

Application Performance Analyzer Mentor Workshop Lab Exercises



Lab Exercise 1

Lab Setup: Create your lab files

In this exercise you will:

Run the LABSETUP program to create your own copies of sample files that will be used during the Application Performance Analyzer (APA) exercises
Check that your files have been created

1. Log on to TSO (if you are not already logged on).
2. Navigate to the ISPF command shell. On most systems, this is **Option 6** from the main ISPF menu.
3. Run the LabSetup program:
 - a. On the command line, enter the lab setup command that your instructor or training coordinator has given to you. The command will have the format:

EX 'xxxx.ADLAB.INSTALL(LABSETUP)'

```
Menu List Mode Functions Utilities Help
-----
                                ISPF Command Shell
Enter TSO or Workstation commands below:
===> EXEC 'DNET249.MASTER.ADLAB.DATA(LABSETUP)'
```

```
Place cursor on choice and press enter to Retrieve command
=>
=>
->
```

4. You will see the message “**SETUP FOR HANDS-ON TRAINING**” message.
 - a. If you do not see this message, check the spelling of the command and try again.
 - b. Press the **ENTER** key repeatedly until the LabSetup program completes.
 - Note: Many screens full of messages will be displayed. Continue to press **Enter**. There may be times when three asterisks appear in the bottom left corner of the screen or the process just stops. Keep pressing Enter. You will end up at the Command Shell panel once again.

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5. Note: In the next steps, you will verify that your files have been created.
6. Navigate to the system 3.4 panel (Data Set List).
 - Type 3.4 on the command line, then **ENTER**:
7. Enter a Dsname level of: **your-tso-id.ADLAB**, then press **ENTER**.

```

Menu  RefList  RefNode  Utilities  Help
-----
Data Set List Utility
Option ==>
blank Display data set list          P Print data set list      More: +
  U Display UTOC information          PU Print UTOC information

Enter one or both of the parameters below:
Dsname Level . . . DNET249.ADLAB
Volume serial . . .

Data set list options
-----

```

8. You should see a list of data sets that begin with your ID, with a middle qualifier of ADLAB.

```

Menu  Options  View  Utilities  Compilers  Help
-----
DSLIST - Data Sets Matching DNET249.ADLAB          Row 1 of 16
Command ==>                                         Scroll ==> CSR
Command - Enter "/" to select action                Message          Volume
-----
DNET249.ADLAB.COPYLIB                               DMPU14
DNET249.ADLAB.CUSTFILE                              DMPU23
DNET249.ADLAB.DATA                                  DMPU25
DNET249.ADLAB.DTCHD                                 DMPU07
DNET249.ADLAB.DTLOG                                 DMPU05
DNET249.ADLAB.DTMAP                                DMPU16
DNET249.ADLAB.EMI                                  MIGRAT1
DNET249.ADLAB.EQI                                  DMPU05
DNET249.ADLAB.JCI                                  DMPU15
DNET249.ADLAB.LI                                   DMPU08
DNET249.ADLAB.LOAD                                  DMPU19
DNET249.ADLAB.PROC                                  DMPU09
DNET249.ADLAB.SOURCE                                DMPU21
DNET249.ADLAB.SYSDEBUG                              DMPU01
DNET249.ADLAB.TEMPLATE                              DMPU02

F1=Help      F2=$plit    F3=Exit     F4=$wapNext  F5=Rfind    F7=Up
F8=Down      F9=$wap     F10=Left    F11=Right    F12=Cancel

```

It is OK if your list of files is different from the list shown here.

- a. If you have ADLAB data sets, then you are ready for the APA exercises.
- b. If you do not have the ADLAB datasets, then return to step 1. Ask for help if you aren't sure why you don't have the sample files.

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Lab Exercise 2

In this exercise you will:

Use a web browser to locate the Application Performance Analyzer manuals on the IBM web site. Open the “Application Performance Analyzer User’s Guide” for your reference. Learn how to download any of the APA manuals to your workstation.

