

What is CA-MAT All About

Glenn Hanna
&
Nancy Kilroy, Lloyd Spiegel

Share in Boston
2013



MAT: Agenda

- What is CA-MAT
- Why would I use CA-MAT
- Product Review
- GUI Review
- Meet the developers for Q&A

MAT: What is CA-MAT

- CA Mainframe Application Tuner(CA MAT) is a CA Technologies product that identifies application performance delays and utilization.
- CA MAT monitors application programs to pinpoint delays. It observes and samples program activity, showing you the application's view of performance.
- CA MAT presents detailed application-specific delay information, allowing you to improve the performance of your application.
- From a single program—monitoring session, CA MAT can answer questions for the application programmer, systems programmer, and database administrator. This ability saves time and reduces machine resources that are used in resolving program bottlenecks or delays.

MAT: Why use CA-MAT

- To improve the success of a business
- To meet increasing performance demands
- To reduce costly, highly-visible delays due to inefficient applications
- To evaluate applications under development and compare third-party software
- To identify the source of batch, CICS, DB2, and IMS loops and waits
- To plan and position for a shrinking batch timeframe
- To increase system throughput, reduce costs, and improve application efficiency and performance.

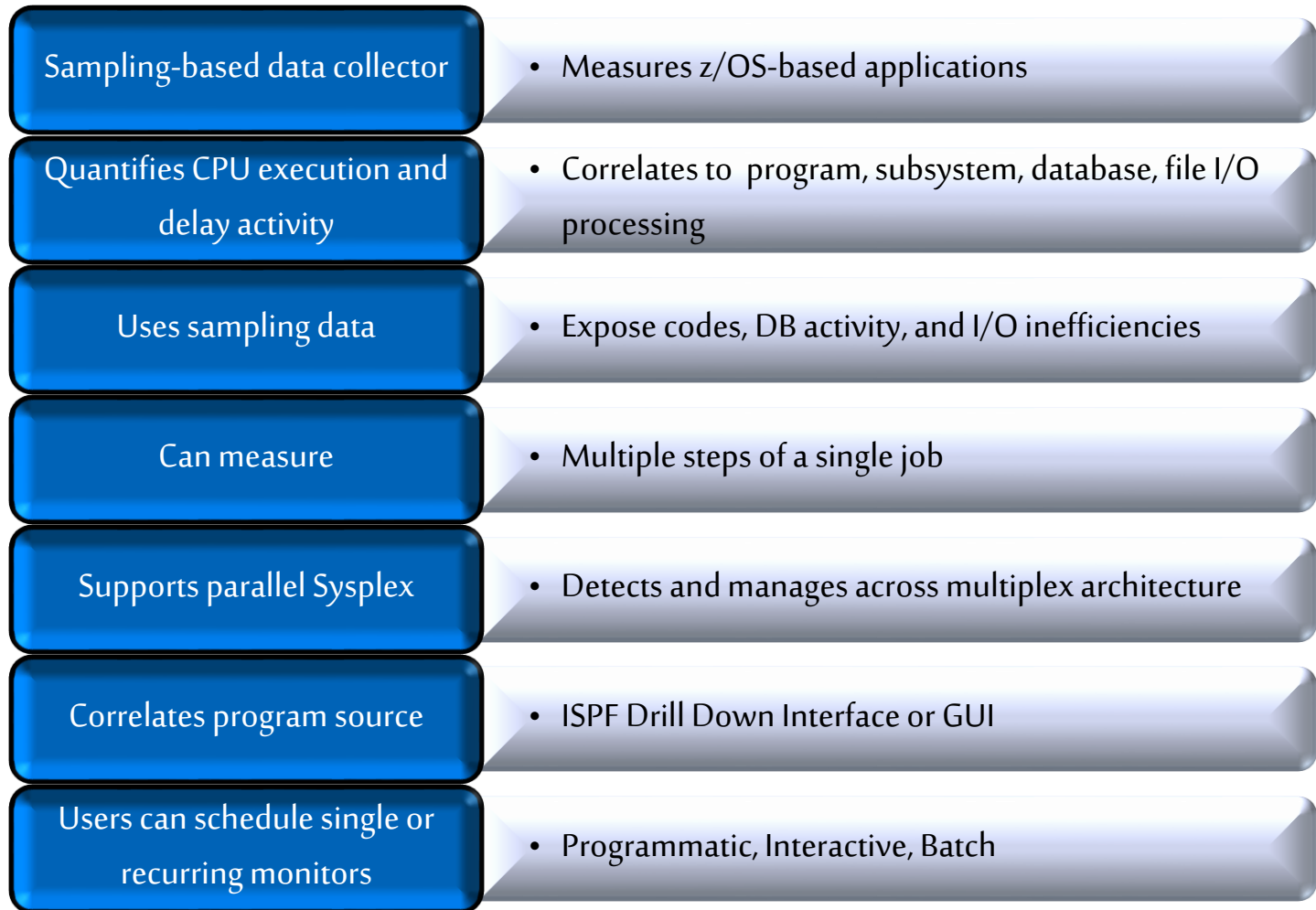
What you expected...

