to DFH0STAT.

Pre-compiled versions of DFH0STAT and its associated programs are supplied, along with the assembled BMS maps and HTML templates. This allows customers who do not have a COBOL compiler to use DFH0STAT as long as they are using the Language Environment for their CICS systems. A fully Web enabled version of DFH0STAT is NOT provided.

The DFH0STAT report selection options may also be saved/restored to/from temporary storage. The options are saved in auxiliary temporary storage using a 16-byte tsqueue name consisting of a concatenation of "eibtrnid|eibtrmid|userid". If the CICS-supplied RDO group of DFH0STAT is used, eibtrnid will default to the 'STAT' transaction id. The temporary storage queue can be made recoverable by defining a tsmode1 with the following attributes: location(auxiliary) prefix(stat) and recovery(yes).

An option on the statistics print screen, DFH0STM, allows the user to select an abbreviated report for transactions and programs. The option allows the user to print the statistics for only those transactions and programs that have a non-zero use count or vice-versa, or both.

## Sample Programs and Utilities - DFH0STAT ...

```

Sample Program - CICS Statistics Print
                                02/01/2007 16:03:54

Type in destination fields if required. Press Enter to print

Jobname. . . . : CI07CJB3
Applid . . . . : IYK2Z1V3
Sysid. . . . . : CJB3

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 . . . : 01:00:00
Last Reset Time . . . : 16:03:22    Elapsed Time Since Reset. : 00:00:31
Next Collection . . . : 16:59:00     End-of-Day Time . . . . . : 23:59:00

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

```



## Sample Programs and Utilities - DFH0STAT ...

Sample Program - CICS Statistics Print Report Selection  
02/01/2007 16:06:22

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	<b>LIBRARYs . . . . .</b>	<b>N</b>
Transactions . . . . .	N	Programs . . . . .	N
Transaction Classes . . . . .	N	Programs by DSA and LPA . . . . .	N
		<b>DFHRPL and LIBRARY Analysis . . . . .</b>	<b>N</b>
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

## Sample Programs and Utilities - DFH0STAT ...

Sample Program - CICS Statistics Print Report Selection  
02/01/2007 16:09:30

Select the statistics reports required and press 'Enter' to validate

DB2 Connection . . . . .	N	<b>WebSphere MQ Connection . . . . .</b>	<b>N</b>
DB2 Entries . . . . .	N	Program Autoinstall . . . . .	N
		Terminal Autoinstall and VTAM . . . . .	N
JVM Pool and Class Cache . . . . .	N	Connections and Modenames . . . . .	N
JVMs . . . . .	N	TCP/IP . . . . .	N
JVM Profiles . . . . .	N	TCP/IP Services . . . . .	N
JVM Programs . . . . .	N	<b>IPCONNs . . . . .</b>	<b>N</b>
		URIMAPs . . . . .	N
CorbaServers and DJARs . . . . .	N	Virtual Hosts . . . . .	N
DJARs and Enterprise Beans . . . . .	N	PIPELINES . . . . .	N
Requestmodels . . . . .	N	WEBSERVICES . . . . .	N
EJB System Data Sets . . . . .	N	Document Templates . . . . .	N
Trace Settings and Levels . . . . .	N	Recovery Manager . . . . .	N
User Exit Programs . . . . .	N	Enqueue Manager . . . . .	N
Global User Exits . . . . .	N	Enqueue Models . . . . .	N

F1=Help    F3=Return to Print    F7=Back    F10=Save    F12=Restore

## Sample Programs and Utilities - DFH0STAT ...

### CICS Transaction Server V3.1 ...

- Revised Report Selection screen layout
- Changed Reports ...
  - Dispatcher Report
    - New TCB Mode(s), New TCB Pool(s)
  - System Logs, TCP/IP, TCP/IP Services, Connections,
  - Page Index
- New Reports ...
  - Urimap, Virtual Host, ...
  - Pipeline, Webservice, Document Templates, ...
  - Trace Settings and Levels

## Sample Programs and Utilities - DFH0STAT - Notes

The statistics sample program (DFH0STAT) for CICS Transaction Server for z/OS has been continually enhanced to include new functions along with many new and revised reports for all the statistics record changes in each CICS release. Some of the new reports in CICS Transaction Server for z/OS Version 3.1 include:-

- The Urimap global statistics report includes various counts on the searching and matching of the URIs for HTTP or Web service requests and how the request was handled.
- The Urimap resource statistics report provides information on the URIMAP resource definitions and their usage when processing the HTTP or Web service requests and how the request was processed.
- Also provided is a report on the virtual hosts created by CICS from the URIMAP definitions.
- The PIPELINE resource statistics report provides information about the message handler programs that act on a service request, HFS file name and PIPELINE usage count.
- The WEBSERVICE resource statistics report provides information on the run time environment for a CICS application deployed in a Web services setting. This information includes the pipeline, Web service binding file name, and WEBSERVICE usage count.

Examples of the updated DFH0STAT reports include:-

- The Dispatcher reports have been updated to include the statistics for the new CICS Dispatcher SSL and XPLink TCB Pools as well as the new CICS Dispatcher TCB modes SP, L9, X8 and X9.
- The Connection reports has been updated to include statistics data on the transaction routing and function shipping requests that have used the new channel option along with information on the number of bytes sent and received on this connection.

IBM 2007 IBM

Applid IYK2Z1V1 Sysid CJB1 Jobname CI07CJB1 Date 09/23/2004 Time 13:59:42 CICS 6.4.0 PAGE 7

Connections

Connection Name/Netname . . . . .	CJB2/IYK2Z1V2	Access Method/Protocol . . . . .	XM
		Autoinstalled Connection Create Time . . . . .	00:00:00.00000
Peak Contention Losers . . . . .	0	Receive Session Count . . . . .	5
ATIs satisfied by Losers . . . . .	0	Send Session Count . . . . .	5
Peak Contention Winners . . . . .	0		
ATIs satisfied by Winners . . . . .	0	Generic AIDs in chain . . . . .	0
Current AIDs in chain . . . . .	0	Peak Bids in progress . . . . .	0
Total number of Bids sent . . . . .	0		
Current Bids in progress . . . . .	0	Allocates per second . . . . .	0.00
Total Allocates . . . . .	0	Allocate Max Queue Time . . . . .	0
Allocates Queued . . . . .	0	Allocate Queue Limit . . . . .	0
Peak Allocates Queued . . . . .	0		
Allocates Failed - Link . . . . .	0	Allocates Rejected - Queue Limit . . . . .	0
Allocates Failed - Other . . . . .	0	Max Queue Time - Allocate Purge . . . . .	0
		Allocates Purged - Max Queue Time . . . . .	0
		Allocates Rejected - XZIQUE . . . . .	0
		XZIQUE - Allocate Purge . . . . .	0
		Allocates Purged - XZIQUE . . . . .	0

Transaction Routing Requests

Transaction Routing - Total . . . . .	0
Transaction Routing - Channel . . . . .	0