1. Start an Internet Browser window.
2. Open URL:
<http://www.ibm.com/software/awdtools/deployment>
3. Click on the **Select a Product** pull-down.
4. Click on **Application Performance Analyzer for z/OS**

The screenshot shows the IBM website interface for 'z/OS Problem Determination Tools'. The page includes a navigation bar with 'Home', 'Products', 'Services & solutions', 'Support & downloads', and 'My account'. A search bar is located in the top right corner. The main content area features a 'z/OS Problem Determination Tools' heading and a description of the tools. Below the description is a 'Select a Product' pull-down menu with a 'Go' button. A red arrow points to the pull-down menu. The page is divided into sections: 'Products' and 'Solutions'. The 'Products' section lists 'Application Performance Analyzer for z/OS' and 'Debug Tool for z/OS'. The 'Solutions' section lists 'Problem Determination Tools Information Center' and 'IBM COBOL family'. A 'Highlights' sidebar on the right contains links for 'File Manager: Latest PTF information', 'Fault Analyzer: Latest PTF information', 'Debug Tool: Latest PTF information', and 'WebSphere and zSeries AD tools help meet on demand'. The IBM logo is visible in the top left corner.

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5. Click on **Library**

The screenshot shows the IBM website for 'Application Performance Analyzer for z/OS'. The left sidebar contains a navigation menu with the following items: Application Performance Analyzer for z/OS, Features and benefits, System requirements, **Library** (highlighted with a red arrow), News, How to buy, Training and certification, Services, and Support. The main content area shows the product title and an 'Overview' section with a list of bullet points: Discover how Application Performance Analyzer for z/OS® V7.1 can help your business; Optimize the performance of your existing application; Improve the response time of your online transactions and batch turnaround times; Isolate performance problems in applications; Test the effect of increased workloads on your systems; and a 'Learn more' link. A 'We're here to help' section is visible on the right.

6. You can browse manuals online. For the “User’s Guide”, click on the link under the View Book column.

The screenshot shows the 'Library' section of the IBM website. It lists two versions: Version 7 Release 1 and Version 1 Release 1. Below this is a table titled 'Application Performance Analyzer for z/OS, Version 7 Release 1'. The table has columns for Title, View/download PDF, Order number, View Book, Download Book, and Last update. A red arrow points to the 'View Book' link for the 'User's Guide (4.9MB)' row.

Title	View/download PDF	Order number	View Book	Download Book	Last update
Customization Guide (693KB)	View	SC19-1065-01	View	Download (124KB)	03/2007
License Information (580KB)	View	GC19-1068-00	View	Download (184KB)	03/2007
Messages Guide (839KB)	View	GC19-1067-01	View	Download (184KB)	03/2007
Program Directory (130KB)	View	GI10-8736-00	View	Download (732KB)	03/2007
User's Guide (4.9MB)	View	SC19-1066-01	View	Download (732KB)	03/2007
Bookshelf	View	GC19-1089-01	View	Download (124KB)	03/2007
Bookshelf Index	View	GC19-1090-01	View	Download (364KB)	03/2007
PDF Extended Shelf	View	GC19-1091-01	View	Download (237KB)	03/2007

Search for text across all books in the Application Performance Analyzer V7 Bookshelf.

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- The contents page for the User's Guide appears. You can use the navigation links to get to specific sections.
- Click on the browser's BACK button until you are back to the APA Library page.
- You can download APA manuals to your workstation from this web site. **CLICK** on the link next to the "User's Guide" manual in the Download Book column. You may also **CLICK** on the title of the document that you would like to download, to download a PDF version of the manual.

United States [chang

Home | Products | Services & industry solutions | Support & downloads | My IBM

Software > Software Development > z/OS Problem Determination Tools >

Application Performance Analyzer for z/OS

Library

Application Performance Analyzer for z/OS:

- Version 7 Release 1
- Version 1 Release 1

Application Performance Analyzer for z/OS, Version 7 Release 1					
Title View/download PDF	Order number	View Book	Download Book	Last update	
Customization Guide (693KB)	SC19-1065-01	View	Download (124KB)	03/2007	
License Information (580KB)	GC19-1068-00				
Messages Guide (839KB)	GC19-1067-01	View	Download (184KB)	03/2007	
Program Directory (130KB)	GI10-8736-00				
User's Guide (4.9MB)	SC19-1066-01	View	Download (732KB)	03/2007	
Bookshelf	GC19-1089-01	View	Download (4KB)	03/2007	
Bookshelf Index	GC19-1090-01		Download (364KB)	03/2007	
PDF Extended Shelf	GC19-1091-01	View	Download (237KB)	03/2007	

[Search for text](#) across all books in the Application Performance Analyzer V7 Bookshelf.