- On Demand z/OS sampling for any application
- CPU execution/delay activities for Program, Subsystem, Database and I/O
- Pinpoint code and stored procedure inefficiencies to the source level
- Language support for COBOL, PL/1, Assembler, C, C++, Fortran, SAS C, REXX
- Support for IMS, DB2, CICS, ADABAS/Natural, CA-DATACOM/Ideal, USS, WebSphere, IDMS
- Comprehensive detail reporting for System Support Experts

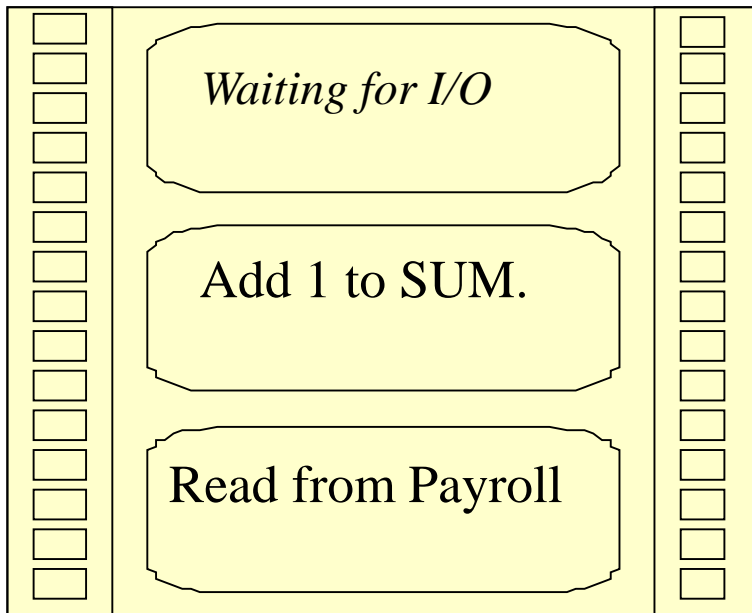
What you probably did not expect...

- Drill-down ISPF Interface for z/OS data useable by Application Development, Database and Quality Assurance personnel which presents performance data in graphical form

MAT: The measurement tool



MAT: How it works



MAT takes snapshots (generally every 10 milliseconds) of the application as it runs, noting what was being done by the application. All of these snapshots put together provide a picture of how the application was spending its time.

MAT: What does it “cost?”