Function Shipping Requests

File Control . . . . .	0
Interval Control - Total . . . . .	0
Interval Control - Channel . . . . .	0
Transient Data . . . . .	0
Temporary Storage . . . . .	0
Program Control - Total . . . . .	0
Program Control - Channel . . . . .	0
Total . . . . .	0

Bytes Sent by Transaction Routing requests . . . . .	0	Average Bytes Sent by Routing requests . . . . .	0
Bytes Received by Transaction Routing requests . . . . .	0		
Bytes Sent by Program Channel requests . . . . .	0	Average Bytes Sent by Channel request . . . . .	0
Bytes Received by Program Channel requests . . . . .	0		
Bytes Sent by Interval Channel requests . . . . .	0	Average Bytes Sent by Channel request . . . . .	0
Bytes Received by Interval Channel requests . . . . .	0		

© 2007 IBM Corporation 51

IBM 2007 IBM

## Sample Programs and Utilities - DFH0STAT ...

Applid IYK2Z1V1 Sysid CJB1 Jobname CI07CJB1 Date 02/20/2005 Time 11:16:02 CICS 6.4.0 PAGE 113

URIMAP Name . . . . . : DFHBOB  
 URIMAP Enable Status . . . . . : Enabled  
 URIMAP Usage . . . . . : Pipeline  
 URIMAP Scheme . . . . . : HTTP

URIMAP Host . . . . . : winmvs2c.hursley.ibm.com  
 URIMAP Path . . . . . : /chris

TCPIP SERVICE name . . . . . : CHRIS1  
 WEBSERVICE name . . . . . : bobswebservice  
 PIPELINE name . . . . . : BOBPIPE

Templatenamename . . . . . :  
 HFS File . . . . . :

Analyzer . . . . . : No  
 Converter . . . . . :  
 Transaction ID . . . . . : CPIH  
 Program name . . . . . :

Redirection type . . . . . : None  
 Location for redirection . . . . . :

URIMAP reference count . . . . . : 14  
 Disabled . . . . . : 0  
 Redirected . . . . . : 0

© 2007 IBM Corporation 52

## Sample Programs and Utilities - DFH0STAT ...

Applid IYK2Z1V1 Sysid CJB1 Jobname CI07CJB1 Date 02/20/2005 Time 11:16:02 CICS 6.4.0 PAGE 116

WEBSERVICES

```
WEBSERVICE Name . . . . . : mybindfile
WEBSERVICE Status . . . . . : Inservice
Last modified date and time . . . . . : 11/26/2004 / 10:43:19

URIMAP name . . . . . :
PIPELINE name . . . . . : PAULPROV

Web service description (WSDL) . . . :

Web service binding file . . . . . : /u/p9coopz/wsd1/pickup/mybindfile.wabind
Web service WSDL binding . . . . . : StockQuoteSoap
Endpoint . . . . . : http://www.webservicex.net/stockquote.asmx
Validation . . . . . : No

Program interface . . . . . : Channel
Program name . . . . . : WSBEARD
Container . . . . . : DFHWS-DATA

WEBSERVICE use count . . . . . : 5
```

## Sample Programs and Utilities - DFH0STAT ...

CICS Transaction Server V3.2 ...

- Revised Report Selection screen layout
- New Reports ...
  - LIBRARY, IPCONN, and MQCONN
- Changed Reports ...
  - System Status, Dispatcher, ...
  - DSA, Domain Subpools, Domain Subpool Totals, ...
  - Programs, DFHRPL and LIBRARY Analysis,
  - User Exit Programs, Global User Exits, ...
  - Document Templates, Temporary Storage Queues, ...
  - TCP/IP Service, Pipeline, JVMPool, JVMPProfile, ...
  - Trace Settings and Levels, Page Index

## Sample Programs and Utilities - DFH0STAT - Notes

The statistics sample program (DFH0STAT) for CICS Transaction Server for z/OS has been continually enhanced to include new functions along with many new and revised reports for all the statistics record changes in each CICS release.

Some of the new reports in CICS Transaction Server for z/OS Version 3.2 include:-

- Library report
- WebSphere MQ Connection report
- IP Connectivity report.

Examples of the updated DFH0STAT reports include:-

- System Status, Dispatcher, ...
- DSA, Domain Subpools, Domain Subpool Totals, ...
- Programs, DFHRPL and LIBRARY Analysis,
- User Exit Programs, Global User Exits, ...
- Document Templates, Temporary Storage Queues, ...
- TCP/IP Service, Pipelines, JVMPool, JVM profiles, ...
- Trace Settings and Levels, Page Index.

## Sample Programs and Utilities – DFH0STAT

Applid IYK221V3 Sysid CJB3 Jobname CI07CJB3 Date 07/19/2006 Time 09:55:57 CICS 6.5.0 PAGE 1

### System Status

MVS Product Name . . . . . : MVS/SP7.0.7	CICS Transaction Server Level . . . : 03.02.00
CICS Startup . . . . . : INITIAL	MVS Workload Manager (WLM) Mode . : Goal
CICS Status . . . . . : ACTIVE	WLM Server . . . . . : No
VTAM Open Status . . . . . : OPEN	WLM Workload Name . . . . . : GENERAL
IRC Status . . . . . : OPEN	WLM Service Class . . . . . : BATCH
<b>IRC XCF Group Name . . . . . : DFHIR000</b>	WLM Report Class . . . . . :
Storage Protection . . . . . : ACTIVE	WLM Resource Group . . . . . :
Transaction Isolation . . . . . : ACTIVE	WLM Goal Type . . . . . : Velocity
Reentrant Programs . . . . . : PROTECT	WLM Goal Value . . . . . : 30
Exec storage command checking : ACTIVE	WLM Goal Importance . . . . . : 5
Force Quasi-Reentrant . . . . . : No	WLM CPU Critical . . . . . : No
Program Autoinstall . . . . . : ACTIVE	WLM Storage Critical . . . . . : No
Terminal Autoinstall . . . . . : ENABLED	RLS Status . . . . . : ACTIVE
Activity Keypoint Frequency . . . . . : 5,000	RRMS/MVS Status . . . . . : OPEN
Logstream Deferred Force Interval . . . . . : 5	TCP/IP Status . . . . . : OPEN
DB2 Connection Name . . . . . : RCT1f	Max IP Sockets . . . . . : 65,535
DB2 Connection Status . . . . . : NOTCONNECTED	Active IP Sockets . . . . . : 7
	WEB Garbage Collection Interval . . : 60
	Terminal Input Timeout Interval . . : 5



