

CICS Tools: Tuning CICS with CICS Performance Analyzer V5.3

Ezriel Gross - Circle Software Incorporated

Tuesday, November 8, 2016, 10:30 CST / 16:30 GMT

<http://www.fundi.com/virtualcics/meetings.htm>

Webinar ID: 939-962-403

Agenda

Introduction

CICS tasks, transactions, and programs

CICS monitoring facility and CMF data types

Response time and suspend time

Value and benefits of CICS PA

Settings for SMF data collection

CICS PA overview and performance reporting

Architecture

Documentation

ISPF interface

Report forms

Performance reports

CICS PA statistics reporting

CICS Statistics

Statistics reporting

Statistics alerts

Plug-in to the CICS Explorer

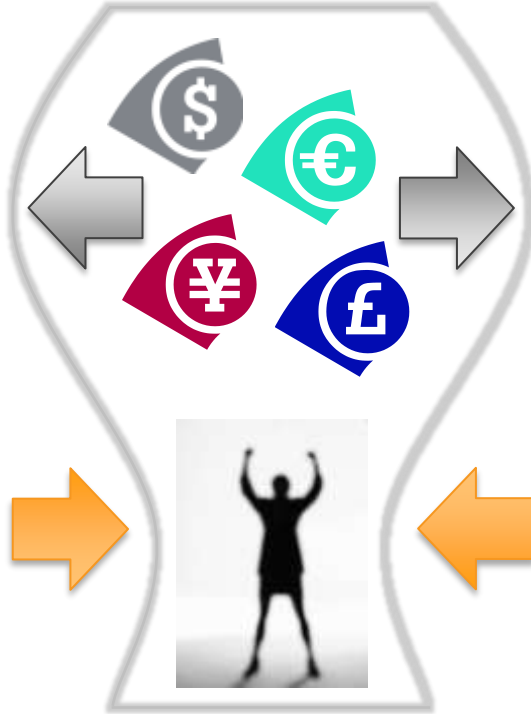
Discussion

CICS Performance Analyzer for z/OS

Introduction

Introduction

Today's world:



Ever-expanding costs

Pressure to reduce expenditure

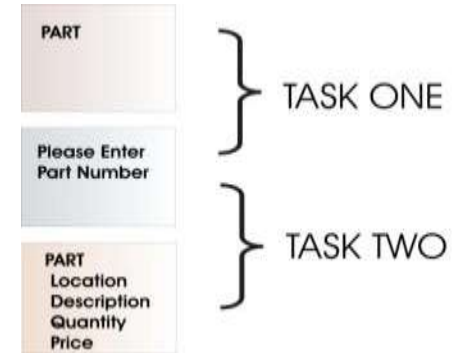
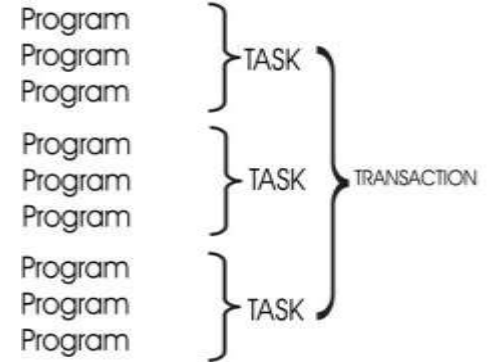
Lack of skilled resources

This session introduces IBM's premier CICS tuning product, CICS Performance Analyzer for z/OS

- Functions and features of the product
- Real-world examples of how to resolve performance problems and optimize operations

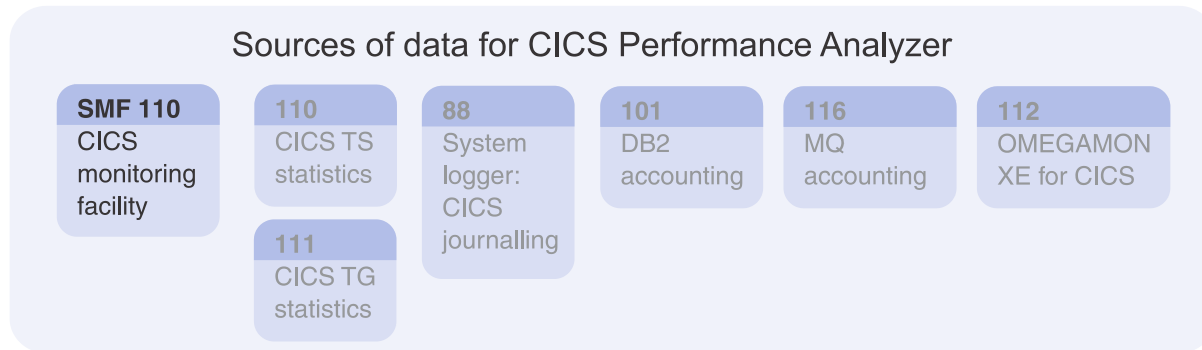
CICS tasks and programs

- A task is an instance of a transaction started by a user
- When a user types in data and presses Enter or a Function key, CICS begins a task and loads the necessary programs
- Tasks run concurrently. Therefore, a user can run multiple instances of the same transaction simultaneously
- CICS multitasks giving fast response times
- CICS runs each task, briefly giving CPU to each one



CICS monitoring facility (CMF)

- CMF collects data about all transactions in CICS
- Records are written to SMF for later offline processing
- CMF collects 4 classes of data: exception, identity, performance, and transaction resource
- CMF can produce a significant volume of data, so CICS compresses the data by default
- To exclude monitoring data fields, use a monitoring control table (MCT)
- To process output you can use CICS Performance Analyzer or CICS-supplied sample program DFH\$MOLS



CMF data types

- **Exception class**
 - Information about resource shortages encountered
 - Queuing for file strings
 - Wait for temporary storage buffers
 - Highlights problems in CICS system operation
 - Identifies system constraints that affect performance
 - One exception record written for each condition that occurs
- **Identity class**
 - Provides enhanced audit information
 - Captures identity propagation data from a client system across a network for eligible transactions

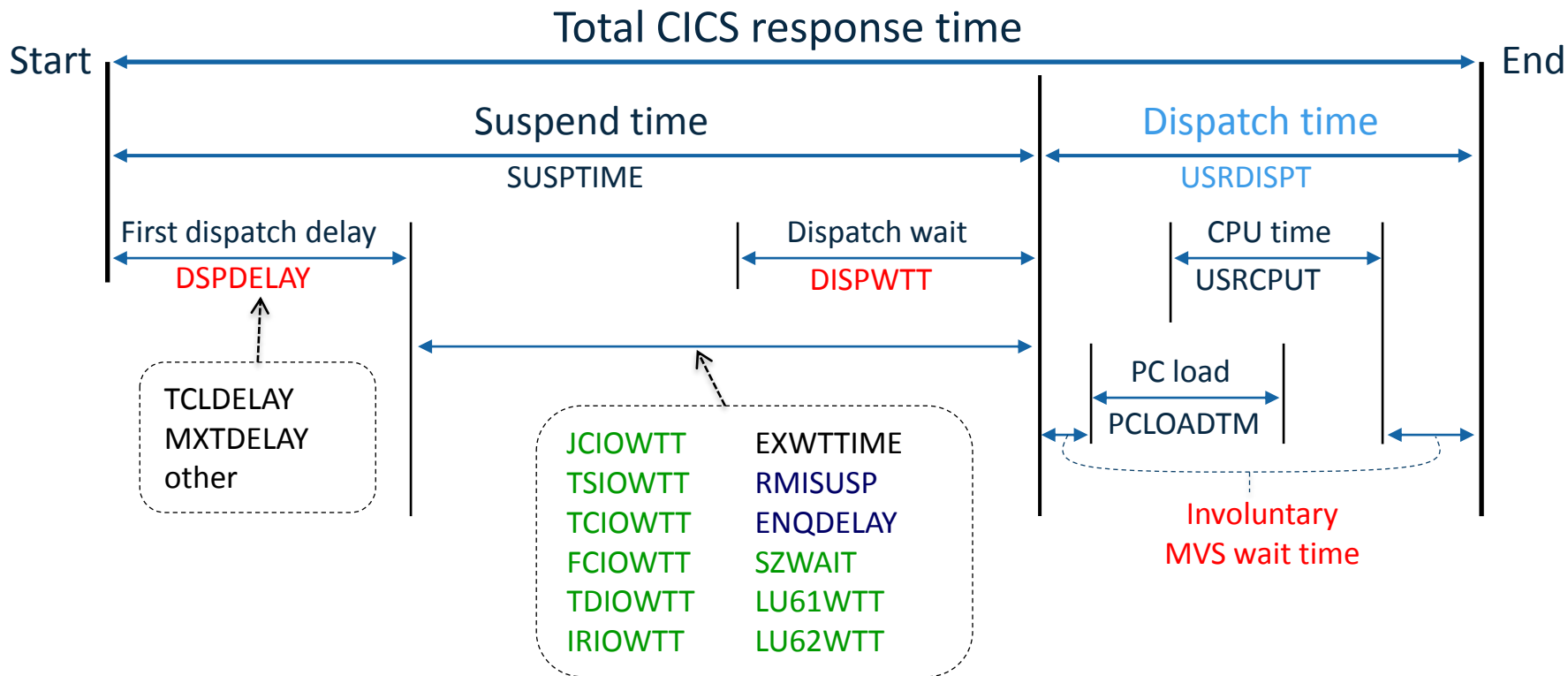
CMF data types

- **Performance class**
 - Provides detailed transaction information
 - Processor and elapsed time
 - Time spent waiting for I/O
 - One record per transaction
- **Transaction Resource class**
 - Additional transaction level information about individual resources accessed by a transaction
 - Items such as distributed program links, file and temporary storage queues
 - One transaction resource record per transaction monitored
 - Record cut only if transaction accesses at least one resource being monitored