- Both links will let you download the manual to your workstation. Click on **SAVE** in the resulting dialogue .
- A dialog is displayed where you can select any valid directory on your workstation to download the manual in Book Manager or PDF format. If you would like a softcopy of the manual, you can download it now. Otherwise, press **Escape**.
- Close your Internet Browser window.

Lab Exercise 3

In this exercise you will:

- Enter an observation session for a batch job that is not running yet.
 - Use the NEW command
 - Specify 30,000 observations for 3 minutes
 - Job name = userid + A
 - Submit the request to APA
- Run a sample job
 - Prepare your-tso-id.ADLAB.JCL(XSAMAPA)
 - Add job card (job name = userid + A)
 - Submit the job
- Notice that request goes active
- Use the Real-Time Report facility
 - View real-time report while the program executes
 - Observe things of interest and navigate to other Real-Time Reports
 - After the observation is complete, cancel the job.

1. Log on to TSO.
2. Navigate to the APA main panel. If you do not know where APA is installed at your site, please ask your instructor.
3. Begin a new APA Observation Session by:

Typing “NEW” on the Command Line and pressing “ENTER”

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```
File View Navigate Help
R02: IBM APA for z/OS Observation List (CAZ0) Row 00001 of 00147
Command ==> NEW Scroll ==> CSR

ReqNum  Owned By  Description  Job Name  Date/Time  Samples  Status
0381    DBA022                DBA022W  Jun-6  11:18      3  Ended
0379 +  DNET603                DNET603D Jun-4  14:02    10,000 STEPS
0378    DBA022                DBA022W  Jun-4  13:49      1,000  Ended
0376    DNET100  THIS IS A TEST  DNET100R May-29  2:17    100,000 Ended
0375    DNET290  Test           DNET290R May-28  4:09    100,000 Ended
0374    DNET290  Demo Sample    DNET290R May-28  3:58    100,000 Ended
0373    ADPOT25  CHECK THRESHOLD ADPOT25R May-27  19:00      1,000  Thresh
0370 +  DNET047                DNET047X May-24  13:38    10,000 STEPS
0367 +  DNET047  this is the des DNET047X May-24  13:29      1,000  STEPS
0366    DNET047  description    DNET047X May-24  10:42    23,517 Cancel
0363 +  DNET047  description    DNET047X May-24  10:29      2,000  STEPS

Welcome to IBM APA for z/OS ISPF Version 7.100C. You are currently connected
to measurement task id CAZ0. Enter CONNECT for an alternate connection,
VERSION for version information, NEW to start a measurement.

0353    ADPOT04  For CICS AOR De CICS AOR5 May-22  7:12    50,000  Ended
```

4. On the resulting panel, you will specify job information to indicate to APA what should be observed and set parameters for your Observation Session. Using your TAB key to navigate from prompt to prompt, type the following:

In the **Job Name/Pattern** prompt type your TSO **Userid + the letter "A"**

In the **Step No** prompt type an ***** to monitor all job steps

In the **Number of Samples** prompt type **30000** (thirty thousand)

In the **Duration (min:sec)** type **3:00** or **180** to represent 3 minutes

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```

File View Navigate Help
R03: Schedule New Measurement Row 00001 of 00012
Command ==> Scroll ==> CSR

1. Job Information 3. Multi Steps 5. CICS Options 7. Schedule
2. Options 4. Active Jobs 6. Sysplex 8. Sched Options

Panel 1. Job Information

Job Name/Pattern . [ ] System Name . . . DEMOMVS

Step Specification
Step No. . . . [ ] Specify step number, program name,
Program Name . . . [ ] step name or step name + Proc step
Step Name . . . [ ] name. Use panel 3 to specify more
ProcStepName . . . [ ] than one step.

Description . . . [ ]
Number of Samples [ ] Measure to step end . . . N
Duration (min:sec) [ ] Delay by (secs) . . . [ ]
Notify TSO User . . DNET047 Retain file for (days) . [ ]
  