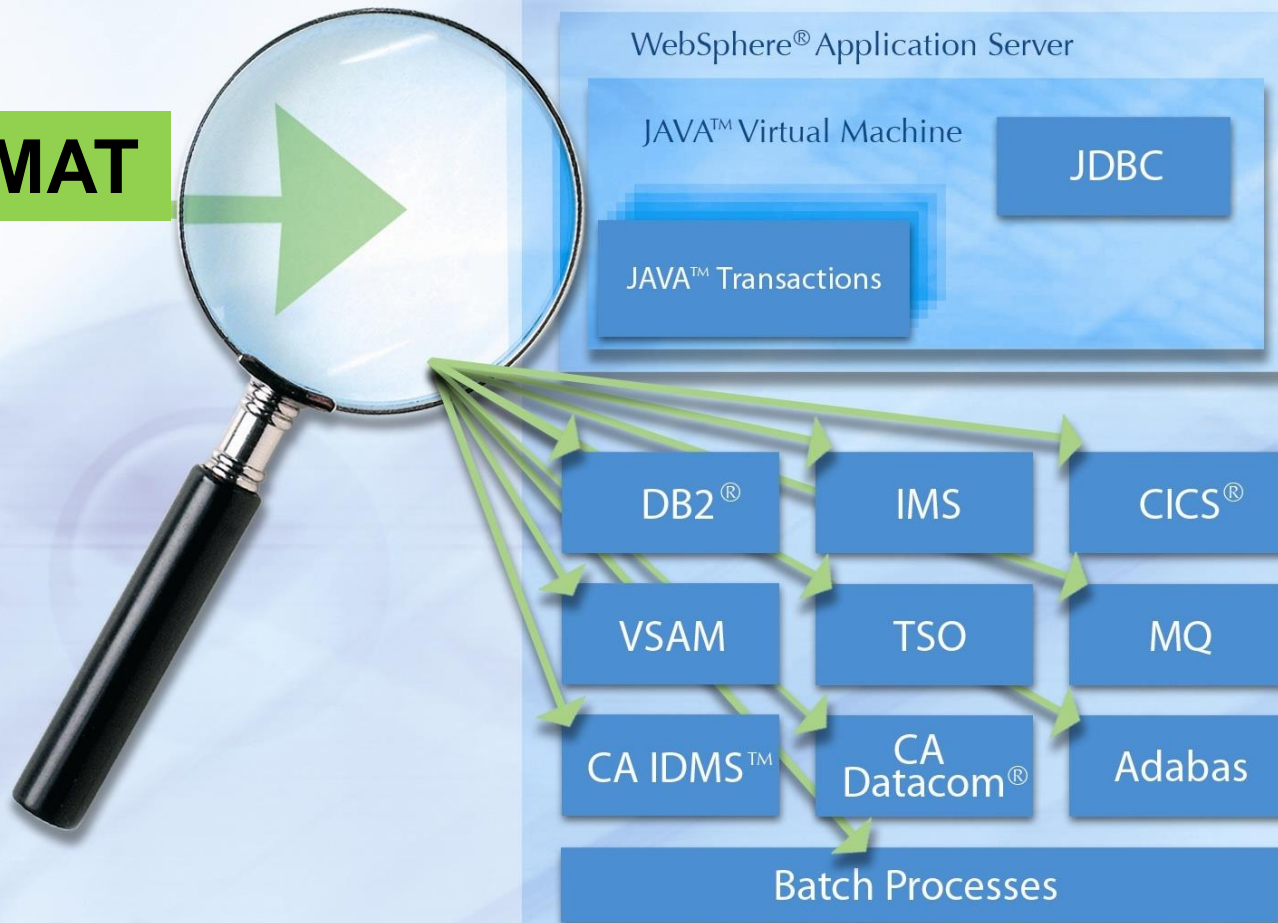
- Generally ~2%. That is, the application will see a 2% increase in CPU usage during the time it is being monitored
- MAT uses DIE/SRB technology to gather data. It does not run as part of the application.
- Uses both sampling and run-time statistics to expose code, DB call, and I/O access inefficiencies
- Interactive ISPF-based Analysis interface enables rapid Monitor (profile) analysis
- No changes to JCL, applications, security.
- No private storage used, no allocation/open files

MAT: What's included?

- Parallel Sysplex support
- Context sensitive help
- Ability to schedule monitors in advance, recurrent, permanent
- MAT API – monitoring initiated from batch jobs, REXX, CLIST, other enabled products including CA SYSVIEW
- Spreadsheet converter – monitor data can be downloaded in CSV format
- Registration of Source Listings, interactively, batch and globally

MAT: What's supported?

MAT



CA MAT CICS analysis DelayView

tpx.ca.com

QWS3270 Edit View Options Tools Help

CA MAT ----- DelayView ----- Row 1 to 8 of

COMMAND ==> _ SCROLL ==> CSR

Primary commands: DETail on / off

ADDHelp

Line commands: A - Address

(AutoNav enabled) S - Distribution

Module: *

Csect: *

Offset: *

Profile: CICSDEMO

Options: ACTIVE

Detail: ON

LC	Major Category	Minor Category	Actv%	Wait%	Totl%	Visual
—	Program Active	Program Active	69.75	0.00	69.75	=====>
—	Data Delay	DB2 Statement	16.05	0.00	16.05	==>
—	CICS File Ctl Delay	VSAM I/O Wait	7.80	0.00	7.80	=>
—	PC routine delay	PC Call	4.68	0.00	4.68	
—	Voluntary Wait	Wait/Waitr SVC	1.15	0.00	1.15	
—	Java Virtual Machine	ExecuteJava	0.48	0.00	0.48	
—	System Active	Post SVC	0.04	0.00	0.04	
—	System Active	Time SVC	0.04	0.00	0.04	