Response time

- Response time consists of two elements:
 1. **Suspend time:** the time a task is not executing (waiting)
 2. **Dispatch time:** the time that CICS thinks the task is executing. This time is further divided into:
 - A. **CPU time:** the time the task is executing on CPU
 - B. **Wait time:** the time the CPU has been taken away from the task without the knowledge of CICS
- CPU to dispatch ratio:
 - Ratio = (CPU time/dispatch time) * 100
 - Objective is 80% or higher

Response time structure of CICS transaction



Suspend time breakdown

Suspend time = First dispatch time + I/O wait time +
Other wait time + Unaccounted wait time

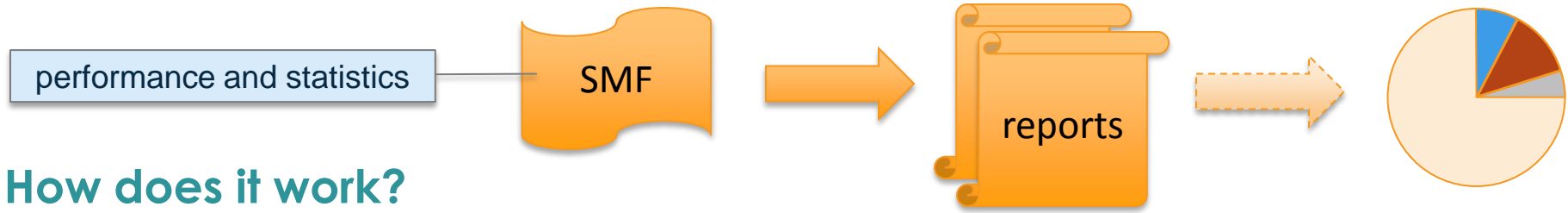
First dispatch delay includes
TRANCLASS delay and MXT delay

Total I/O wait time =
(terminal I/O wait time +
temporary storage I/O wait time +
shared temporary storage I/O wait time +
transient data I/O wait time +
journal (MVS Logger) I/O wait time +
file I/O wait time +
RLS file I/O wait time +
Coupling Facility Data Table (CFDT) I/O wait time +
inbound socket I/O wait time +
outbound socket I/O wait time +
inter-region (MRO) I/O wait time +
LU 6.1 I/O wait time +
LU 6.2 I/O wait time +
FEPI I/O wait time)

Total Other wait time =
(CICS OTE TCBS delay time +
CICS change-TCB mode delay time +
TCB mismatch wait time +
ENQ delay time +
IC/WAIT interval control delay time +
Lock Manager (LM) delay time +
RMI suspend time +
BTS delay +
JVM suspend +
request receiver wait time +
request processor wait time +
RRMS/MVS in-doubt wait time +
3270 bridge partner wait time +
CFDT server sync point wait time +
MVS storage constraint wait time +
dispatchable waits wait time)

What is CICS PA?

- A comprehensive performance reporting and analysis tool for CICS
- Provides ongoing system management and measurement reports on all aspects of CICS application performance



How does it work?

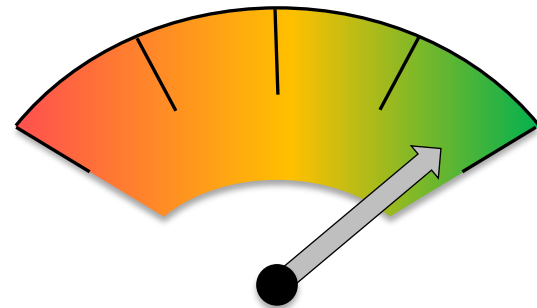
- Uses SMF data as input
- Easy to use interface for report generation (over 250 supplied report forms)
- Performance and statistical analysis
- Graphical performance analysis via CICS Explorer

What is its value?

- Analyze CICS application performance
- Improve CICS resource usage
- Evaluate the effects of CICS tuning efforts
- Improve transaction response time
- Provide ongoing system management and measurement reports
- Increase availability of resources
- Increase the productivity of system and application programmers
- Provide awareness of usage trends

Why is it important?

- Reduce time and resource required to analyze offline performance data
- Enables deep-dive CICS performance analysis and understanding of usage trends
- Aids capacity planning and tuning
- Help quickly identify trends, anticipate and prevent online performance problems



Benefits

- Ease of use
 - No additional setup or customization required
 - Familiar CICS terms and concepts
- ISPF dialog to build, maintain, and submit reports
 - Tailor your reports easily using report forms
 - Extensive online help available, and field descriptions
- Extensive tabular reports and graph reports
 - Summary, Wait Analysis, ...
 - Resource Usage, DB2, WebSphere MQ, z/OS System Logger
- Extract data sets
 - Cross-System Work, Export, Record Selection, System Logger

Benefits

- Trend and capacity planning
- Statistics reporting capability
 - Comprehensive reporting and analysis of CICS statistics data
 - Alert processing to highlight potential tuning opportunities
- Transaction profiling
 - Compares transaction performance between two time periods
- Plug-in to the CICS Explorer
 - Graphical interface allows for interactive query analysis of performance data with the ability to create charts and graphs

Settings for SMF data collection

CICS 110 records

1. Turn on Exception and Performance class monitoring:
 - MN=ON
 - MNPER=ON
 - MNEXC=ON
2. Review MCT settings for each region
 - Ensure that RMI is set to YES in the MCT so details are collected for each of the resource managers
3. Ensure the statistics settings are as follows:
 - STATRCD=ON
 - STATINT=010000 (*010000 is for 1 hour. You may choose to set the interval differently*)

DB2 101 records

- Include ACCOUNTREC(TASK) in the DB2CONN resource definition to collect DB2 data at the task level

MQ 116 records

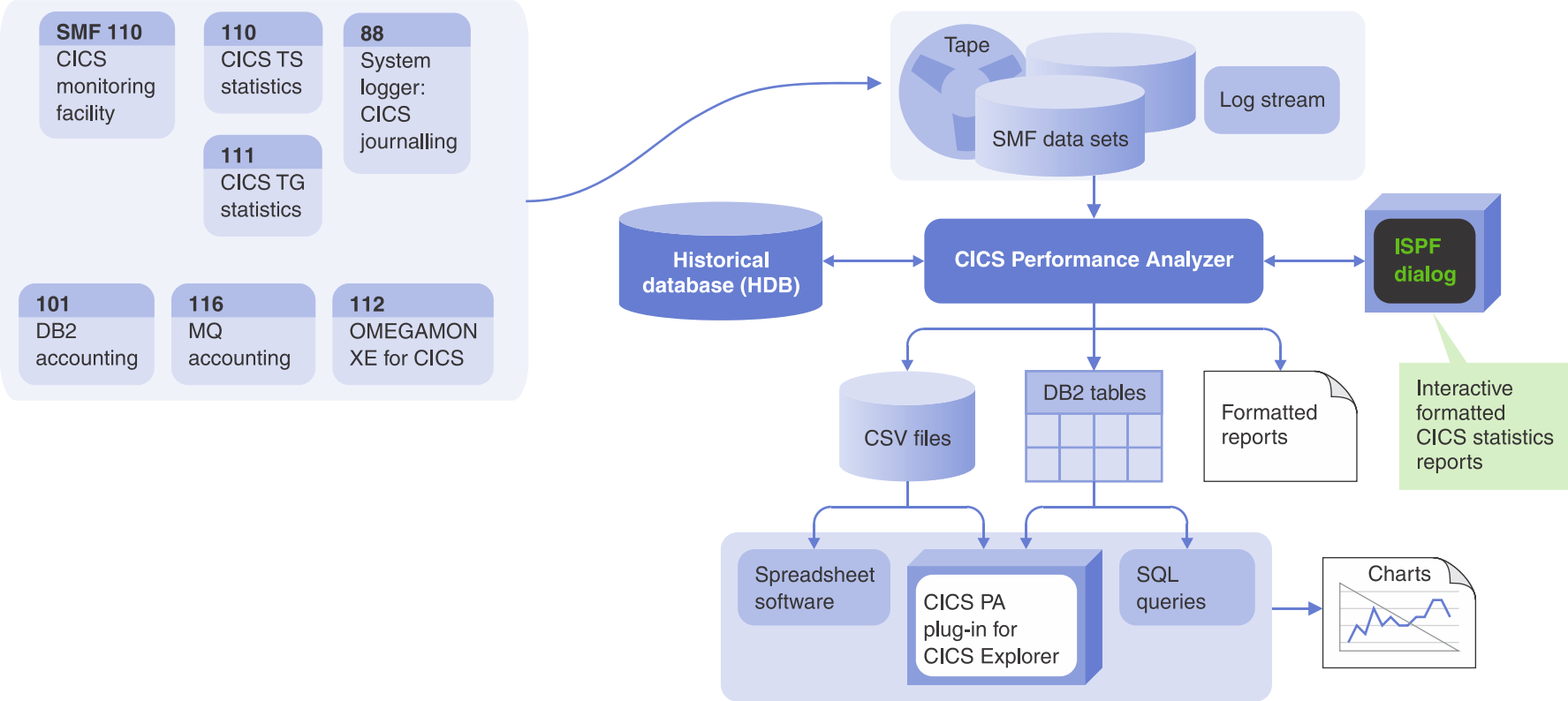
- To report IBM MQ details, you must collect SMF 116 records from MQ