```

5. Following the instructions above, your screen should look similar to the screen below.

```

File View Navigate Help
R03: Schedule New Measurement Row 00001 of 00012
Command ==> Scroll ==> CSR

1. Job Information 3. Multi Steps 5. CICS Options 7. Schedule
2. Options 4. Active Jobs 6. Sysplex 8. Sched Options

Panel 1. Job Information

Job Name/Pattern . . DNET047A System Name . . . DEMOMVS

Step Specification
Step No. . . . . * Specify step number, program name,
Program Name . . . [ ] step name or step name + Proc step
Step Name . . . [ ] name. Use panel 3 to specify more
ProcStepName . . . [ ] than one step.

Description . . . [ ]
Number of Samples . 30000 Measure to step end . . . N
Duration (min:sec) . 3:00 Delay by (secs) . . . [ ]
Notify TSO User . . DNET047 Retain file for (days) . [ ]
  
```

6. Press **ENTER** to submit this request to APA for observation.
7. In the resulting panel, APA confirms that the data on the panel is formatted correctly and that you that you can still input more data for your Observation Session on the other panels if needed. To tell APA that you are done press **ENTER** one more time.

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```

File View Navigate Help
R03: Schedule New Measurement                               Row 00001 of 00012
Command ==>                                               Scroll ==> CSR
1. Job Information    3. Multi Steps    5. CICS Options    7. Schedule
2. Options           4. Active Jobs    6. Sysplex        8. Sched Options

Panel 1. Job Information                                Input more data or ENTER to submit

Job Name/Pattern . . DNET047A    System Name . . . DEMONVS

Step Specification
Step No. . . . . *
Program Name . . .
Step Name . . .
ProcStepName . . .
Specify step number, program name,
step name or step name + Proc step
name. Use panel 3 to specify more
than one step.

Description . . . >
Number of Samples . 30000    Measure to step end . . . N
Duration (min:sec) . 3:00    Delay by (secs) . . .
Notify TSO User . . DNET047    Retain file for (days) . 0
  
```

- Your new Observation Request has been added and APA is now waiting for your job to begin processing.

```

File View Navigate Help
R02: IBM APA for z/OS Observation List (CAZ0)              New request added
Command ==>                                               Scroll ==> CSR

ReqNum  Owned By  Description          Job Name  Date/Time  Samples  Status
-----  -
0394    DNET047          DNET047A           DNET047A  Jun-7  20:40  30,000  STEPS
0381    DBA022          DBA022W            DBA022W   Jun-6  11:10   3        Ended
0379    + DNET603          DNET603D           DNET603D  Jun-4  14:02  10,000  STEPS
0378    DBA022          DBA022W            DBA022W   Jun-4  13:49   1,000   Ended
0376    DNET100          THIS IS A TEST     DNET100R  May-29  2:17  100,000  Ended
0375    DNET290          Test               DNET290R  May-28  4:09  100,000  Ended
0374    DNET290          Demo Sample        DNET290R  May-28  3:58  100,000  Ended
0373    ADPOT25          CHECK THRESHOLD    ADPOT25R  May-27  19:00   1,000   Thresh
0370    + DNET047          DNET047X           DNET047X  May-24  13:38  10,000  STEPS
0367    + DNET047          this is the des    DNET047X  May-24  13:29   1,000   STEPS
0366    DNET047          description         DNET047X  May-24  10:42  23,517  Cancel
0363    + DNET047          description         DNET047X  May-24  10:29   2,000   STEPS
0360    DNET047          ACI Demonstrati    DNET047X  May-24  9:39   1,000   STEPS
0359    ADPOT04          demo               ADPOT04R  May-23  9:18  100,000  Ended
0358    ADPOT04          demo sample        ADPOT04R  May-23  9:12  100,000  Ended
0357    ADPOT04          demo sample        ADPOT04R  May-23  9:07  100,000  Ended
  
```

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9. To submit your job, open the following dataset in an EDIT session:

'your-tso-id.ADLAB.JCL(XSAMAPA)'