Context changed

Connected to tpx.ca.com port 23

2/15

NUM

14:33:17 IBM-3278-2 - A55T1557

CA MAT CICS analysis

QWS3270 Edit View Options Tools Help

CA MAT	-----	CodeView	-----	Row 1 to 8 of 24
C				SCROLL ==> CSR
P	CA MAT	-----	Code Distribution	-----
	COMMAND ==> _		SCROLL ==> CSR	
	Module: RJPOP00T		Csect: RJPOP00T	
L	Trancode	Pct	Visual	
	-----	-----	-----	
E	RJUA	24.82	=====>	
	RJA4	13.82	=====>	
	RJAB	10.54	=====>	
L	RJA0	10.30	=====>	
	RJU8	7.73	=====>	
>	RJAA	6.91	=====>	
S	RJU7	5.62	=====>	
	RJ00	3.28	>	
	RJA7	2.69	>	
	RJV0	2.11		
	DFHSIP	DFHTRPX	Trace control program	A Y 1.67
	DSNIDM	DSNIONX2	DM-NEXT ON CUB DEFINED	A Y 1.67
	DSNGEDM	DSNGEPLC	DM-LOC A PT SECT FROM S	A Y 1.52

Profile: CICSDEMO
Options: ACTIVE
Mode: CSECT

lays N - Long Name
distribution
m

Via

Wait% Totl% Visual

0.00	31.74	=====>
0.00	16.31	=====>
0.00	3.90	>
0.00	2.04	
0.00	1.71	
0.00	1.67	
0.00	1.67	
0.00	1.52	

CA MAT CICS analysis

```
tpx.ca.com
QWS3270 Edit View Options Tools Help

CA MAT ----- CodeView ----- Row 1 to 8 of 24
COMMAND ==> SCROLL ==> CSR

Primary commands: MOde Pseudo / Module / Csect / 4GL,      Profile: CICSDemo
                  PSEudo, REGister, ADDHelp                Options: ACTIVE
                                                           Mode: CSECT

Line commands: A - Associate      C - Callerid      D - Delays      N - Long Name
               I - Info           L - Listing       S - Distribution
               H - Histogram      NH - Normalized Histogram

Extended Callerid: CC - Current  CA - Application  CV - Via

LC Module      Csect      Description      L C X Actv% Wait% Totl% Visual
-----
>-----
h_ RJPOP00T RJPOP00T      A Y      31.74  0.00  31.74  =====>
_ DFHSIP DFHDS3 DS domain - main dispat A Y      16.31  0.00  16.31  =====>
_ DFHEIDTI EIDTI EXEC ask-time, format-t A Y      3.90  0.00  3.90  >
_ DSNBBM DSNB1GET BM-RETRIEVE REQUESTED P A Y      2.04  0.00  2.04
_ .NUCLEUS IEAVEPS1 Task management      B Y      1.71  0.00  1.71
_ DFHSIP DFHTRPX Trace control program A Y      1.67  0.00  1.67
_ DSNIDM DSNIONX2 DM-NEXT ON CUB DEFINED A Y      1.67  0.00  1.67
_ DSNGEDM DSNGEPLC DM-LOC A PT SECT FROM S A Y      1.52  0.00  1.52

Connected to tpx.ca.com port 23
17/3 NUM 14:59:52 IBM-3278-2 - A55T1557
```

CA MAT CICS analysis

tpx.ca.com						
QWS3270 Edit View Options Tools Help						
CA MAT ----- Histogram ----- Row 1 to 12 of 3						
COMMAND ==> _						
SCROLL ==> CSR						
Group ==> STMT (Group size in bytes or STMT)						
Profile: CICSDEMO						
Normalized: NO						
Module name: RJPOP00T						
Primary commands: REGister, ADDHelp						
Line commands: D - Delays L - Listing						
LC	Csect	Stmt	Verb	Actv%	Wait%	Totl% Visual