See IBM Knowledge Center for details <https://www-01.ibm.com/support/knowledgecenter/>

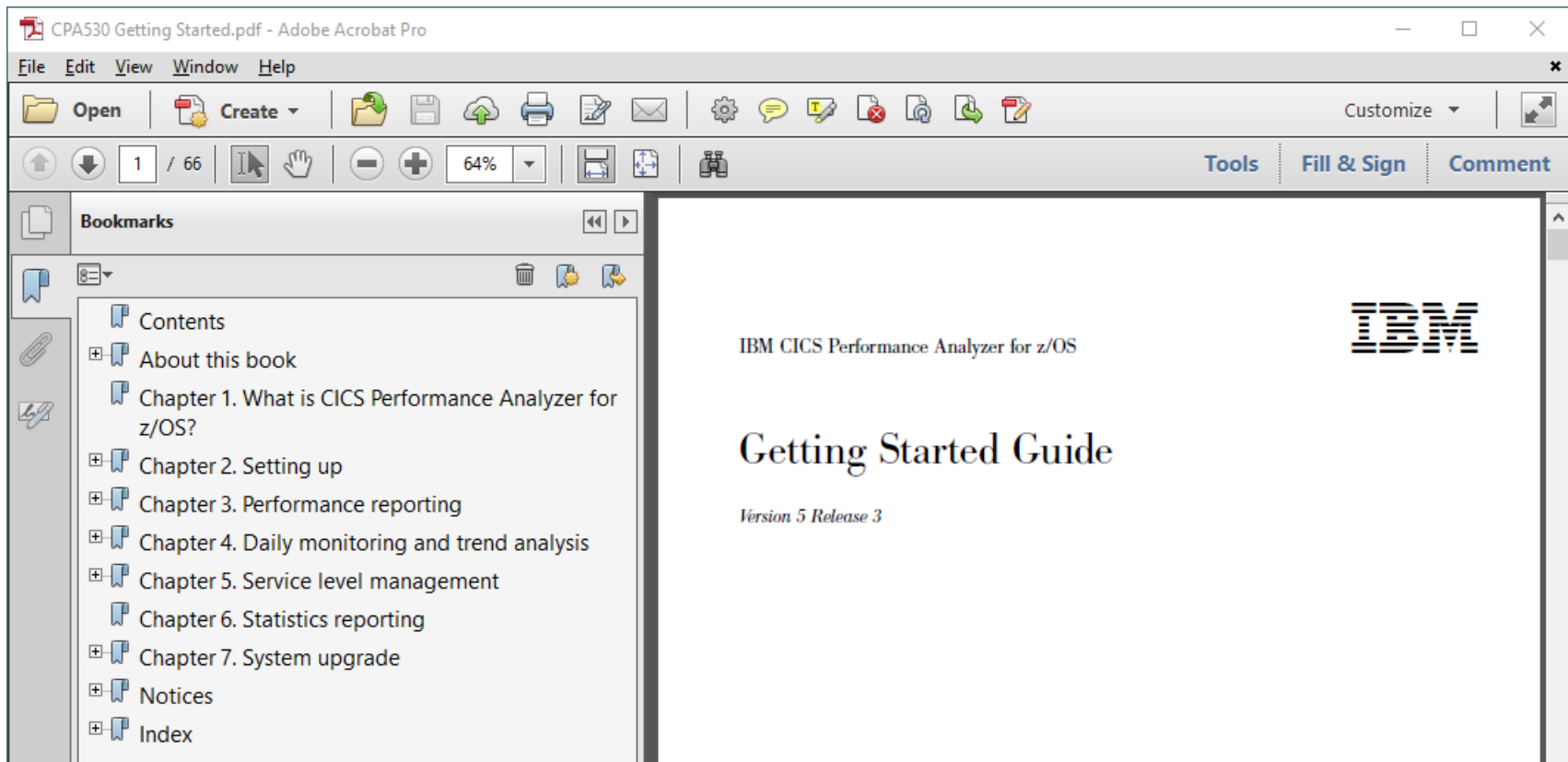
CICS Performance Analyzer for z/OS

CICS PA overview and performance reporting

Architecture



Documentation - Getting Started Guide



ISPF interface

Performance reports identify troublesome **transactions**

Report Set - MAXTASK

Row 1 of 25
Scroll ==> PAGE

Description . . . MXT exceeded analysis

Enter "/" to select action.

```

** Reports **
+ ___ Options Active Yes
+ ___ Selection Criteria No
- ___ Performance Reports Yes
  ___ List Yes
  ___ List Extended No
  ___ Summary Yes
  ___ Totals No
  ___ Wait Analysis Yes
  ___ Transaction Profiling No
  ___ Cross-System Work No
  ___ Transaction Group No
  ___ BTS No
  ___ Workload Activity No
  ___ Transaction Tracking List No
  ___ Transaction Tracking Summary No
+ ___ Exception Reports No
+ ___ Transaction Resource Usage Reports No
- ___ Statistics Reports Yes
  ___ List No
  ___ Summary Yes
  ___ Alert Yes
  ___ Gateway No
  ___ No No
  ___ No No
  ___ No No
  
```

Statistics reports identify **resources** and **CICS functions** that could be affecting CPU consumption

MAXTASK - Performance List Reports Row 1 from 1
Command ==> _____ Scroll ==> CSR

___ System Selection ___ Selection Criteria
/ Exc APPLID + Image + Group + Output Form + Alert +
- _____ MXTBYTSK MXTBYTSK _____ NO

MAXTASK - Performance Summary Reports Row 1 from 1
Command ==> _____ Scroll ==> CSR

___ System Selection ___ Selection Criteria
/ Exc APPLID + Image + Group + Output Form + Alert +
- _____ MXTBYTOD MXTBYTOD _____ NO

MAXTASK - Statistics Summary Reports Row 1 from 3
Command ==> _____ Scroll ==> CSR

___ System Selection ___
/ Exc APPLID + Image + Group + Output Form + Alert +
- _____ STGOVRV STGOVRV _____
- _____ VIRTSTG VIRTSTG _____
- _____ TRANMNGR TRANMNGR _____

Report forms

- Report forms allow you to tailor the output and format of your reports and data extracts
- Over 250 sample report forms provided with CICS PA, covering every aspect of CICS transaction activity and resource usage

Sample Report Forms Row 71 to 84 of 241

Command ==> _____ Scroll ==> CSR

Select one or more Sample Report Forms then press EXIT.