## Sample Programs and Utilities – DFH0STAT

Appid: IYK221V3 Sysid: CJB3 Jobname: CI07CJB3 Date: 07/19/2006 Time: 09:55:57 CICS 6.5.0 PAGE 2	
<u>Monitoring</u>	
Monitoring . . . . .	ON
Exception Class . . . . .	ON
Performance Class . . . . .	ON
Resource Class . . . . .	ON
<b>Data Compression Option . . . . .</b>	<b>YES</b>
Application Naming . . . . .	YES
RMI Option . . . . .	YES
Converse Option . . . . .	NO
Syncpoint Option . . . . .	NO
Time Option . . . . .	LOCAL
File Resource Limit . . . . .	10
Tsqueue Resource Limit . . . . .	12
Exception Class Records . . . . .	0
Exception Records Suppressed . . . . .	0
Performance Class Records . . . . .	35
Performance Records Suppressed . . . . .	0
Resource Class Records . . . . .	4
Resource Records Suppressed . . . . .	0
Monitoring SMF Records . . . . .	4
Monitoring SMF Errors . . . . .	0
Monitoring SMF Records Compressed . . . . .	3
Monitoring SMF Records Not Compressed . . . . .	1
Percentage of SMF Records Compressed . . . . .	75.00%
Average Compressed Record Length . . . . .	4,879
Average Uncompressed Record Length . . . . .	31,854
Average Record Compression Percentage . . . . .	84.68%

Statistics

Statistics Recording . . . . .	ON
Statistics Last Reset Time . . . . .	09:55:26
Elapsed Time Since Reset . . . . .	00:00:30
Statistics Interval . . . . .	01:00:00
Next Statistics Collection . . . . .	09:59:00
Statistics End-of-Day Time . . . . .	23:59:00
Statistics Start Date and Time . . . . .	07/19/2006 09:55:28.865
Statistics SMF Records . . . . .	12
Statistics SMF Writes Suppressed . . . . .	0
Statistics SMF Errors . . . . .	0

## Sample Programs and Utilities - DFH0STAT – Notes

The previous two slides show examples of the updated DFH0STAT reports for System Status and Monitoring.

The System Status report now includes the XCF Group Name and details of the z/OS WLM Goal used for the CICS address space such as the goal type, value and importance.

The Monitoring report includes details on the usage and performance of the Monitoring record compression support. Details include statistics on the number of records compressed or not compressed, compression record lengths and compression percentages.

The next two slides show examples of the updated DFH0STAT reports for the CICS Dispatcher. These examples show the report changes for the increased clock formatting capacity and the MVS TCB reports now show the TCB storage in use as well as the storage allocated.

IBM 2007 **IMPACT** **IBM**

---

Applid IYK221V3 Sysid CJB3 Jobname CI07CJB3 Date 03/20/2007 Time 16:17:29 CICS 6.5.0 PAGE 4

**Dispatcher TCB Modes**

Dispatcher Start Time and Date . . . . . : 16:10:29.801528 03/20/2007

Address Space Accumulated CPU Time . . . . . : 0000:00:01.257781 (Not Reset)

Address Space Accumulated SRB Time . . . . . : 0000:00:00.085682 (Not Reset)

Address Space CPU Time (Since Reset) . . . . . : 0000:00:01.223649

Address Space SRB Time (Since Reset) . . . . . : 0000:00:00.085295

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
QR	1	1	1,937	0000:06:57.462739	0000:00:01.345123	0000:00:00.502550	0000:00:00.040667	37.3%
RO	1	1	149	0000:06:53.879414	0000:00:04.442768	0000:00:00.428236	0000:00:00.070025	
CO	1	1	501	0000:00:08.663773	0000:00:00.257359	0000:00:00.058688	0000:00:00.012288	
SZ	1	1	2	0000:00:00.000129	0000:00:00.000445	0000:00:00.000410	0000:00:00.000043	
RP	0	0	0	0000:00:00.000000	0000:00:00.000000	0000:00:00.000000	0000:00:00.000000	
FO	1	1	116	0000:00:07.981042	0000:00:03.549565	0000:00:00.121870	0000:00:00.001135	
SL	1	1	15	0000:00:07.228525	0000:00:00.001503	0000:00:00.001468	0000:00:00.000077	
SO	1	1	8	0000:00:06.652912	0000:00:00.576900	0000:00:00.014587	0000:00:00.002104	
SP	1	1	2	0000:00:00.003846	0000:00:00.006828	0000:00:00.000113	0000:00:00.000064	
DZ	0	0	0	0000:00:00.000000	0000:00:00.000000	0000:00:00.000000	0000:00:00.000000	
JM	0	0	0	0000:00:00.000000	0000:00:00.000000	0000:00:00.000000	0000:00:00.000000	
SS	1	1	1	0000:00:00.000000	0000:00:00.200962	0000:00:00.000876	0000:00:00.000876	
L8	4	4	210	0000:00:07.302090	0000:06:31.566680	0000:00:00.043872	0000:00:00.002060	
L9	0	0	0	0000:00:00.000000	0000:00:00.000000	0000:00:00.000000	0000:00:00.000000	
J8	0	1	8	0000:00:00.132664	0000:00:00.215096	0000:00:00.015541	0000:00:00.000157	
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	
Totals	13				0000:00:01.188215	0000:00:00.129500		

© 2007 IBM Corporation 59

IBM 2007 **IMPACT** **IBM**

---

## Sample Programs and Utilities - DFH0STAT ...

Applid IYK221V3 Sysid CJB3 Jobname CI07CJB3 Date 03/20/2007 Time 16:17:29 CICS 6.5.0 PAGE 10

**Dispatcher - MVS TCBs**

Dispatcher Start Time and Date . . . . . : 16:10:29.801528 03/20/2007

Address Space Accumulated CPU Time . . . . . : 0000:00:01.257781 (Not Reset)

Address Space Accumulated SRB Time . . . . . : 0000:00:00.085682 (Not Reset)

Address Space CPU Time (Since Reset) . . . . . : 0000:00:01.228860

Address Space SRB Time (Since Reset) . . . . . : 0000:00:00.085379

Current number of CICS TCBs . . . . . : 17

Current CICS TCB CPU time . . . . . : 00:00:01.23813

Current CICS TCB Private Stg below 16MB . . . . . : 6,436K

Current CICS TCB Private Stg below 16MB in use . . . . . : 6,350K

Current CICS TCB Private Stg above 16MB . . . . . : 368,580K

Current CICS TCB Private Stg above 16MB in use . . . . . : 368,293K

Current number of non-CICS TCBs . . . . . : 2

Current non-CICS TCB CPU time . . . . . : 00:00:05.67311

Current non-CICS TCB Private Stg below 16MB . . . . . : 240K

Current non-CICS TCB Private Stg below 16MB in use . . . . . : 200K

Current non-CICS TCB Private Stg above 16MB . . . . . : 3,840K

Current non-CICS TCB Private Stg above 16MB in use . . . . . : 3,724K

© 2007 IBM Corporation 60

## Sample Programs and Utilities - DFH0STAT ...

Appid IYK221V3 Sysid CJB3 Jobname CI07CJB3 Date 02/19/2007 Time 12:52:35 CICS 6.5.0 PAGE 5	
<b>Storage ABOVE 2GB</b>	
MEMLIMIT Size . . . . .	2,048M
MEMLIMIT Set By . . . . .	IEFUSI
GETSTOR request size . . . . .	1,024M
Current Address Space active . . . . .	1M
Peak Address Space active . . . . .	1M
Current GDSA Active . . . . .	1M
Peak GDSA Active . . . . .	1M
Above the bar Cushion Limit . . . . .	1,945M
Allocates into the Cushion . . . . .	0
<b>GCDSA</b>	
Current DSA Size . . . . .	0M
Peak DSA Size . . . . .	0M
Getmain Requests . . . . .	0
Freemain Requests . . . . .	0
Current number of Subpools . . . . .	1
Add Subpool Requests . . . . .	1
Delete Subpool Requests . . . . .	0
Times no storage returned . . . . .	0
Times request suspended . . . . .	0
Current requests suspended . . . . .	0
Peak requests suspended . . . . .	0
Requests purged while waiting . . . . .	0