		11839	MOVE	23.71	0.00	23.71 =====>
		11849	PERFORM-EPIL	4.09	0.00	4.09 >
		11826	PERFORM	0.93	0.00	0.93
		11822	MOVE	0.41	0.00	0.41
		11878	MOVE	0.33	0.00	0.33
		11847	PERFORM	0.33	0.00	0.33
	RJPOP00T	8301	GO	0.26	0.00	0.26
		8531	MOVE	0.19	0.00	0.19
		11879	MOVE	0.15	0.00	0.15
		8532	MOVE	0.15	0.00	0.15
		11827	IF	0.15	0.00	0.15
		8489	MOVE	0.11	0.00	0.11

CA MAT CICS analysis

```
tpx.ca.com
QWS3270 Edit View Options Tools Help

CA MAT ----- DB2View ----- Row 73 of 678
COMMAND ==> SCROLL ==> CSR

Primary Commands: SQL (all/sampled), SEQ (sort), ADDHelp Profile: CICSDemo
Options: ACTIVE
Line commands: S - Select SQL E - Explain SQL SQL: All
SD - Show Declare I - Explain Information Sort: Sequence
C - Code Details D - Statement Detail DB2 SSID: DSN
DB2 Rel: 8.10.00

DBRM or D Data
LC Package S From Stmt Num Type Declare Total
RJP _____ Stmt Samps Actv% Wait% Totl%
-----
s_ RJPOP00T S S 4497 SELECT NA 2 0.04 0.04 0.07
_ RJPOP00T S S 3337 SELECT NA 1 0.04 0.00 0.04
_ RJPOP00T S S 3337 SELECT NA 2 0.07 0.00 0.07
_ RJPOP00T S S 3337 SELECT NA 1 0.00 0.04 0.04
_ RJPOP00T S S 3296 DELETE NA 1 0.04 0.00 0.04
_ RJPOP00T S S 3288 DELETE NA 1 0.04 0.00 0.04
_ RJPOP02T S S 2224 SELECT NA 2 0.04 0.04 0.07
***** End of Table *****
```

CA MAT CICS analysis DB2

tpx.ca.com

QWS3270 Edit View Options Tools Help

CA MAT ----- DB2 Statement Detail ----- Row 1 to 14 of 20
COMMAND ==> _ SCROLL ==> CSR

Primary Commands: SQL - Display SQL Text Profile: CICSDemo
Options: NORMAL
Line Commands: N - Display Long Name DB2 SSID: DSN
DB2 Rel: 8.10.00

LC Field Name	Field Value
Location	ITUNDSNP
Plan	PLTPRCA
Collection	PKTPRJ0W
Package	RJPOP00T
Section Number	4
Stmnt Number	4497
Statement	SELECT
SQL Type	Static
Length	153
Connection Type	CICS
Correlation	RJA0
OPER ID	@TS006
Thread	18D3FCA8
Thread Count	25759

Connected to tpx.ca.com port 232/15NUM18:31:30 IBM-3278-2 - A55T5873

CA MAT CICS analysis DB2

```
tpx.ca.com
QWS3270 Edit View Options Tools Help

CA MAT ----- SQL Statements ----- Row 1 to 3 of 3
COMMAND ==>                                SCROLL ==> CSR

        DBRM name: RJPOP00T                      Profile: CICSDEMO
        Statement: 4497                          DB2 SSID: DSN
        Stmt type: SELECT                        DB2 Rel: 8.10.00
        Timestamp: 10.175 16:20:15                Source: SAMPLE
                                                Block: SPA

        Line commands: E - Explain I - Explain Information

LC SQL Text

-----
-- SELECT POP_TERM , POP_NOME , POP_CHIAVE , POP_TESTO INTO : H , : H , : H ,
: H FROM TBEJPOP WHERE POP_TERM = : H AND POP_NOME = : H AND POP_CHIAVE = :
H
***** End of Table *****
```

SQL not from Catalog

CA MAT CICS analysis DB2

```
tpx.ca.com
QWS3270 Edit View Options Tools Help

CA MAT ----- Callerid Detail ----- Row 1 to 1 of
COMMAND ==> SCROLL ==> CSR

Plan/Package: RJPOP00T Statement Number: 4497 Profile: CICSDEMO
Module: DSNXGRDS
Csect: DSNXEBR

Primary commands: REGister, ADDHelp

Line commands: L - Listing A - Associate N - USS Long Name
I - Module/Csect Information

LC Module Csect Offset Stmt Csect Description Pct Visual
-----
>-----
1_ RJPOP00T RJPOP00T 00017ED4 11937 0.04 =====>
***** End of Table *****
```