Name	Type	Description	Saved
— EPEC4SUM	SUMMARY	CICS Event Capture Activity (V4)	
— EPEC4SU1	SUMMARY	Event Capture by Time-of-Day(V4)	
— EXPLORE5	SUMMARY	Explorer CSV for CICS TS V5	
— EXWTLST	LIST	Exception Wait Analysis	
— EXWTSUM	SUMMARY	Exception Wait Analysis	
— FCLST	LIST	File Request Activity	
— FCRQRNGC	SUMMARY	File Request Distribution	Yes
— FCRQRNGP	SUMMARY	File Request Distribution (%)	Yes
— FCSUM	SUMMARY	File Request Activity	Yes
— FCTYLST	LIST	Transaction Facility Analysis	

Each sample can be used as it is, or easily customized

Easy to customize sample reports

Line command H provides help and expanded description of each field

Move (M) a field after (A) another field to reorder fields. Fields above EOR appear in report.

```

File  Edit  Confirm  Upgrade  Options  Help
-----
                                EDIT LIST Report Form - FCLIST          Row 1 of 416 More: >
Command ===> _____ Scroll ===> CSR

Description . . . List Report Form _____ Version (VRM): 700

Selection Criteria:
  _ Performance _____ Page width . . 132

  Field
  / Name +   Type   Fn   Description
  _ TRAN    _____   ___   Transaction ident
  D USERID  _____   ___   User ID
  _ PROGRAM _____   ___   Program name
  _ TASKNO  _____   ___   Transaction identification number
  _ STOP    TIMET  _____   Task stop time
  A RESPONSE _____   ___   Transaction response time
  _ DISPATCH TIME  _____   Dispatch time
  _ CPU     TIME  _____   CPU time
  M SUSPEND TIME  _____   Suspend time
  D DISPWAIT TIME  _____   Redispatch wait time
  _ FCWAIT  TIME  _____   File I/O wait time
  _ FCAMCT  _____   ___   File access-method requests
  _ EOR     _____   ___   ----- End of Report -----
  _ EOX     _____   ___   ----- End of Extract -----
  _ ABCODEC _____   ___   Current ABEND code
  _ ABCODEO _____   ___   Original ABEND Code
  
```

7 date/time formats are available

Performance List report – File Requests

V5R3M0

CICS Performance Analyzer
Performance List

LIST0001 Printed at 9:31:21 10/14/2016

Data from 22:59:58 4/19/2016

APPLID CJTCNQ2

Tran	Program	TaskNo	Stop Time	Response Time	Suspend Time	Dispatch Time	User CPU Time	FC Wait Time	FCAMRq
QXPE	QXPDC00	71963	22:59:58.735	.0085	.0073	.0011	.0007	.0025	16
QXPE	QXPDC00	71964	22:59:58.744	.0106	.0091	.0015	.0007	.0025	24
QX38	QX37C01	71966	22:59:59.317	.0011	.0000	.0011	.0006	.0000	0
DSMJ	DZ10AAA	71965	22:59:59.317	.0014	.0011	.0002	.0002	.0000	0
QX02	QX00C01	71944	22:59:59.476	2.0111	2.0098	.0013	.0011	.0023	18
DAPB	DZ12ABA	71968	22:59:59.480	.0042	.0035	.0007	.0006	.0000	0
QXPE	QXPDC00	71969	22:59:59.483	.0069	.0054	.0014	.0008	.0018	16
QX02	QX00C01	71953	23:00:00.362	2.0468	2.0449	.0019	.0016	.0052	51
QX38	QX37C01	71972	23:00:00.535	.0005	.0000	.0005	.0004	.0000	0

Performance Summary report

- Sort and summarize the data in your report
- Sorting criteria
 - Up to eight sort fields
 - Ascending or descending sequence (in any combination)
- Statistics functions available include:
 - Avg, Min, Max, Total, Std Deviation, Peak Percentile, Range, ...
- Reporting options:
 - Time Interval
 - Totals Level:
 - blank – suppress totals
 - 0 through 8 – optional sub-totals

Performance Summary report

```
EDIT SUMMARY Report Form - PS1          Row 1 of 401 More: >
Command ===> _____ Scroll ===> CSR
Description . . . Summary Report Form      Version (VRM): 700
Selection Criteria:
  _ Performance                               Page width . . 132

  Field      Sort
  / Name +   K  O Type   Fn  Description
  ---
  TRAN      K  A  _____  _____  Transaction identifier
  WEBDESC   -  -  _____  _____  User field - Web description
  TASKCNT   -  -  _____  _____  Total Task count
  RESPONSE -  -  _____  AVE    Transaction response time
  RESPONSE -  -  _____  MAX    Transaction response time
  DISPATCH -  -  _____  TIME   Dispatch time
  CPU       -  -  _____  AVE    CPU time
  SUSPEND   -  -  _____  TIME   Suspend time
  SUSPEND   -  -  _____  MAX    Suspend time
  DISPWAIT -  -  _____  TIME   Redispach wait time
  FCWAIT    -  -  _____  AVE    File I/O wait time
  FCAMCT    -  -  _____  AVE    File access-method requests
  IRWAIT    -  -  _____  TIME   MRO link wait time
  SC24UHWM -  -  _____  AVE    UDSA HWM below 16MB
  SC31UHWM -  -  _____  AVE    EUDSA HWM above 16MB
  EOR       -  -  _____  _____  ----- End of Report -----
  EOX       -  -  _____  _____  ----- End of Extract -----
  ABCODEC   K  *  _____  _____  Current ABEND code
  ABCODEO   K  *  _____  _____  Original ABEND Code
  ACAPPLNM K  *  _____  _____  Application context application name
```

...

Performance Summary report

V5R3M0

CICS Performance Analyzer
Performance Summary

0SUM0001 Printed at 15:29:36 12/06/2016

Data from 00:17:50 11/23/2015 to 23:59:49 11/23/2015

Page 1

Tran	WEBDESC	#Tasks	Avg Response Time	Max Response Time	Avg Dispatch Time	Avg User CPU Time	Avg Suspend Time	Max Suspend Time	Avg DispWait Time	FC	Avg Wait Time	Avg FCAMRq Count	Avg IR Wait Time	Avg SC24UHW Count	Avg SC31UHWM Count
DSA2	wachinformation	876	.0261	1.2575	.0094	.0067	.0167	1.2470	.0040	.0000	43	.0000	0	8873477	
DSA2	wactualdisbursements	130	.0339	.2196	.0196	.0137	.0142	.1928	.0047	.0000	200	.0000	0	9228932	
DSA2	waddhistory	44309	.0272	6.2085	.0080	.0061	.0192	6.2001	.0032	.0000	29	.0000	0	8526714	
DSA2	wadverseactionhierarchy	5	.0392	.0435	.0303	.0096	.0090	.0164	.0036	.0000	63	.0000	0	8919520	
DSA2	wbankersnote	9200	.0326	3.0703	.0147	.0118	.0179	3.0548	.0039	.0000	57	.0000	0	8547006	
DSA2	wcchupdate	37083	.0334	5.2381	.0103	.0074	.0231	5.2260	.0040	.0000	58	.0000	0	8918366	
DSA2	wchecklist	4823	.3627	4.6495	.1993	.1375	.1635	4.4762	.0351	.0000	2494	.0000	0	9230632	
DSA2	wclosingmethodrecommend	37	.1910	.3687	.1514	.0965	.0396	.1822	.0196	.0000	1846	.0000	0	9131641	
DSA2	wclosingsupport	3632	.0916	2.3611	.0337	.0236	.0580	2.3270	.0077	.0000	370	.0000	0	9130782	
DSA2	wcommunication	27439	.3698	4.5413	.2227	.1542	.1472	4.3050	.0388	.0000	2753	.0000	0	9249514	
DSA2	wcontactupdate	5477	.0346	3.1524	.0129	.0093	.0218	3.1350	.0043	.0000	85	.0000	0	8951858	
DSA2	wcontractfinancial	8179	.3128	3.7768	.1864	.1274	.1265	3.5585	.0316	.0000	2391	.0000	0	9306619	
DSA2	wcontractissuenotificat	1959	.0325	1.0548	.0143	.0104	.0182	1.0395	.0034	.0000	98	.0000	0	9078754	
DSA2	wcosignaturestatement	62	.0244	.0969	.0119	.0078	.0125	.0862	.0045	.0000	52	.0000	0	9078769	
DSA2	wcreditbureaureports	13790	.1867	6.1528	.1401	.0946	.0466	6.1404	.0207	.0000	1707	.0000	0	9082305	
DSA2	wcreditreversal	2	.0367	.0433	.0283	.0092	.0084	.0106	.0011	.0000	35	.0000	0	8591656	
DSA2	wdecision	31634	.3303	6.9502	.1807	.1226	.1495	6.6450	.0312	.0000	2217	.0000	0	9142872	
DSA2	wdisbursementdetails	2943	.0356	6.0530	.0174	.0134	.0182	6.0456	.0049	.0000	210	.0000	0	9216289	
DSA2	wdisclosures	853	.1028	3.1773	.0193	.0132	.0835	3.1549	.0062	.0000	172	.0000	0	8951865	
DSA2	wdiscountmaintutility	650	.0573	2.1343	.0215	.0151	.0357	2.1096	.0049	.0000	183	.0000	0	9092450	
DSA2	wemploymentandincome	2015	.3116	4.4824	.2051	.1430	.1064	4.2515	.0314	.0000	2398	.0000	0	9244769	
DSA2	wexceptions	22007	.2874	6.6658	.1744	.1177	.1130	6.4709	.0292	.0000	2152	.0000	0	9139205	
DSA2	wextcontact	1	.0299	.0299	.0297	.0133	.0002	.0002	.0001	.0000	62	.0000	0	8658976	
DSA2	wfinancial	1763	.3131	2.3143	.1818	.1252	.1313	2.1094	.0327	.0000	2510	.0000	0	9227588	