## Sample Programs and Utilities - DFH0STAT – Notes

The previous slide shows an example of the new Storage Manager DSA report for the DSAs above the 2GB bar. It shows the current MEMLIMIT setting and the source of the setting (JCL, IEFUSI, REGION, ...) and the statistics for the GCDSA which resides above the 2GB bar.

The next four slides show examples of the new and changed DFH0STAT reports for the new LIBRARY resources. The new reports include a new LIBRARY resource report and also a LIBRARY dataset concatenation report which shows the complete dataset concatenation order from all the currently installed and enabled LIBRARY resources. There are also examples of the updated PROGRAMs report which now shows the LIBRARY and dataset concatenation offset from where the program was currently loaded and an example of the update DHFRPL and LIBRARY analysis report.

## Sample Programs and Utilities - DFH0STAT ...

Applid IYK221V3 Sysid CJB3 Jobname CI07CJB3 Date 03/20/2007 Time 16:17:29 CICS 6.5.0 PAGE 36

**LIBRARYs**

LIBRARY Name	Search Position	Rank -ing	Critical	Enable Status	Program Loads	Number Dsnames	Concat-enation	Dataset Name	Dsname Number
DFHRPL	1	10	Yes	Enabled	467	16	0	CBAKER.JAVA.PDSE 1 UTL.CBAKER.LOAD 2 PUBCER.IT2M.LOAD 3 BLDBSF.CERXA.SEYULOAD 4 BLDBSF.CERXA.SDFHLOAD 5 UTL.CBAKER.LOAD 6 PP.ADLE370.ZOS170.SCEECICS 7 PP.ADLE370.ZOS170.SCEERUN 8 PP.CBC.ZOS170.SCLBDLL 9 PP.TCPIP.ZOS170.SEZATCP 10 CBAKER.CSATTOOL.SDFHLOAD 11 JTILLI1.NODDYTRU.LOAD 12 MQM.V531.SCSQAUTH 13 MQM.V531.SCSQANLE 14 MQM.V531.SCSQCICS 15 PP.REXXCICS.V110.SCICLOAD	
TESTLIB	2	50	No	Enabled	3	1	0	CBAKER.TESTPROG.LOAD	07

## Sample Programs and Utilities - DFH0STAT ...

Applid IYK221V3 Sysid CJB3 Jobname CI07CJB3 Date 03/20/2007 Time 16:17:29 CICS 6.5.0 PAGE 37

**LIBRARY Dataset Concatenation**

Concat-enation	Dataset Name	Dsname Number	LIBRARY Name	Ranking	Critical
0	CBAKER.JAVA.PDSE		DFHRPL	10	Yes
1	UTL.CBAKER.LOAD				
2	PUBCER.IT2M.LOAD				
3	BLDBSF.CERXA.SEYULOAD				
4	BLDBSF.CERXA.SDFHLOAD				
5	UTL.CBAKER.LOAD				
6	PP.ADLE370.ZOS170.SCEECICS				
7	PP.ADLE370.ZOS170.SCEERUN				
8	PP.CBC.ZOS170.SCLBDLL				
9	PP.TCPIP.ZOS170.SEZATCP				
10	CBAKER.CSATTOOL.SDFHLOAD				
11	JTILLI1.NODDYTRU.LOAD				
12	MQM.V531.SCSQAUTH				
13	MQM.V531.SCSQANLE				
14	MQM.V531.SCSQCICS				
15	PP.REXXCICS.V110.SCICLOAD				
16	CBAKER.TESTPROG.LOAD	07	TESTLIB	50	No

Sample Programs and Utilities - DFH0STAT ...											
Applid IYK221V3 Sysid CJB3 Jobname CI07CJB3 Date 02/19/2007 Time 12:18:31 CICS 6.5.0 PAGE 48											
Program Name	Data Loc/Exec Key	Times Used	Times Fetched	Total Fetch Time	Average Fetch Time	LIBRARY Name	Offset	Times Newcopy	Times Removed	Program Size	Prog Locn
IGZCLNC	Below/USER	0						0	0		None
IGZCLNK	Below/USER	0						0	0		None
IGZCMGEN	Below/USER	0						0	0		None
IGZCMGJA	Below/USER	0						0	0		None
IGZCMGUE	Below/USER	0						0	0		None
IGZCPAC	Below/USER	1	1	00:00:00.04100	00:00:00.04100	DFHRPL		7	0	409,176	ERDSA
IGZCPCC	Below/USER	1	1	00:00:00.00393	00:00:00.00393	DFHRPL		6	0	12,432	ERDSA
IGZINSH	Below/USER	0						0	0		None
IIMMSGT	Below/USER	0						0	0		None
IIGZMSGT	Below/USER	0						0	0		None
IOSTREAM	Any/CICS	0						0	0		None
IXM4CS4	Any/CICS	0						0	0		None
JTRUEL	Any/CICS	1	1	00:00:00.00158	00:00:00.00158	DFHRPL		11	0	2,312	ECDSA
MONEXIT	Any/CICS	0						0	0		None
PBREPTR	Any/CICS	0						0	0		None
PBREPTRJ	Any/CICS	0						0	0		None
PBSTRTR	Any/CICS	0						0	0		None
REMOSTAT	/	0						0	0		None
RMIIN	Any/CICS	1	1	00:00:00.01435	00:00:00.01435	TESTLIB		0	0	336	ECDSA
RSINDI	Any/CICS	1	1	00:00:00.00241	00:00:00.00241	DFHRPL		1	0	56	ECDSA
SM64PROG	Any/CICS	0						0	0		None
WLMNOUT	Any/CICS	0						0	0		None
XPBASIC	Any/USER	0						0	0		None
<b>Totals</b>		<b>6,628</b>	<b>107</b>					<b>1</b>	<b>0</b>		