CA MAT CICS analysis

```
tpx.ca.com
QWS3270 Edit View Options Tools Help

BROWSE - SANYV01.DEMO.COMPILE.LIST2(RJPOP00T) - 01.0 LINE 00022961 COL 001 080
COMMAND ===>                                SCROLL ===> PAGE

011930
011931          INSERT-TBEJPOP.
011932          *-----
011933          * ESEGUE LA INSERT SU TBEJPOP
011934          *-----
011935          MOVE 'INSERT-TBEJPOP'              TO      RCA-FUNZIONE.
011936
011937          *****EXEC SQL SELECT POP_TERM,
011938          *****                      POP_NOME,
011939          *****                      POP_CHIAVE,
011940          *****                      POP_TESTO
011941          *****                      INTO  :DCLTBEJPOP.POP-TERM,
011942          *****                      :DCLTBEJPOP.POP-NOME,
011943          *****                      :DCLTBEJPOP.POP-CHIAVE,
011944          *****                      :DCLTBEJPOP.POP-TESTO
011945          *****                      FROM    TBEJPOP
011946          *****                      WHERE  POP_TERM      = :DCLTBEJPOP.POP-TERM
011947          *****                      AND    POP_NOME      = :DCLTBEJPOP.POP-NOME
011948          *****                      AND    POP_CHIAVE    = :DCLTBEJPOP.POP-CHIAVE
011949          *****END-EXEC
011950          PERFORM SQL-INITIAL UNTIL SQL-INIT-DONE
011951          CALL 'DSNHLI' USING SQL-PLIST9
```

MAT GUI Overview

Overview Task Delay Code Time Data Modules DB2

☒ All ☐ Normal ☐ Active ☐ Wait ☐ Synchronize

Analysis for: DB2TEST DSN: 'APM.HANGL01.DB2TEST.D2013221.T1952335'

```
-- Job Information -- ----- Job Statistics ----- --- Monitor Statistics ---

Jobname . . HANGL01D  TCB Time . . . . 00:00:00.03  Start Date . . 2013/08/09
Stepname . . PH064S03  SRB Time . . . . 00:00:00.01  Start Time . . 19:52:33
Procstep . .                               Duration . . . 00:00:07
Program . . CUP9ARDY  ECPU Time . . . . 00:00:00.04
ASID . . . . 1080     zAAP Time . . . . **N/A**  Observations:
(HEX) . . . . 0438    Elig zAAP Time . . . . **N/A**  Final rate . . 10Msec
User ID . . HANGL01   zIIP Time . . . . 00:00:00.00  Requested . . 6000
Job ID . . . . JOB46020  Elig zIIP Time . 00:00:00.00  Used . . . . .

DB2 Lvl . . 9.1.0     Swapped Out . . 00:00:00.00  Samples:
                               Non Disp . . . . 00:00:00.00  Used . . . . . 67
                               LPAR/DIS Delay . 00:00:00.00  % Active . . . 0.00
                               Wait . . . . . 00:00:07.00  % Wait . . . . 100.00
                               CPU Svc Units . 1286
                               EXCP count . . . 12          Avg TCBs Act . 0.00
                               EXCP rate . . . 1.60

DB2 Name . . D91A

< Rgn Lim . 8168K    < Rgn Used HWM . **N/A**    CMN HWM Used . 225K
> Rgn Lim . 1117M    > Rgn Used HWM . **N/A**    Page-ins . . . 0
Rgn Request 0M       Page-in Rate . 0.00
Dynamic Linklist:
LNKLST00
```

MAT GUI Task

Overview Task Delay Code Time Data Modules DB2

☒ All ☐ Normal ☐ Active ☐ Wait ☐ Synchronize

Analysis for: DB2TEST DSN: 'APM.HANGL01.DB2TEST.D2013221.T1952335'

[illegible]

MAT GUI Delay

Overview	Task	Delay	Code	Time	Data	Modules	DB2
----------	------	-------	------	------	------	---------	-----