Performance Wait Analysis report

- Summary of transaction activity by suspend wait time
- Summarized by transaction ID (default), highlights:
 - the resource that cause a transaction to be suspended
 - the CICS system resource bottlenecks that may be causing bad response time
- Enables a detailed analysis to be more easily performed
 - focusing on the problem resources identified

Tran=XWRE

Summary Data	Time		Count		Ratio
	Total	Average	Total	Average	
# Tasks			4506		
Response Time	641.8387	0.1424			
Dispatch Time	246.4258	0.0547	556991	123.6	38.4% of Response
CPU Time	51.9394	0.0115	556991	123.6	21.1% of Dispatch
Suspend Wait Time	395.4128	0.0878	556991	123.6	61.6% of Response
Dispatch Wait Time	3.4036	0.0008	552485	122.6	0.9% of Suspend
QR TCB Redispach Wait Time	0.3228	0.0001	31911	7.1	9.5% of Dispwait
Resource Manager Interface (RMI) elapsed time	3.0753	0.0007	45060	10.0	0.5% of Response
Resource Manager Interface (RMI) suspend time	0.0000	0.0000	0	0.0	0.0% of Suspend

Suspend Detail

	Suspend Time			Graph	Count	
	Total	Average	%age		Total	Average
SOIOWTT Inbound Socket I/O wait time	357.3830	0.0793	90.4%	*****	17159	3.8
IRIOWTT MRO link wait time	34.8886	0.0077	8.8%	*	9012	2.0
DSCHMDLY Redispach wait time caused by change-TCB mode	3.0295	0.0007	0.8%		521080	115.6
LMDELAY Lock Manager (LM) wait time	0.0690	0.0000	0.0%		5452	1.2
DSPDELAY First dispatch wait time	0.0424	0.0000	0.0%		4506	1.0
N/A Other Wait Time	0.0004	0.0000	0.0%		218	N/C

Threadsafe

Use CICS Performance Analyzer to analyze your CICS applications to determine which of these applications are good candidates for Threadsafe....and then when to stop

- How many switches (change modes) occurred?
 - What was the delay as the result?
- How much CPU time did they use?
 - What is this costing me?
- Sample Report Forms
 - CPU Usage, Delays, Change Mode Delays, Transaction Profiling ...
- Without CICS PA, threadsafe analysis would be a longer and more painful process

Transaction Threadsafe Analysis report set

THRDSAFE - Wait Analysis Reports

WAIT0001

THRDSAFE - Performance Summary Reports

CPU5SUM --- transaction CPU analysis (V5)
CPU5SUMC --- transaction CPU count analysis (V5)
CPU85SUM --- transaction CPU analysis (V5) (key 8)
CPU95SUM --- transaction CPU analysis (V5) (key 9)
DISPSUM --- transaction Dispatch/CPU usage
CHMDSSUM --- EXEC CICS commands and change
CICS TCB Modes analysis - Summary

THRDSAFE - Statistics Summary Reports

DISPOVRV --- Dispatcher statistics overview
TCBMODES --- Dispatcher statistics TCB Modes
TCBPOOLS --- Dispatcher statistics TCB Pools
MONTORNG --- Monitoring statistics summary

THRDSAFE - Performance List Reports

CHMDSLST --- EXEC CICS commands and change
CICS TCB Modes analysis - List

THRDSAFE - Performance List Extended Reports

BADCHMDS --- top 20 change TCB modes

V5R3M0

CICS Performance Analyzer
Performance Summary

CHMDSSUM Printed at 8:20:00 9/28/2016

Data from 10:28:44 4/19/2016 to 11:15:00 4/19/2016

Page 12

Transaction threadsafe analysis - EXEC CICS commands and change CICS TCB Modes analysis - Summary

Stop Interval	Tran	#Tasks	Avg Response Time	Avg Dispatch Time	Avg User CPU Time	Avg Suspend Time	Avg DispWait Time	Avg QRMdDly Time	Avg QRMdDly Count	Avg DSCHMDLY Time	Avg DSCHMDLY Count	Max DSCHMDLY Count	Avg EICTotCt Count
11:00:00	KENO	17	.0343	.0085	.0025	.0258	.0031	.0031	6	.0025	8	8	8
11:00:00	KENV	213	.0381	.0049	.0024	.0333	.0039	.0038	6	.0030	8	8	8
11:00:00	KEPC	79	.1372	.0043	.0025	.1329	.0030	.0029	6	.0028	8	8	5
11:00:00	KEPH	1482	.0672	.0071	.0065	.0601	.0058	.0056	12	.0054	16	2984	14
11:00:00	KEPV	300	.1815	.0042	.0024	.1773	.0038	.0037	7	.0030	10	824	5
11:00:00	KEQE	363	.0378	.0033	.0026	.0345	.0023	.0022	6	.0021	7	824	5
11:00:00	KERY	13046	.0585	.0034	.0031	.0550	.0036	.0035	7	.0034	10	832	7
11:00:00	KETI	8	.0788	.0026	.0025	.0761	.0033	.0032	6	.0031	8	8	5
11:00:00	KETO	5492	.0733	.0032	.0025	.0700	.0034	.0033	7	.0029	10	1642	6
11:00:00	KETP	170	.0500	.0034	.0024	.0466	.0023	.0022	4	.0021	5	12	5
11:00:00	KETS	3932	.0405	.0039	.0034	.0366	.0040	.0039	7	.0035	9	32	11
11:00:00	KE90	24	.0196	.0028	.0025	.0168	.0032	.0031	6	.0030	8	8	5
11:00:00	KG1D	2	.0020	.0006	.0006	.0014	.0000	.0000	1	.0000	0	0	21
11:00:00	KG1I	26	.0027	.0007	.0007	.0019	.0000	.0000	1	.0000	0	0	21

Cross-System Work report

- Combines CMF records from your connected systems to produce a consolidated unit-of-work report
 - Default report includes only the performance class records that have the same network unit-of-work in multiple records in a single or multiple systems
- Records can be sorted by:
 - Network unit-of-work prefix and suffix
 - Syncpoint count concatenated with descending stop time (default) or ascending start time
 - Generic APPLID
- Report can be tailored using report forms
- Selection criteria
 - By record or unit-of-work

CROS0001 Printed at 8:13:33 9/13/2016 Data from 22:10:24 6/20/2014 to 00:00:45 6/24/2014

Page 1

Tran	Userid	SC	TranType	Term	LUName	Request Type	Program	Fcty T/Name	Conn Name	NETName	UOW Seq	APPLID	Task	R T	Stop Time	Response Time	
UOWID=51D469372260																	
TKP0	CICSPRD	SD	U			AP:	P1VCTKP0			EBD1.CICSPSCG	5	CICSPSCG	96308	T	10:01:18.116	.4156	
ISCU	CICSPRD	TO	UMD		<BCC	CICSPSCG	AP:F---	M1VMMFRT	T/<BCC	PSOS	EBD1.CICSPSCG	3	CICSPACG	78408	T	10:01:17.780	.0015

TKP0	CICSPRD	SD	U			AP:	P1VCTKP0			EBD1.CICSPSCG	6	CICSPSCG	96361	T	10:01:20.352	.7926	
ISCA	CICSPRD	TO	UMD		<AFK	CICSPSCG	AP:F---	E1VMMSP0	T/<AFK	PSOS	EBD1.CICSPSCG	1	PSO5CICG	39411	T	10:01:19.782	.2079

TKP0	CICSPRD	SD	U			AP:	P1VCTKP0			EBD1.CICSPSCG	4	CICSPSCG	96366	T	10:01:19.952	.2975	
ISCA	CICSPRD	TO	UMD		<AFL	CICSPSCG	AP:F---	E1VMMSP0	T/<AFL	PSOS	EBD1.CICSPSCG	1	PSO5CICG	39412	T	10:01:19.692	.0352