Sample Programs and Utilities - DFH0STAT ...											
Applid IYK221V3 Sysid CJB3 Jobname CI07CJB3 Date 02/19/2007 Time 12:18:31 CICS 6.5.0 PAGE 50											
<b>DFHRPL Analysis</b>											
DFHRPL Offset	DFHRPL Dataset name	Programs	Times Used	Fetches	Average Fetch Time	Newcopies	Removes				
0	CBAKER.JAVA.PDSE	0	0	0		0	0				
1	UTL.CBAKER.LOAD	3	3	3	00:00:00.00520	0	0				
2	PUBCER.IT2M.LOAD	7	26	8	00:00:00.00726	0	0				
3	BLDBSF.CERXA.SEFULOAD	0	0	0		0	0				
4	BLDBSF.CERXA.SDFHLOAD	68	6,574	75	00:00:00.00473	0	0				
5	UTL.CBAKER.LOAD	0	0	0		0	0				
6	PP.ADL370.ZOS170.SCEECICS	1	1	1	00:00:00.00393	0	0				
7	PP.ADL370.ZOS170.SCEERUN	8	8	8	00:00:00.10590	0	0				
8	PP.CBC.ZOS170.SCLBDLL	0	0	0		0	0				
9	PP.TCPIP.ZOS170.SEZATCP	6	10	6	00:00:00.01297	0	0				
10	CBAKER.CSATTOOL.SDFHLOAD	0	0	0		0	0				
11	JTILLI1.NODDYTRU.LOAD	2	2	2	00:00:00.00715	0	0				
12	MQM.V531.SCSQAUTH	1	1	1	00:00:00.00651	1	0				
<b>Totals</b>		<b>99</b>	<b>6,628</b>	<b>107</b>		<b>1</b>	<b>0</b>				
<b>LIBRARY Analysis</b>											
Programs	Times Used	Fetches	Average Fetch Time	Newcopies	Removes						
<b>Totals</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>00:00:00.01003</b>	<b>0</b>	<b>0</b>					



IBM 2007 IMPACT										IBM		
AppId IYK221V3 Sysid CJB3 Jobname CI07CJB3 Date 02/01/2007 Time 16:17:42										CICS 6.5.0		PAGE 3
User Exit Programs												
<---- Global Area ---->										No.		
Program Name	Entry Name	Entry Name	Length	Count	Exits	Program Status	Exit Program Use Count	LIBRARY				
								Name	LIBRARY Dataset Name			
DFHEDP	DLI		0	0	0	Started	0	DFHRPL	BLDSF.CERXA.SDFHLOAD			
DFHMQTRU	MQM	MQM	32	1	0	Started	9	DFHRPL	PUBCER.IT2M.LOAD			
CBTRUE1	CBTRUE1		0	0	0	Started	0	TESTLIB	CBAKER.TESTPROG.LOAD			
RMIIN	RMIIN		0	0	1	Started	39	TESTLIB	CBAKER.TESTPROG.LOAD			
RSINDI	RSINDI		0	0	1	Started	72	DFHRPL	UTI.CBAKER.LOAD			
JTRUE1	JTRUE1		0	0	0	Started	0	DFHRPL	JTILLI1.NODDYTRU.LOAD			
EZACIC01	EZACIC01	EZACIC01	468	1	0	Started	37	DFHRPL	PP.TCPIP.ZOSI170.SEZATCP			

AppId IYK221V3 Sysid CJB3 Jobname CI07CJB3 Date 02/01/2007 Time 16:17:42										CICS 6.5.0		PAGE 4
Program Name	Entry Name	API	Program Concurrency	Concurrency Status	Qualifier	Length	<----- Task Related User Exit Options ----->					
							Taskstart	EDF	Shutdown	Indoubt	SPI	Purgeable
DFHEDP	DLI	Cics	Quasirent	Quasirent		284	No	No	No	Wait	No	No
DFHMQTRU	MQM	Open	Threadsafe	Threadsafe	MQCD	224	No	No	Yes	Wait	Yes	No
CBTRUE1	CBTRUE1	Open	Threadsafe	Threadsafe		0	No	No	No	Wait	No	No
RMIIN	RMIIN	Cics	Threadsafe	Threadsafe		0	No	No	No	Wait	No	No
RSINDI	RSINDI	Cics	Threadsafe	Threadsafe		0	No	No	No	Wait	No	No
JTRUE1	JTRUE1	Open	Threadsafe	Threadsafe		0	No	No	No	Wait	No	No
EZACIC01	EZACIC01	Open	Quasirent	Threadsafe		788	No	No	Yes	Wait	No	Yes

AppId IYK221V3 Sysid CJB3 Jobname CI07CJB3 Date 02/01/2007 Time 16:17:42										CICS 6.5.0		PAGE 5
Global User Exits												
Exit Name	Program Name	Entry Name	<----- Global Area ----->			Number of Exits	Program Status	Program Concurrency	Concurrency Status			
XRSINDI	RSINDI	RSINDI	Entry Name	Length	Use Count	1	Started	Threadsafe	Threadsafe			
XRMIIN	RMIIN	RMIIN		0	0	1	Started	Threadsafe	Threadsafe			

© 2007 IBM Corporation

IBM 2007 IMPACT										IBM	
<h2>Sample Programs and Utilities – DFH0STAT – Notes</h2>											
<p>The previous slide shows an example of the updated DFH0STAT report for the User Exit Programs and Global User Exits.</p> <p>The user exit program reports have been re-arranged to include the LIBRARY name and LIBRARY dataset name from which the exit program was loaded when the exit program was enabled. In addition, the Program Concurrency and Concurrency Status on both the User Exit Programs and Global User Exits reports have been re-positioned to improve readability.</p> <p>The next four slides shows examples of the new DFH0STAT reports for WebSphere MQ Connections and IPCONNn followed by examples of the updated reports for Document Templates, and Pipelines.</p>											
© 2007 IBM Corporation											

IBM 2007 IBM

## Sample Programs and Utilities - DFH0STAT ...

Applid IYK221V3 Sysid CJB3 Jobname CI07CJB3 Date 06/29/2006 Time 09:06:39 CICS 6.5.0 PAGE 3

**WebSphere MQ Connection**

```

WebSphere MQ Connection Status . . . . . : CONNECTED
WebSphere MQ Queue Manager Name . . . . . : MQCD
Initiation Queue Name . . . . . : CICS01.INITQ
Number of current tasks . . . . . : 1
Number of futile attempts . . . . . : 0

Total number of API calls . . . . . : 2
Number of API calls completed OK . . . . . : 1

Number of OPEN requests . . . . . : 1
Number of CLOSE requests . . . . . : 0
Number of GET requests . . . . . : 1
Number of GETWAIT requests . . . . . : 1
Number of GETWAITs that waited . . . . . : 1
Number of PUT requests . . . . . : 0
Number of PUT1 requests . . . . . : 0
Number of INQ requests . . . . . : 0
Number of SET requests . . . . . : 0

Number of internal MQ calls . . . . . : 4
Number that completed synchronously . . . . . : 3
Number that needed I/O . . . . . : 0
Number of calls with TCB switch . . . . . : 3

Number of indoubt units of work . . . . . : 0
Number of unresolved units of work . . . . . : 0
Number of resolved committed UOWs . . . . . : 0
Number of resolved backout UOWs . . . . . : 0
Number of Backout UOWs . . . . . : 0
Number of Committed UOWs . . . . . : 0
Number of tasks . . . . . : 1
Number of Single Phase Commits . . . . . : 0
Number of Two Phase Commits . . . . . : 0
  