☒ All ☐ Normal ☐ Active ☐ Wait ☐ Synchronize

Analysis for: DB2TEST DSN: 'APM.HANGL01.DB2TEST.D2013221.T1952335'

[illegible]

MAT GUI Code

Overview Task Delay **Code** Time Data Modules DB2

☒ All ☐ Normal ☐ Active ☐ Wait ☐ Synchronize

Analysis for: DB2TEST DSN: 'APM.HANGL01.DB2TEST.D2013221.T1952335', Mode: CSECT

Module	Csect	Description	L	C	X	Active %	Wait %	Total %	Overlap %
.NUCLEUS	IEAVEPS1	Task management	B		Y	0.00	95.52	95.52	0.00
.XMS01F1	D91ADBM1					0.00	1.49	1.49	0.00
TNSLOG	D91ADBM1					0.00	1.49	1.49	0.00
IGG019BB	.DSNWAIT	BSAM/QSAM check a...				0.00	0.00	0.00	0.00

MAT GUI Time

Overview Task Delay Code **Time** Data Modules DB2

☒ All ☐ Normal ☐ Active ☐ Wait ☐ Synchronize

Analysis for: DB2TEST DSN: 'APM.HANGL01.DB2TEST.D2013221.T1952335'

Sequence Number	Observation Number	Module	CSECT	Offset	S	Det	Calling Module	Calling CSECT	Caller Offset	Task Id
1	1	.NUCLEUS	IEAVEPS1	0000085E	W					CUP9ARDY007D4AC8
2	2	.NUCLEUS	IEAVEPS1	0000085E	W					CUP9ARDY007D4AC8
3	3	.NUCLEUS	IEAVEPS1	0000085E	W					CUP9ARDY007D4AC8
4	4	.NUCLEUS	IEAVEPS1	0000085E	W					CUP9ARDY007D4AC8
5	5	.NUCLEUS	IEAVEPS1	0000085E	W					CUP9ARDY007D4AC8
6	6	.NUCLEUS	IEAVEPS1	0000085E	W					CUP9ARDY007D4AC8
7	7	.NUCLEUS	IEAVEPS1	0000085E	W					CUP9ARDY007D4AC8
8	8	.NUCLEUS	IEAVEPS1	0000085E	W					CUP9ARDY007D4AC8
9	9	.NUCLEUS	IEAVEPS1	0000085E	W					CUP9ARDY007D4AC8
10	10	.NUCLEUS	IEAVEPS1	0000085E	W					CUP9ARDY007D4AC8
11	11	.NUCLEUS	IEAVEPS1	0000085E	W					CUP9ARDY007D4AC8
12	12	.NUCLEUS	IEAVEPS1	0000085E	W					CUP9ARDY007D4AC8
13	13	.NUCLEUS	IEAVEPS1	0000085E	W					CUP9ARDY007D4AC8
14	14	.NUCLEUS	IEAVEPS1	0000085E	W					CUP9ARDY007D4AC8
15	15	.NUCLEUS	IEAVEPS1	0000085E	W					CUP9ARDY007D4AC8
16	16	.NUCLEUS	IEAVEPS1	0000085E	W					CUP9ARDY007D4AC8
17	17	.NUCLEUS	IEAVEPS1	0000085E	W					CUP9ARDY007D4AC8
18	18	.NUCLEUS	IEAVEPS1	0000085E	W					CUP9ARDY007D4AC8
19	19	.NUCLEUS	IEAVEPS1	0000085E	W					CUP9ARDY007D4AC8
20	20	.NUCLEUS	IEAVEPS1	0000085E	W					CUP9ARDY007D4AC8
21	21	.NUCLEUS	IEAVEPS1	0000085E	W					CUP9ARDY007D4AC8
22	22	.NUCLEUS	IEAVEPS1	0000085E	W	Yes				CUP9ARDY007D4AC8

MAT GUI Data

Overview Task Delay Code Time **Data** Modules DB2

☒ All ☐ Normal ☐ Active ☐ Wait ☐ Synchronize

Analysis for: DB2TEST DSN: 'APM.HANGL01.DB2TEST.D2013221.T1952335'