```
File Edit Edit_Settings Menu Utilities Compilers Test Help
-IPT- EDIT DNET047.ADLAB.JCL(XSAMAPA) - 01.00 Columns 00001 00072
Command ==> █ Scroll ==> CSR
***** ***** Top of Data *****
000001 /* - - - ADD A JOB CARD ABOVE THIS LINE - - -
000002 /* *****
000003 /* RUN SAMPLE PROGRAM SAM1V
000004 /*
000005 /* CREATE WORKLOAD TO BE MONITORED IN APA WORKSHOP
000006 /* *****
000007 /*
000008 /*
000009 /* PROC TO ALLOCATE AND POPULATE A VSAM DATASET
000010 /*
000011 /*ALLOCVS PROC FILNAM='NONAME',XSPACE='CYL,(1,1)',
000012 /* XLRECL=2048,XKEYOFF=0,XKEYLEN=10,XRECOGR=KS
000013 /*
000014 /* CHECK TO SEE IF FILE IS ALREADY ALLOCATED
000015 /*CHECKV EXEC PGM=IKJEFT01,REGION=4M,
000016 /* PARM='%@FILECHK &SYSUID &FILNAM'
000017 /*SYSEXEC DD DSN=&SYSUID..ADLAB.FILES,DISP=SHR
000018 /*SYSTSPRT DD SYSOUT=*
000019 /*SYSTSIN DD DUMMY
```

10. Customize the JCL to run on your system by making the following changes:
 - a. Add a JOB card.
 - b. Change the jobname to your TSO Userid plus the character “A”.
 - c. The instructor may tell you about other customizations needed for your system.

11. Submit the job. (type **SUB** on the command line, then **ENTER**).

12. Once the job becomes ACTIVE, APA will begin its observation and sampling process. Notice the changes in the line containing your job:

A + (plus sign) appears to the right of the **Request Number** indicating a multi-step job
The **Samples** column changes colour to reflect sampling is in progress

To view the multiple steps, place a + (plus sign) over the first character of the **Request Number** and press **ENTER**

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```
File View Navigate Help
R02: IBM APA for z/OS Observation List (CAZ0) Measurement completed
Command ==> Scroll ==> CSR
```

ReqNum	Owned By	Description	Job Name	Date/Time	Samples	Status
<u>0394</u> +	DNET047		DNET047A	Jun-7 20:40	30,000	STEPS
<u>0381</u>	DBA022		DBA022W	Jun-6 11:18	3	Ended
<u>0379</u> +	DNET603		DNET603D	Jun-4 14:02	10,000	STEPS
<u>0378</u>	DBA022		DBA022W	Jun-4 13:49	1,000	Ended
<u>0376</u>	DNET100	THIS IS A TEST	DNET100R	May-29 2:17	100,000	Ended
<u>0375</u>	DNET290	Test	DNET290R	May-28 4:09	100,000	Ended
<u>0374</u>	DNET290	Demo Sample	DNET290R	May-28 3:58	100,000	Ended
<u>0373</u>	ADPOT25	CHECK THRESHOLD	ADPOT25R	May-27 19:00	1,000	Thresh
<u>0370</u> +	DNET047		DNET047X	May-24 13:38	10,000	STEPS
<u>0367</u> +	DNET047	this is the des	DNET047X	May-24 13:29	1,000	STEPS
<u>0366</u>	DNET047	description	DNET047X	May-24 10:42	23,517	Cancel
<u>0363</u> +	DNET047	description	DNET047X	May-24 10:29	2,000	STEPS
<u>0360</u>	DNET047	ACI Demonstrati	DNET047X	May-24 9:39	1,000	STEPS
<u>0359</u>	ADPOT04	demo	ADPOT04R	May-23 9:18	100,000	Ended
<u>0358</u>	ADPOT04	demo sample	ADPOT04R	May-23 9:12	100,000	Ended
<u>0357</u>	ADPOT04	demo sample	ADPOT04R	May-23 9:07	100,000	Ended
<u>0356</u>	ADPOT04	3rd try	ADPOT04R	May-23 4:09	100,000	Ended