```

© 2007 IBM Corporation 69

IBM 2007 IBM

## Sample Programs and Utilities - DFH0STAT ...

Applid IYK221V3 Sysid CJB3 Jobname CI07CJB3 Date 03/05/2007 Time 08:03:11 CICS 6.5.0 PAGE 3

**IPCONN**

```

IPCONN Name . . . . . : CJB2
IPCONN Applid . . . . . : IYK221V2
IPCONN Network ID . . . . . : GBIBMIVA

IPCONN Status . . . . . : Acquired
IPCONN Service Status . . . . . : Inservice

TCPIPSERVICE Name . . . . . : CHRIS5

Host Name . . . . . : winmvs2c.hursley.ibm.com
Port Number . . . . . : 27639

SSL Authentication . . . . . : No
User Authentication . . . . . : Local

Receive Session Count . . . . . : 10
Current Receive Session Count . . . . . : 0
Peak Receive Session Count . . . . . : 0

Total Allocates . . . . . : 2
Current Allocates Queued . . . . . : 0
Peak Allocates Queued . . . . . : 0
Allocates Failed - Link . . . . . : 0
Allocates Failed - Other . . . . . : 0

Number of Transactions Attached . . . . . : 0

Function Shipping Requests
Program Control . . . . . : 2
Total . . . . . : 2

Bytes Sent by Program requests . . . . . : 174
Bytes Received by Program requests . . . . . : 150

Send Session Count . . . . . : 10
Current Send Session Count . . . . . : 0
Peak Send Session Count . . . . . : 1

Allocates per second . . . . . : 0.00
Allocate Queue Limit . . . . . : No
Allocates Rejected - Queue Limit . . . . . : 0

Max Queue Time (seconds) . . . . . : No
Max Queue Time - Allocate Queue Purge . . . . . : 0
Max Queue Time - Allocates Purged . . . . . : 0

XISQUE - Allocates Rejected . . . . . : 0
XISQUE - Allocate Queue Purge . . . . . : 0
XISQUE - Allocates Purged . . . . . : 0

Average Bytes Sent by Program requests . . . . . : 87
  
```

© 2007 IBM Corporation 70

IBM 2007 IBM

---

Applid IYK2Z1V3 Sysid CJB3 Jobname CI07CJB3 Date 03/20/2007 Time 16:17:29 CICS 6.5.0 PAGE 89

**Document Templates**

```

DOCTEMPLATE name . . . . . : SAMPLE
Template name . . . . . : LONGTEMPLATENAME

Append crlf . . . . . : Yes
Template contents . . . . . : Binary

Template cache size . . . . . : 0
Template type . . . . . : Hfsfile
HFS file name . . . . . : /usr/cbaker/templates/templatename

Use count . . . . . : 0
Newcopy count . . . . . : 0
Read count . . . . . : 0
Cache copy used . . . . . : 0
Cache copy deleted . . . . . : 0

```

---

```

DOCTEMPLATE name . . . . . : SAMPLE2
Template name . . . . . : SAMPLE2

Append crlf . . . . . : No
Template contents . . . . . : Binary

Template cache size . . . . . : 0
Template type . . . . . : File
File name . . . . . : TEMPLATE
Dataset name . . . . . : CBAKER.CICS1.DOCTEMPS

Use count . . . . . : 0
Newcopy count . . . . . : 0
Read count . . . . . : 0
Cache copy used . . . . . : 0
Cache copy deleted . . . . . : 0

```

© 2007 IBM Corporation 71

IBM 2007 IBM

## Sample Programs and Utilities - DFH0STAT ...

---

Applid IYK2Z1V3 Sysid CJB3 Jobname CI07CJB3 Date 03/20/2007 Time 16:17:29 CICS 6.5.0 PAGE 87

**PIPELINEs**

```

PIPELINE Name . . . . . : BOBPIPE
PIPELINE Mode . . . . . : Provider
PIPELINE Enable Status . . . . . : Enabled

Configuration file . . . . . : /u/dbeard1/pipeline/testrun.cfg

Shelf directory . . . . . : /u/dbeard1/shelf/

WSDIR pickup directory . . . . . : /u/cbaker/

PIPELINE use count . . . . . : 1

```

---

```

PIPELINE Name . . . . . : DFHWSATP
PIPELINE Mode . . . . . : Unknown
PIPELINE Enable Status . . . . . : Disabled

Configuration file . . . . . : /usr/lpp/cicsts/cicsts32/pipeline/configs/registrationservicePROV.xml

Shelf directory . . . . . : /var/cicsts/

WSDIR pickup directory . . . . . :

PIPELINE use count . . . . . : 0

```

© 2007 IBM Corporation 72

## Sample Programs and Utilities - DFHSTUP

- Interval and/or Summary Statistics Reports
  - 'Summary' Report is equivalent to 'Shutdown' statistics
- Statistics Record selection by ...
  - SELECT or IGNORE APPLID=(xxxxxxxx,xxxxxxxx,...)
    - Maximum of 250 Applid's in CICS TS V2.2 and later
  - DATE and/or TIME
  - SELECT or IGNORE TYPE=(DISPATCHER,PROGRAM,...)
  - Report Granularity ...
    - OVERVIEW - (TRANMGR, DISPATCHER, DSA, LOADER)
    - DSA, TRANMGR, LOADER, TRANDATA, DB2CONN, ...
- Statistics Report selection by ...
  - COLLECTION TYPE=INT,EOD,REQ,RRT,USS or ALL
  - SUMMARY

## Sample Programs and Utilities - DFHSTUP ...

### CICS Transaction Server V3.1 ...

- New keywords on SELECT/IGNORE TYPE
  - URIMAP, PIPELINE, and WEBSERVICE
- New Interval and Summary Reports ...
  - Urimap (Global and Resource), Pipeline, Webservice, ...
- Changed Reports ...
  - Dispatcher, Connections, TCP/IP, TCP/IP Services, ...
- Updated Sample Extract Exit Programs ...
  - DFH0STXR - Statistics Event Reporter
    - Events added and updated

## Sample Programs and Utilities - DFHSTUP ...

### CICS Transaction Server V3.2 ...

- New keywords on SELECT/IGNORE TYPE
  - DOCTEMPLATE, IPCONN, LIBRARY, MQCONN
- New Interval Reports ...
  - Library
- New Interval and Summary Reports ...
  - Doctemplate, IP Connectivity, WebSphere MQ Connection, ...
- Changed Interval and Summary Reports ...
  - DSA, Domain Subpool, Monitoring, ...
  - Loader, Program, Pipeline, JVMProfile, ...
- Updated Sample Extract Exit Programs ...
  - DFH0STXR - Statistics Event Reporter
    - Events added and updated

## Sample Programs and Utilities - DFHSTUP – Notes ...

The statistics utility program (DFHSTUP) for CICS Transaction Server for z/OS has been continually enhanced to include new functions along with many new and revised reports for all the statistics record changes in each CICS release.