DD name	Dataset name	Delay %	Block Size	Record Length	RECFM	EXCPs	Connect Time	R/W	DSORG
.DB2	DB2 Statement Delay	65.67	0	0	0	0	0		DB2
CUPJSEQ	MISAL02.JOEDATAC.SEQD	1.49	0	0	?	0	0		??
DSNRRSAF	HANGL01.HANGL01D.JOB46020.D0000120.?	0.00	0	0	?	0	0		PS
DSNTRACE	HANGL01.HANGL01D.JOB46020.D0000119.?	0.00	0	0	?	0	0		PS
JOBLIB	D91A.PRIVATE.SDSNEXIT	0.00	0	0	?	0	0		PO
JOBLIB	DB2.DB2910.GA.RSU1306.SDSNEXIT	0.00	0	0	?	0	0		PO
JOBLIB	DB2.DB2910.GA.RSU1306.SDSNLOAD	0.00	0	0	?	0	0		PO
JOBLIB	CEE.SCEERUN	0.00	0	0	?	0	0		PO
JOBLIB	PDTDBA.RUNLIB9.LOAD	0.00	0	0	?	0	0		PO
STEPLIB	HANGL01.LOADLIB	0.00	6,144	0	U	0	0		PO
STEPLIB	D91A.PRIVATE.SDSNEXIT	0.00	6,233	0	U	0	0		PO
STEPLIB	DB2.DB2910.GA.RSU1306.SDSNEXIT	0.00	32,760	0	U	0	0		PO
STEPLIB	DB2.DB2910.GA.RSU1306.SDSNLOAD	0.00	32,760	0	U	0	0		PO
SYSPRINT	HANGL01.HANGL01D.JOB46020.D0000117.?	0.00	882	0	?	0	0		PS
SYSTSPRT	HANGL01.HANGL01D.JOB46020.D0000116.?	0.00	0	0	?	0	0		PS
SYSUDUMP	HANGL01.HANGL01D.JOB46020.D0000118.?	0.00	0	0	?	0	0		PS

MAT GUI Module

Overview	Task	Delay	Code	Time	Data	Modules	DB2
----------	------	-------	------	------	------	---------	-----

☒ All ☐ Normal ☐ Active ☐ Wait ☐ Synchronize

Analysis for: DB2TEST DSN: 'APM.HANGL01.DB2TEST.D2013221.T1952335'

[illegible]

MAT GUI DB2

Overview	Task	Delay	Code	Time	Data	Modules	DB2
----------	------	-------	------	------	------	---------	-----

☒ All ☐ Normal ☐ Active ☐ Wait ☐ Synchronize

Analysis for: DB2TEST DSN: 'APM.HANGL01.DB2TEST.D2013221.T1952335'

[illegible]

MAT Summary

MAT is an application performance monitor that you can use to:

- ✓ Solve major performance problems within your system
- ✓ Help optimize your in-house software
- ✓ Evaluate third party software

MAT is easy to learn and simple to use. MAT provides the information you need to solve your application performance problems quickly.

Terms of This Presentation

This presentation was based on current information and resource allocations as of August 11, 2013 and is subject to change or withdrawal by CA at any time without notice. Notwithstanding anything in this presentation to the contrary, this presentation shall not serve to (i) affect the rights and/or obligations of CA or its licensees under any existing or future written license agreement or services agreement relating to any CA software product; or (ii) amend any product documentation or specifications for any CA software product. The development, release and timing of any features or functionality described in this presentation remain at CA's sole discretion. Notwithstanding anything in this presentation to the contrary, upon the general availability of any future CA product release referenced in this presentation, CA will make such release available (i) for sale to new licensees of such product; and (ii) to existing licensees of such product on a when and if-available basis as part of CA maintenance and support, and in the form of a regularly scheduled major product release. Such releases may be made available to current licensees of such product who are current subscribers to CA maintenance and support on a when and if-available basis. In the event of a conflict between the terms of this paragraph and any other information contained in this presentation, the terms of this paragraph shall govern.

For Informational Purposes Only

Certain information in this presentation may outline CA's general product direction. All information in this presentation is for your informational purposes only and may not be incorporated into any contract. CA assumes no responsibility for the accuracy or completeness of the information. To the extent permitted by applicable law, CA provides this document "as is" without warranty of any kind, including without limitation, any implied warranties or merchantability, fitness for a particular purpose, or non-infringement. In no event will CA be liable for any loss or damage, direct or indirect, from the use of this document, including, without limitation, lost profits, lost investment, business interruption, goodwill, or lost data, even if CA is expressly advised of the possibility of such damages.