13. The pop-up window displays the number of samples collected for each step and the status of each step. The status Failed indicates that only one sample could be collected before the job step ended. While the job is executing you can view the Real-Time Reports by placing an “R” (or an “S”) on the **Active** step.

```
File View Navigate Help
R02: IBM APA for z/OS Observation List (CAZ0) Row 00001 of 00159
Command ==> Scroll ==> CSR
```

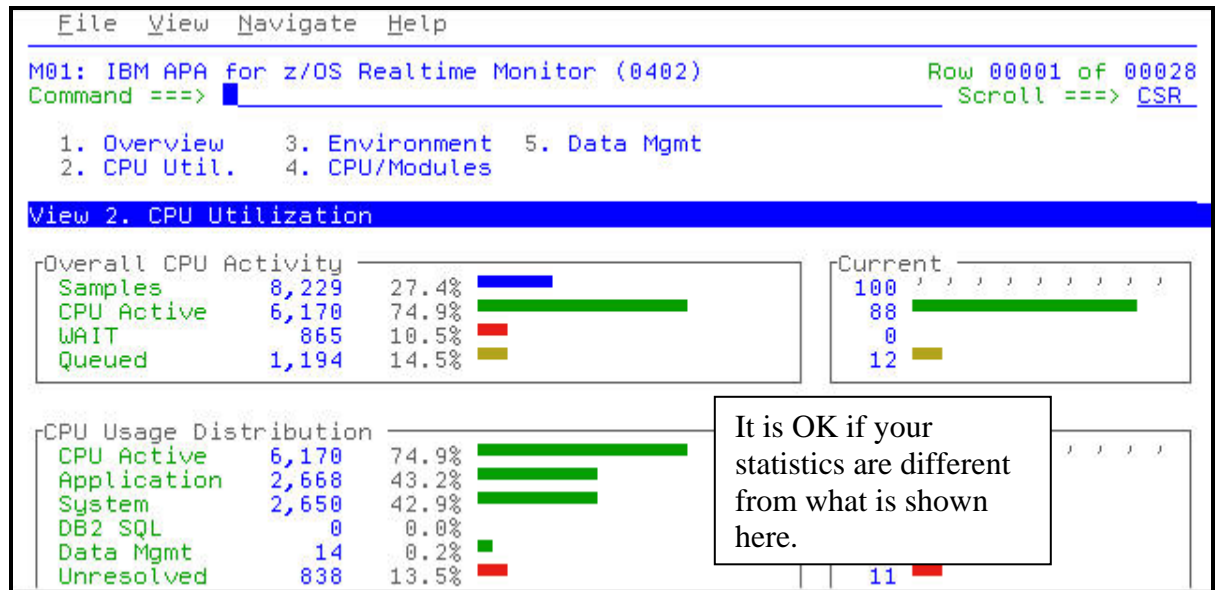
ReqNum	Owned By	Description	Job Name	Date/Time	Samples	Status
<u>0394</u> +	DNET047		DNET047A	Jun-7 20:40	30,000	STEPS
→ <u>0395</u>	0001	IKJEFT01 CUSTKSDS	CHECKV	Jun-7 20:41	17	Ended
→ <u>0396</u>	0002	IEFBR14 CUSTKSDS	ALLOCV	Jun-7 20:41	1	Failed
→ <u>0397</u>	0003	IDCAMS CUSTKSDS	COPYV	Jun-7 20:41	1	Failed
→ <u>0398</u>	0004	IKJEFT01 CUSTKSDS	CHECKV	Jun-7 20:41	18	Ended
→ <u>0399</u>	0005	IEFBR14 CUSTKSDS	ALLOCV	Jun-7 20:41	1	Failed
→ <u>0400</u>	0006	IDCAMS CUSTKSDS	COPYV	Jun-7 20:41	1	Failed
→ <u>0401</u>	0007	IDCAMS VERIFY		Jun-7 20:41	47	Ended
<u>R</u> <u>0402</u>	0008	SAM1V RUNSAM		Jun-7 20:41	6,296	Active
<u>0381</u>	DBA022		DBA022W	Jun-6 11:18	3	Ended
<u>0379</u> +	DNET603		DNET603D	Jun-4 14:02	10,000	STEPS
<u>0378</u>	DBA022		DBA022W	Jun-4 13:49	1,000	Ended
<u>0376</u>	DNET100	THIS IS A TEST	DNET100R	May-29 2:17	100,000	Ended
<u>0375</u>	DNET290	Test	DNET290R	May-28 4:09	100,000	Ended