Some of the new reports in CICS Transaction Server for z/OS Version 3.2 include:-

- Library, IP Connectivity, WebSphere MQ Connection, Document Templates.

The updated reports include:-

- Storage Manager – DSAs, Domain Supools, ...
- CICS Dispatcher (TCB Modes and TCB Pools), Connections, ...
- Monitoring, Loader, Programs, Pipeline, Jvmprofile.

Other enhancements in CICS Transaction Server for z/OS V3.2 include an updated version of the statistics event reporter sample program DFH0STXR in support of the new and enhanced statistics data in the release.



## Sample Programs and Utilities - DFH0STXR ...

- DFH0STXR - Statistics Event Reporter
  - Highlight potential problems - which if left undiagnosed ...
    - May cause system outages, Poor and/or Erratic Response time
  - Information Events
  - Warning Events
    - A defined threshold has been met or exceeded
    - Upper Threshold:- 90%      Lower Threshold:- 25%
  - Exception Events
    - Some type of CICS limit has been reached ...
      - MAXTASK, String Wait, SOS, ...
  - Specify the types of events that you want reported by ...
    - STXRINPT DD statement
    - [EXCEPTION] [WARNING] [INFORMATION]
    - Comment statements are also allowed - '\*' in column 1

## Sample Programs and Utilities - DFH0STXR ...

- DFH0STXR - Statistics Event Reporter ...
  - Exception, Warning and Information Events
  - 138 Events defined in DFH0STXR (CICS TS 3.2)

```

.....
//xxxxxxx EXEC PGM=DFHSTUP,REGION=0M
//STEPLIB DD DSN=CICSTS32.CICS.SDFHLOAD,DISP=SHR
//        DD DSN=PP.ADLE370.ZOS170.SCEERUN,DISP=SHR
//DFHSTATS DD DSN=statistics data set name,DISP=SHR
//DFHSTWRK DD UNIT=SYSDA,SPACE=(CYL,(10,5))
//DFHPRINT DD SYSOUT=A
//SYSOUT DD SYSOUT=A
//SYSPRINT DD SYSOUT=A
//STXRRPT DD SYSOUT=A
//STXRINPT DD *
EXCEPTION                               <-- Event Reporter Control Statements!
WARNING                                  <-- Exception Events (Default!)
/*                                       <-- Warning Events
//SYSIN DD *
SELECT APPLID=(applid1,applid2)
EXTRACT PROGRAM=DFH0STXR                <-- Statistics Event Reporter Only!
/*
    
```

## Sample Programs and Utilities - DFH0STXR - Notes

### Exception Events (61)

Autoinstall, Connection, DBCTL, DB2, Dispatcher, FEPI, File Control and LSRPOOL, ...  
 Loader, Program, Logstream, Monitor, Program Autoinstall, TCP/IP, Statistics, ...  
 Storage Manager, Temporary Storage, System Dumps, Transaction Dumps, ...  
 Transaction Manager, Transient Data, VTAM

### Warning Events (56)

Autoinstall, Connection, CorbaServer, DB2, Dispatcher, Enqueue, File Control, Loader, ...  
 Program, Logstream, Monitor, Recovery Manager, TCP/IP, Statistics, Storage Manager, ...  
 Temporary Storage, Transaction Manager, Transient Data

### Information Events (21)

DB2, Dispatcher, Dispatcher MVSTCB, Logger, TCP/IP, Storage Manager, ...  
 Temporary Storage, Transaction Manager, Transient Data, VTAM

Each event id has the format:- 'xxyyy'

xx is the two character CICS component (e.g. LD - Loader Domain, DS - Dispatcher, ...)  
 yyy is a three digit event id number unique with type of event (exception, warning, information).

## Sample Programs and Utilities - DFH0STXR ...

CICS 6.3.0 Statistics Exception Event Reporter Report Date: 05/07/2003 Report Time: 17:53:38 Page 38

Event Type	Record Date	Record Time	Stats Type	Event Applid	Event id	Event Description
I	05/07/2003	16:58:04	EOD	IYK3ZNR1	XM002	Tranclass 'DFHTCL06' Class Limit = 1. Current Tasks = 0. Peak Tasks = 0.
I	05/07/2003	16:58:04	EOD	IYK3ZNR1	XM002	Tranclass 'DFHTCL07' Class Limit = 1. Current Tasks = 0. Peak Tasks = 0.
I	05/07/2003	16:58:04	EOD	IYK3ZNR1	XM002	Tranclass 'DFHTCL08' Class Limit = 1. Current Tasks = 0. Peak Tasks = 0.
I	05/07/2003	16:58:04	EOD	IYK3ZNR1	XM002	Tranclass 'DFHTCL09' Class Limit = 1. Current Tasks = 0. Peak Tasks = 0.
I	05/07/2003	16:58:04	EOD	IYK3ZNR1	XM002	Tranclass 'DFHTCL10' Class Limit = 1. Current Tasks = 0. Peak Tasks = 0.
I	05/07/2003	16:58:04	EOD	IYK3ZNR1	DS001	MAXOPENTCBS Limit = 12. Current TCBS = 0. Peak TCBS = 0.
I	05/07/2003	16:58:04	EOD	IYK3ZNR1	DS002	MAXJVMTCBS Limit = 5. Current TCBS = 0. Peak TCBS = 0.
I	05/07/2003	16:58:04	EOD	IYK3ZNR1	DS003	MAXHPTCBS Limit = 5. Current TCBS = 0. Peak TCBS = 0.
W	05/07/2003	16:58:04	EOD	IYK3ZNR1	NQ001	Local Enqueues Waited in ENQ Pool 'FCDSRECD' = 17.
I	05/07/2003	16:58:04	EOD	IYK3ZNR1	SM001	DSA Limit = 5,120K. Allocated = 2,048K. Peak = 2,048K.
I	05/07/2003	16:58:04	EOD	IYK3ZNR1	SM002	EDSA Limit = 28,672K. Allocated = 28,672K. Peak = 28,672K.
E	05/07/2003	16:58:04	EOD	IYK3ZNR1	SM001	Times SOS in 'ECDSA' = 10. Cushion Releases = 85.
E	05/07/2003	16:58:04	EOD	IYK3ZNR1	SM003	Times Suspended for Storage in 'ECDSA' = 3. Peak = 1. Purged = 0.
E	05/07/2003	16:58:04	EOD	IYK3ZNR1	SM001	Times SOS in 'EUDSA' = 4. Cushion Releases = 0.
E	05/07/2003	16:58:04	EOD	IYK3ZNR1	SM003	Times Suspended for Storage in 'EUDSA' = 51. Peak = 6. Purged = 0.
W	05/07/2003	16:58:04	EOD	IYK3ZNR1	SM001	Cushion Releases in 'ECDSA' = 85. Size = 5,120K.
E	05/07/2003	16:58:04	EOD	IYK3ZNR1	LD002	DFHREL Dataset Opened = 2.
I	05/07/2003	16:58:04	EOD	IYK3ZNR1	TS001	DFHTEMP CIs = 359. Peak Used = 12. DFHTEMP CI Size = 4,096.
I	05/07/2003	16:58:04	EOD	IYK3ZNR1	TS002	Current TSQueues = 3. Peak TSQueues = 4. Peak TSMain = 0K.
I	05/07/2003	16:58:04	EOD	IYK3ZNR1	TD001	DFHINTRA CIs = 156. Peak Used = 1. DFHINTRA CI Size = 1,536.
I	05/07/2003	16:58:04	EOD	IYK3ZNR1	ZC001	Max RPLs Posted = 1. Peak LGS = 1. Dynamic Opens = 0.
E	05/07/2003	16:58:04	EOD	IYK3ZNR1	DU004	System Dumps Requested = 2. Suppressed = 10.
E	05/07/2003	16:58:04	EOD	IYK3ZNR1	DU003	System Dumpcode 'LD0002' Taken = 2. Suppressed = 0.
E	05/07/2003	16:58:04	USS	IYK3ZNR1	FC001	String Waits for File Name 'RAMFILE' = 10. Peak = 3. Strings = 1.
W	05/07/2003	16:58:04	EOD	IYK3ZNR1	LG001	Force Waits on Logstream 'NRACH.IYK3ZNR1.DFHLOG' = 2. Peak Wtrs = 1.
I	05/07/2003	16:58:04	EOD	IYK3ZNR1	SO001	MAXSOCKETS Limit = 1,500. Peak Inbound = 0. Peak Outbound = 0.