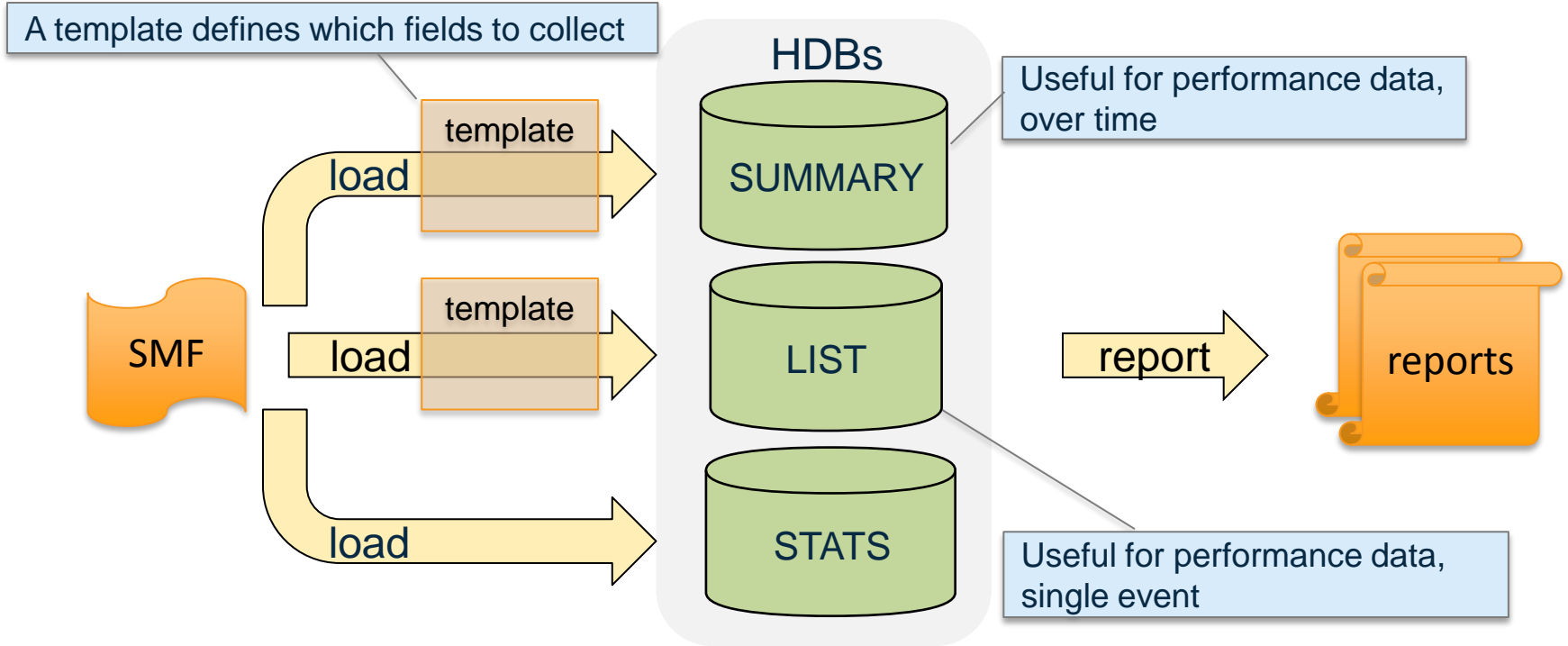
TKP0	CICSPRD	SD	U			AP:	P1VCTKP0			EBD1.CICSPSCG	5	CICSPSCG	96367	T	10:01:19.925	.2671	
ISCU	CICSPRD	TO	UMD		<BCC	CICSPSCG	AP:F---	M1VMMFRT	T/<BCC	PSOS	EBD1.CICSPSCG	3	CICSPACG	78418	T	10:01:19.697	.0014

TKP0	CICSPRD	SD	U			AP:	P1VCTKP0			EBD1.CICSPSCG	20	CICSPSCG	96373	T	10:01:22.579	2.8387	
ISCU	CICSPRD	TO	UMD		<BCC	CICSPSCG	AP:F---	M1VMMFRT	T/<BCC	PSOS	EBD1.CICSPSCG	18	CICSPACG	78440	T	10:01:22.285	.0025
ISCU	CICSPRD	TO	UMD		<BCC	CICSPSCG	AP:F---	M1VMMFRT	T/<BCC	PSOS	EBD1.CICSPSCG	16	CICSPACG	78437	T	10:01:21.895	.0015
ISCU	CICSPRD	TO	UMD		<BCC	CICSPSCG	AP:F---	M1VMMFRT	T/<BCC	PSOS	EBD1.CICSPSCG	11	CICSPACG	78432	T	10:01:21.474	.0116
ISCU	CICSPRD	TO	UMD		<BCC	CICSPSCG	AP:F---	M1VMMFRT	T/<BCC	PSOS	EBD1.CICSPSCG	9	CICSPACG	78429	T	10:01:21.128	.0020
ISCU	CICSPRD	TO	UMD		<BCC	CICSPSCG	AP:F---	M1VMMFRT	T/<BCC	PSOS	EBD1.CICSPSCG	6	CICSPACG	78427	T	10:01:20.794	.0028
ISCU	CICSPRD	TO	UMD		<BCC	CICSPSCG	AP:F---	M1VMMFRT	T/<BCC	PSOS	EBD1.CICSPSCG	4	CICSPACG	78422	T	10:01:20.298	.0015
ISCA	CICSPRD	TO	UMD		<AFL	CICSPSCG	AP:F---	E1VMMSP0	T/<AFL	PSOS	EBD1.CICSPSCG	1	PSO5CICG	39414	T	10:01:19.855	.1116

TKP0	CICSPRD	SD	U			AP:	P1VCTKP0			EBD1.CICSPSCG	5	CICSPSCG	96378	T	10:01:20.109	.2484	
ISCU	CICSPRD	TO	UMD		<BCC	CICSPSCG	AP:F---	M1VMMFRT	T/<BCC	PSOS	EBD1.CICSPSCG	3	CICSPACG	78419	T	10:01:19.905	.0028

TKP0	CICSPRD	SD	U			AP:	P1VCTKP0			EBD1.CICSPSCG	5	CICSPSCG	96394	T	10:01:20.642	.4295	
ISCU	CICSPRD	TO	UMD		<BCC	CICSPSCG	AP:F---	M1VMMFRT	T/<BCC	PSOS	EBD1.CICSPSCG	3	CICSPACG	78423	T	10:01:20.302	.0009

CICS PA historical database (HDB)

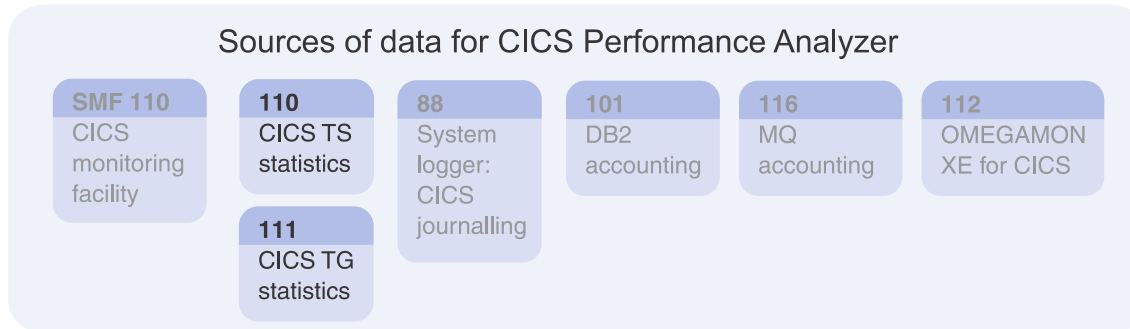


CICS Performance Analyzer for z/OS

CICS PA statistics reporting

CICS statistics

- Statistics domain collects a variety of data and writes it to the SMF data set
- Provides information about resources and domains
 - Counts and wait times for resource requests
 - Processor and storage use
- Some statistics counters can be reset when records are cut
- Interval recording can be set on/off using STATRCD (SIT)
- Records can be processed by DFHSTUP, DFHOSTAT or CICS Performance Analyzer