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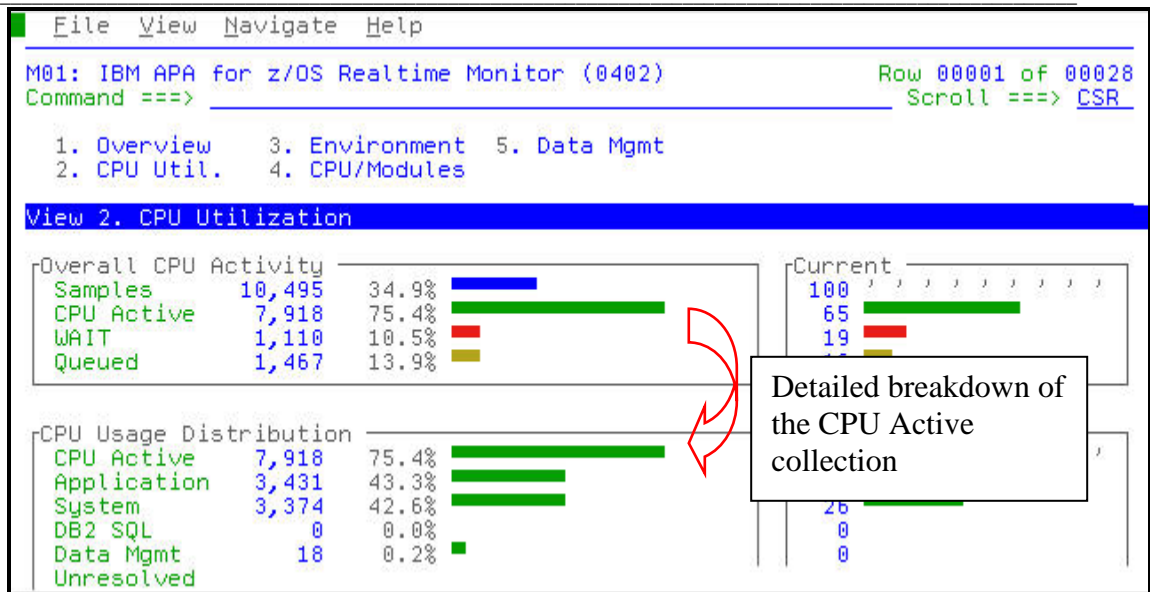


14. Real-Time reports display the resource activity while the job is executing. The report below, CPU Utilization, has two columns of boxes. The first column of boxes shows the total-to-date activity for the job. The second column of boxes shows the current collection or activity since the last time the ENTER key was pressed.



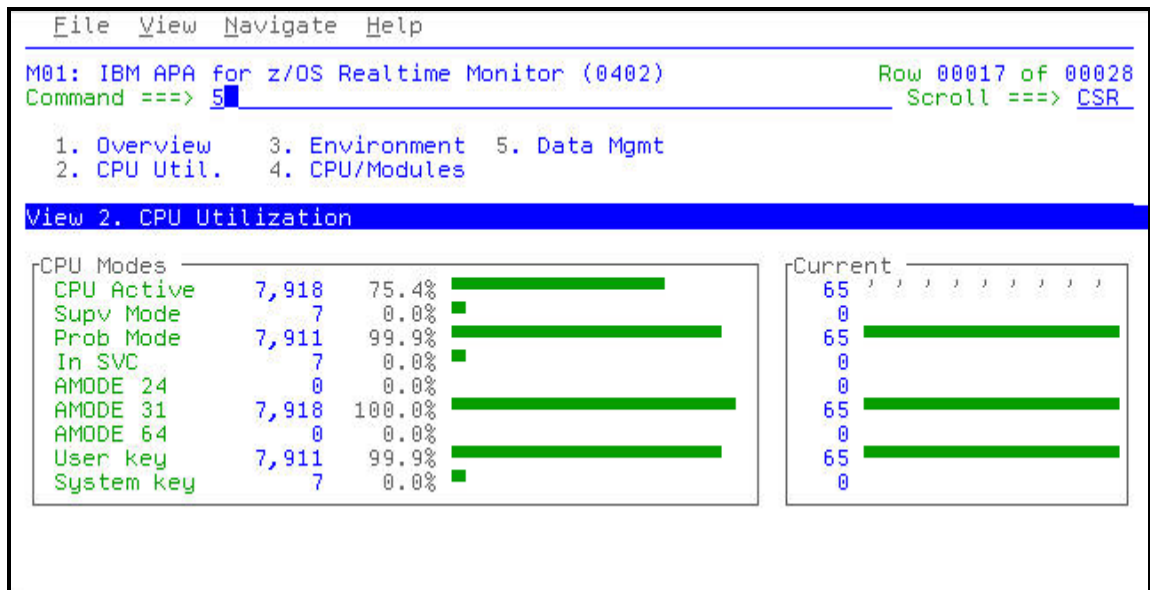
15. Use your PageUp (PF7) and PageDn (PF8) PF Keys to view the various sections of the report.