## Sample Programs and Utilities - DFH0STXR ...

## ▪ Exception Events ...

```

Allocates Failed Link for Connection 'xxxx' = nn,nnn,nnn. Allocates = nn,nnn,nnn.
DB2 Pool Thread Waits = nn,nnn,nnn. Pool Thread Limit = nn,nnn. DB2 Conn 'xxxxxxxx'.
Times at MAXOPENTCBS = nn,nnn. Peak Waiting = nn,nnn. MAXOPENTCBS Limit = nn,nnn.
String Waits for File Name 'xxxxxxxx' = nnn,nnn. Peak = nn,nnn. Strings = nn,nnn.
Times at MAXSOCKETS = nn,nnn,nnn. MAXSOCKETS Limit = nn,nnn.
Times SOS in 'xxxxxxxx' = nn,nnn,nnn. Cushion Releases = nn,nnn,nnn.
String Waits on DFHTEMP = nn,nnn,nnn. Peak Waits = nnn. Strings = nnn.
Transaction Dumpcode 'xxxx'. Taken= nn,nnn,nnn. Suppressed = nn,nnn,nnn.
Times at MXT Limit = nn,nnn,nnn. MXT Limit = nnn. Peak Queued = nnn.
Times at Tranclass 'xxxxxxxx' Limit = nn,nnn,nnn. Limit = nnn. Peak Queued = nnn.

```

## ▪ Warning Events ...

```

Queued terminal logons = nn,nnn,nnn. Peak Queued = nn,nnn. Times at Peak = nn,nnn.
Peak DB2 TCBS = nnn% of TCBLIMIT. Limit = nnnn. DB2 Conn = 'xxxxxxxx'
Peak Lx TCBS = nnn% of MAXOPENTCBS. MAXOPENTCBS Limit = nn,nnn.
Local Enqueues Waited in ENQ Pool 'xxxxxxxx' = nn,nnn,nnn.
Force Waits on Logstream 'xxxxxxxxxxxxxxxxxxxxxxxxxxxx' = nnn,nnn. Peak Wtrs = nnn.
Shunted UOWs for Indoubt Failure = nn,nnn,nnn.
Timed out at MAXSOCKETS = nn,nnn,nnn. MAXSOCKETS Limit = nn,nnn.
Cushion Releases in 'xxxxxxxx' = nn,nnn,nnn. DSA Size = nn,nnn,nnnK.
DFHTEMP in use = nnn%. DFHTEMP CIs = nn,nnn,nnn. DFHTEMP CI Size = nn,nnn.
Peak Tasks = nnn% of MXT. MXT Limit = nnn.
Peak Transactions in Tranclass 'xxxxxxxx' = nnn% of Tranclass Limit. Limit = nnn.

```

## Sample Programs and Utilities - Statistics ...

- Statistics Utility Program - DFHSTUP ...
  - Interval and/or Summary Statistics Reports
- 'Summary' Report equivalent to Shutdown statistics
- Statistics Sample Program - DFHOSTAT ...
  - Provides a "Snapshot" on the Statistics Data
    - Data collected since the last statistics interval
  - Incomplete and Missing Data ...
    - Unsolicited Statistics Records - DBCTL, ..., ...
    - Any Discarded or Closed CICS Resources
      - (e.g. Files, LSR Pools, TDQueues, ...)
    - System and Transaction Dumps, ...

**Only DFHSTUPs "SUMMARY" Report will give you a completely accurate daily statistics report!**

## Summary

- Enhancements and Support for New CICS Functions
- Enhanced Monitoring Data ...
  - Dispatcher, Channels, Containers, Web, ...
  - Clock Precision and Capacity, IP Connectivity, WebSphere MQ, ...
- SMF Data Volume - Performance record size!
  - Monitoring Clock field precision and capacity
  - Monitoring SMF 110 Record Compression support
- New and Enhanced Statistics Data ...
  - Urimap, Pipeline, Webservice, Dispatcher, Connection, ...
  - Library, IP Connectivity, WebSphere MQ, Doctemplate, ...
- Enhanced Sample Programs and Utilities
  - DFH\$MOLS – New EXPAND function, Revised Report Format
  - DFH0STAT and DFHSTUP – Many New and Enhanced Reports....

## References

*CICS Performance Analyzer for z/OS User's Guide, SC34-6799*  
*CICS Performance Analyzer for z/OS Report Reference, SC34-6800*

*CICS Resource Definition Guide, SC34-6815*  
*CICS Performance Guide, SC34-6833*

*z/OS V1R8.0 MVS System Management Facilities (SMF), SA22-7630*

*z/OS Resource Measurement Facility User's Guide, SC33-7996*  
*z/OS Resource Measurement Facility Report Analysis, SC33-7991*  
*z/OS Resource Measurement Facility Performance Management Guide, SC33-7992*

*z/OS Communications Server IP CICS Sockets Guide, SC31-8807*

### Redbooks:

*CICS Performance Analyzer, SG24-6063*  
*Threadsafe considerations for CICS, SG24-6351*



IBM 2007  
**IMPACT**

**IBM**<sup>®</sup>

**Questions  
and  
Answers**

impact·venture\*