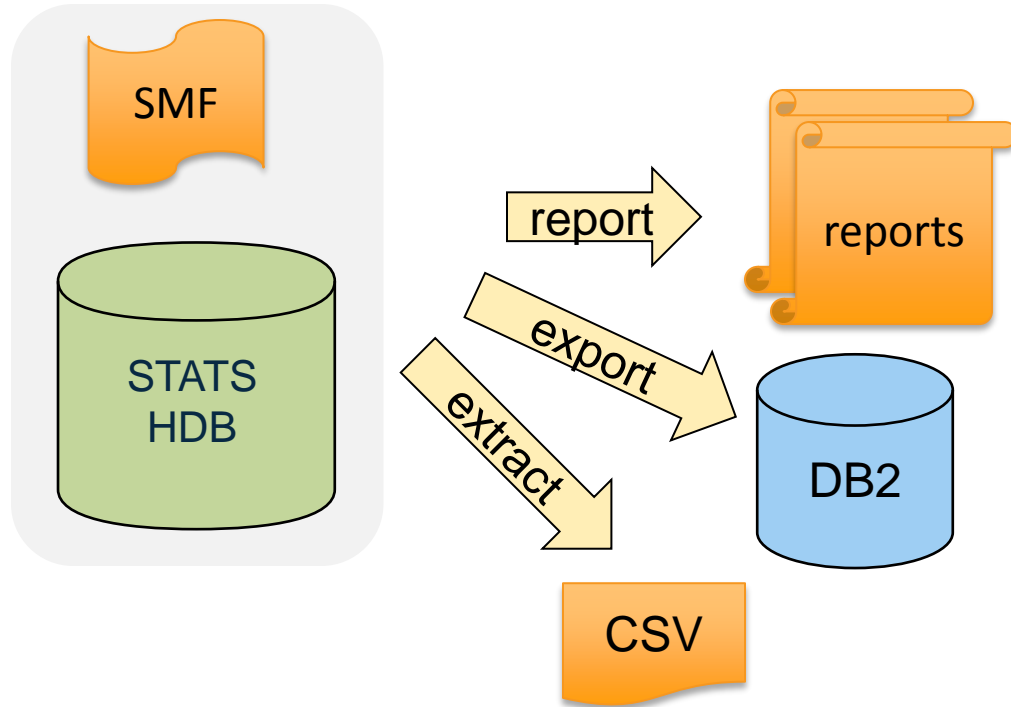
When does CICS collect statistics?

- **Interval statistics**
 - At intervals set: default every hour
 - Requires STATRCD=ON in SIT
 - Can be turned on using SET command
- **End-of-day statistics**
 - When CICS shuts down either normal or immediate
 - At midnight (by default) in 24/7 operations
- **Requested statistics**
 - EXEC CICS Perform statistics record
 - EXEC CICS Set statistics RECORDNOW
 - CEMT Perform statistics
 - Can be issued with any combination of resources

When does CICS collect statistics?

- **Requested Reset statistics**
 - EXEC CICS Perform statistics record RESTNOW
 - EXEC CICS Set statistics RECORDNOW RESETNOW
 - CEMT Perform statistics all RESTNOW
 - Differs from Request Statistics as counters are reset
 - Causes loss of data since the last statistics interval
- **Unsolicited statistics**
 - Collected for resources allocated or de-allocated
 - Written to SMF before resource is deleted
 - Produced for resources such as, Atom Feeds, Autoinstalled Terminals, Files, DB2, FEPI, IPCONN, etc.

CICS statistics and CICS server statistics support



- Comprehensive reporting and analysis of CICS **TS** and **TG** statistics
- **Forms** for personalized reports
- **Sorting** by fields in the form
- **Batch** reporting
- **Online** reporting

Statistics reporting

- From an SMF files (option 6 **Statistics** > 4 **Process SMF File**), or
- From a STATS HDB (option 5.4, select a STATS HDB, 1 **Start online reporting**, press Enter)

```
REPORT                               Statistics Intervals                               Row 1 from 77
Command ==> _____ Scroll ==> CSR

Select the required CICS Statistics interval.

/ System Image VRM Type --- Collection Time --- Reset Duration
- IYCUZC31 MV2A 690 TS USS 2015/07/29 14:02:36 Wed 13:43:46
- IYCUZC31 MV2A 690 TS USS 2015/07/29 14:02:42 Wed 13:43:46
- IYCUZC31 MV2A 690 TS USS 2015/07/29 14:02:44 Wed 13:43:46
- IYCUZC31 MV2A 690 TS USS 2015/07/29 14:02:45 Wed 13:43:46
- IYCUZC31 MV2A 690 TS USS 2015/07/29 14:02:46 Wed 13:43:46
- IYCUZC31 MV2A 690 TS USS 2015/07/29 14:02:47 Wed 13:43:46
- IYCUZC31 MV2A 690 TS USS 2015/07/29 14:02:48 Wed 13:43:46
- IYCUZC31 MV2A 690 TS USS 2015/07/29 14:02:49 Wed 13:43:46
- IYCUZC31 MV2A 690 TS USS 2015/07/29 14:02:51 Wed 13:43:46
- IYCUZC31 MV2A 690 TS USS 2015/07/29 14:02:52 Wed 13:43:46
- IYCUZC31 MV2A 690 TS USS 2015/07/29 14:02:53 Wed 13:43:46
- IYCUZC31 MV2A 690 TS USS 2015/07/29 14:02:55 Wed 13:43:46
- IYCUZC01 MV2A 700 TS USS 2015/07/29 14:03:07 Wed 13:23:53
- IYCUZC31 MV2A 690 TS USS 2015/07/29 14:04:42 Wed 13:43:46
- IYCUZC31 MV2A 690 TS USS 2015/07/29 14:04:52 Wed 13:43:46
```

Select from the list of statistics collection intervals in the selected SMF files or HDB

Accessing the statistics reports in ISPF

```
REPORT                               Statistics Reports
Command ==> _____

System: IYCYZC20/MV2E               Type: INT  Interval:

___ - ___ ** Reports **
                Regions
                Transaction Manager
                Monitoring
                CICS Dispatcher
                Dispatcher Overview
                Dispatcher TCB Modes
                Dispatcher TCB Pools
                ...
```

Am I hitting the MXT limit?

How was the Response Time affected?

What are the average and peak response times?

What are the z/OS WLM settings?

What are the CICS Dispatcher settings?

REPORT Dispatcher Overview

Line 00000001 Col 001 080

Command ==>

Scroll ==> PAGE

System: IYCYZC2N/MV2E Type: INT Interval: 2015/03/25 16:00:00 Wednesday

Global Statistics Length	:		128
CICS TCB MODES	:		18
CICS TCB POOLS	:		4
Current ICV Time	:	00.00.01.000	
Current ICVR Time	:	00.00.05.000	
Current ICVTSD Time	:	00.00.00.000	
Current PRTYAGE Time	:	00.00.32.768	
Concurrent Subtask TCBs	:		0
Current MRO (QR) Batching	:		1
Current Tasks	:		29
Peak Tasks	:		31
Dispatcher Start Time GMT	:	2015-03-10-13.39.06	
Dispatcher Start Time Local	:	2015-03-10-13.39.06	
Address Space CPU Time	:	00.00.00.056095	
Address Space SRB Time	:	00.00.00.006233	
Excess TCB Scans	:		1
Excess TCB Scans No TCB Detached	:		1
Excess TCBs Detached	:		0

Statistics alerts

- Help you find potential **tuning opportunities**
- Identify **trends** that could lead to poor CICS performance or even unnecessary CICS system outages
- Can help you focus your analysis efforts on:
 - specific CICS regions
 - a time of day
 - specific types of CICS resources

Command ==> _____ Scroll ==> CSR

Description . . . CICS TS Sample Alerts

Specify the Conditions for this Alert Definition.

- Alert System dumps requested
 Formula SYS DUMPS TAKEN

Critical >5 Warning >0 Info _____ +
 - Res _____ List _____ +
 - APPLID _____

- Alert Maximum tasks reached
 Formula XMGTAMXT

Critical >10 Warning >0 Info _____ +
 - Res _____ List _____ +
 - APPLID _____

- Alert Peak tasks (% of maximum tasks)
 Formula XMGPAT / XMGMXT * 100

Critical _____ Warning >=90 Info >=80 +
 - Res _____ List _____ +
 - APPLID _____

V5R3M0

CICS Performance Analyzer
Statistics Alerts - List by APPLID

STAL0001 Printed at 14:20:12 9/15/2016

Data from 16:15:00 7/27/2015 to 16:55:00 7/27/2015

System: IYCYZC20 Image: MV2E VRM: 700 Type: TS

Sev	Alert	Threshold	Actual	Collection	Time	Type
C	File string waits File Name = TRMNALDB	>10	37	2015-07-27	16.15.00	INT
C	File buffer waits LSR Pool Number = 5	>10	280	2015-07-27	16.15.00	INT
C	Maximum tasks reached	>10	12	2015-07-27	16.15.00	INT
C	Temporary storage: buffer waits on DFHTEMP	>10	1233	2015-07-27	16.15.00	INT
C	File string waits File Name = INVENTOR	>10	462	2015-07-27	16.20.00	INT
C	File string waits File Name = PARTS	>10	264	2015-07-27	16.20.00	INT
C	File string waits File Name = TRMNALDB	>10	16	2015-07-27	16.20.00	INT
C	File buffer waits LSR Pool Number = 5	>10	65	2015-07-27	16.20.00	INT

Statistics alerts via the Explorer

- Critical, warning, information
- Opening a stat will provide its individual stats record if available

Alert Description	Start Date	Start Time	Applid	MVS ID	Resource	Manager	Actual	Threshold	Type	Session ID	Interval	Interval
Maximum active transactions in class reached	2009-06-11	01.00.00	IYDZEJ01	MV2F	Table Fees...	DFHTCL02	30	>10	INT	6601	1	01.00.00
Maximum active transactions in class reached	2009-06-11	10.00.00	IYDZEJ01	MV2F	Table Fees...	DFHTCL02	30	>10	INT	6601	10	01.00.00
Maximum active transactions in class reached	2009-06-11	09.00.00	IYDZEJ01	MV2F	Table Fees...	DFHTCL02	30	>10	INT	6601	9	01.00.00
Maximum active transactions in class reached	2009-06-11	08.00.00	IYDZEJ01	MV2F	Table Fees...	DFHTCL02	30	>10	INT	6601	8	01.00.00
Maximum active transactions in class reached	2009-06-11	07.00.00	IYDZEJ01	MV2F	Table Fees...	DFHTCL02	30	>10	INT	6601	7	01.00.00
Maximum active transactions in class reached	2009-06-11	06.00.00	IYDZEJ01	MV2F	Table Fees...	DFHTCL02	30	>10	INT	6601	6	01.00.00
Maximum active transactions in class reached	2009-06-11	05.00.00	IYDZEJ01	MV2F	Table Fees...	DFHTCL02	30	>10	INT	6601	5	01.00.00
Maximum active transactions in class reached	2009-06-11	04.00.00	IYDZEJ01	MV2F	Table Fees...	DFHTCL02	30	>10	INT	6601	4	01.00.00
Maximum active transactions in class reached	2009-06-11	03.00.00	IYDZEJ01	MV2F	Table Fees...	DFHTCL02	30	>10	INT	6601	3	01.00.00
Maximum active transactions in class reached	2009-06-11	02.00.00	IYDZEJ01	MV2F	Table Fees...	DFHTCL02	30	>10	INT	6601	2	01.00.00
Writes greater than DFHTEMP-CI sess	2009-06-11	10.00.00	IYDZEJ01	MV2F	...	...	60	30	INT	6601	10	01.00.00
Writes greater than DFHTEMP-CI sess	2009-06-11	09.00.00	IYDZEJ01	MV2F	...	...	60	30	INT	6601	9	01.00.00
Writes greater than DFHTEMP-CI sess	2009-06-11	08.00.00	IYDZEJ01	MV2F	...	...	60	30	INT	6601	8	01.00.00
Writes greater than DFHTEMP-CI sess	2009-06-11	07.00.00	IYDZEJ01	MV2F	...	...	60	30	INT	6601	7	01.00.00
Writes greater than DFHTEMP-CI sess	2009-06-11	06.00.00	IYDZEJ01	MV2F	...	...	60	30	INT	6601	6	01.00.00
Writes greater than DFHTEMP-CI sess	2009-06-11	05.00.00	IYDZEJ01	MV2F	...	...	60	30	INT	6601	5	01.00.00
Writes greater than DFHTEMP-CI sess	2009-06-11	04.00.00	IYDZEJ01	MV2F	...	...	60	30	INT	6601	4	01.00.00
Writes greater than DFHTEMP-CI sess	2009-06-11	03.00.00	IYDZEJ01	MV2F	...	...	60	30	INT	6601	3	01.00.00
Writes greater than DFHTEMP-CI sess	2009-06-11	02.00.00	IYDZEJ01	MV2F	...	...	60	30	INT	6601	2	01.00.00
Writes greater than DFHTEMP-CI sess	2009-06-11	01.00.00	IYDZEJ01	MV2F	...	...	67	30	INT	6601	1	01.00.00
EDSA peak	2009-06-11	02.00.00	IYDZEJ01	MV2F	...	...	1004100	>0K	INT	6601	2	01.00.00
EDSA peak	2009-06-11	04.00.00	IYDZEJ01	MV2F	...	...	1004100	>0K	INT	6601	4	01.00.00
EDSA peak	2009-06-11	03.00.00	IYDZEJ01	MV2F	...	...	1004100	>0K	INT	6601	3	01.00.00
EDSA peak	2009-06-11	05.00.00	IYDZEJ01	MV2F	...	...	1004100	>0K	INT	6601	5	01.00.00
EDSA peak	2009-06-11	06.00.00	IYDZEJ01	MV2F	...	...	1004100	>0K	INT	6601	6	01.00.00
EDSA peak	2009-06-11	07.00.00	IYDZEJ01	MV2F	...	...	1004100	>0K	INT	6601	7	01.00.00
EDSA peak	2009-06-11	08.00.00	IYDZEJ01	MV2F	...	...	1004100	>0K	INT	6601	8	01.00.00
EDSA peak	2009-06-11	09.00.00	IYDZEJ01	MV2F	...	...	1004100	>0K	INT	6601	9	01.00.00
EDSA peak	2009-06-11	10.00.00	IYDZEJ01	MV2F	...	...	1004100	>0K	INT	6601	10	01.00.00
EDSA peak	2009-06-11	01.00.00	IYDZEJ01	MV2F	...	...	1004100	>0K	INT	6601	1	01.00.00

Alerts Transaction Classes (1/1 rows)

Maximum active transactions in class reached

Start Date	Start Time	Applid	MVS ID	Version R...	Type	Interval ...	Interval ...	Transacti...	Attac
2009-06-11	10.00.00	IYDZEJ01	MV2F	660	INT	01.00.00	10	DFHTCL02	

CICS Performance Analyzer

Plug-in to the CICS Explorer

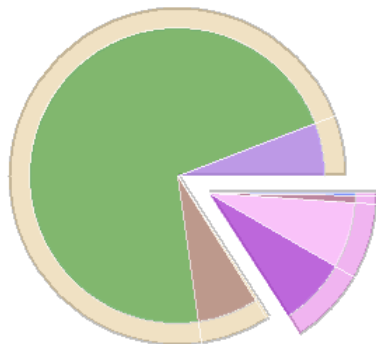
CICS PA plug-in to the CICS Explorer

- Graphical representation of performance and statistics data
- View statistics and performance alerts
- View data from CSV files or loaded from an HDB into DB2
- Customizable sheet view
- Bar charts, pie charts, and other graphs



Suspend time

2,525 transaction(s): 0.026566 seconds response time, 0.001041 seconds user dispatch time, 0.025525 seconds suspend time per transaction.



- Restrict tree nodes to those applicable to visible chart.
- Include available non-zero values only

Suspend time component	Time (average)	Count (average)	%Suspend time	%Relative
▲ Suspend time	0.025525	8.317228	-	-
▲ Total I/O wait time	0.021466	0	84.10%	84.10%
TC I/O wait time	0	0	-	-
TS I/O wait time	0	0	-	-
Shared TS I/O wait time	0	0	-	-
TD I/O wait time	0.001483	2.039604	5.81%	6.91%
JC I/O wait time	0.018256	2.439208	71.52%	85.05%
File I/O wait time	0.001726	2.459406	6.76%	8.04%
RLS File I/O wait time	0	0	-	-
CFDT wait time	0	0	-	-
Inbound socket I/O wait time	0	0	-	-
IPCONN I/O wait time	0	0	-	-
Outbound socket I/O wait time	0	0	-	-
Inter-Region I/O wait time	0	0	-	-
LU61 I/O wait time	0	0	-	-
LU62 I/O wait time	0	0	-	-
FEPI I/O wait time	0	0	-	-
▲ Other wait time	0.004059	0	15.90%	15.90%
First dispatch delay time	0.001893	1	7.47%	46.64%

Records from: 2013-04-29 13:02:58 (Last twelve months)

Start Timestamp	Stop Timestamp	Applid	Trans.	Task no.	Alert fil.	Alert fil.	Threshold	Resourc.	Resourc.	Resourc.	Resourc.	Resourc.	Resourc.	Sequen.	Alert de.
2014-01-29 15:44:51.430888	2014-01-29 15:45:06.880118	IVCYZC2Q	CEMT	LDH1	SUSPEND	13.225502	> +4.0	TRAN	CEMT					1	SUSPAURL
2014-01-29 15:44:15.881568	2014-01-29 15:44:29.89438	IVCYZC2Q	CEMT	1789	SUSPEND	4.201263	> +4.0	TRAN	CEMT					1	SUSPAURL

Summary

What is CICS Performance Analyzer?

- A tool to provide ongoing system management and measurement reports on all aspects of CICS application performance

What's its value?

- Reduce both time and resources required to analyze off-line performance data for tuning and capacity planning
- CICS PA is IBM's strategic SMF reporter for CICS. It complements Omegamon XE for CICS (on-line tool)

How does it enhance the management of CICS?

- CICS Performance Analyzer for 'offline' analysis
- Provides ongoing system management and measurement reports on all aspects of CICS application performance
- Enables deep-dive CICS performance analysis and understanding of usage trends
- Aids capacity planning and tuning
- Helps quickly identify trends, anticipate and prevent online performance problems

Discussion