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16. Use your PageUp (PF7) and PageDn (PF8) PF Keys to view the various sections of the report. When you are done viewing this report navigate to the Data Mgmt report.

Type “5” in command line and press **ENTER**



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17. The Real-Time Data Management report shows the files activity at any given point in time. When you are done viewing this report navigate to the CPU/Modules report.

Type “**4**” in command line and press **ENTER**

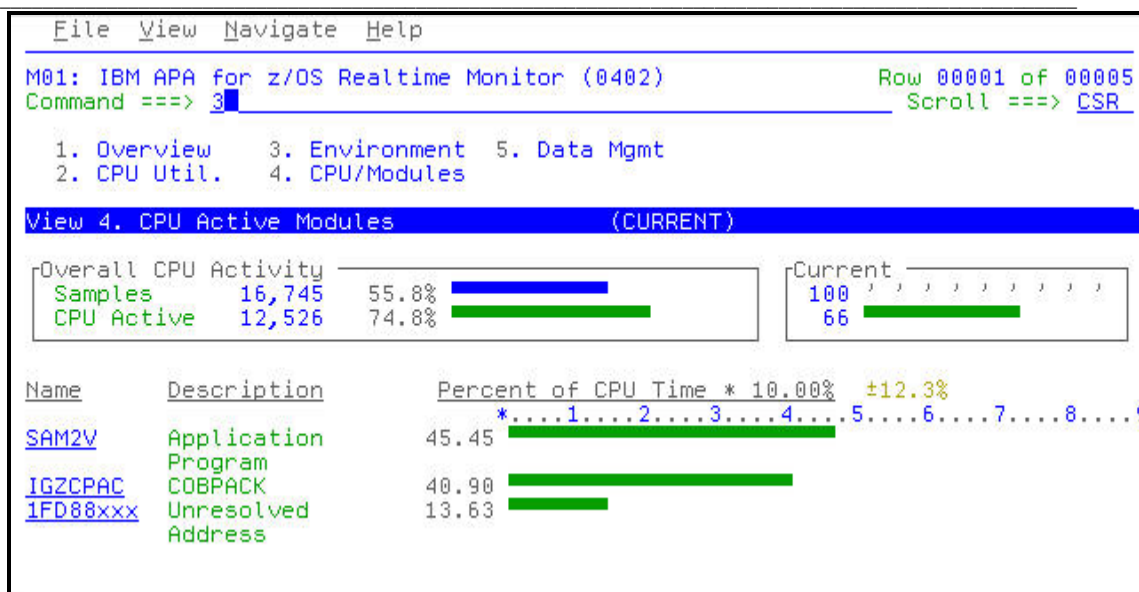
The screenshot shows the IBM APM console interface. At the top, there is a menu bar with 'File', 'View', 'Navigate', and 'Help'. Below the menu bar, the text reads 'M01: IBM APA for z/OS Realtime Monitor (0402)' and 'Command ==> 4'. A menu of options is displayed: '1. Overview', '2. CPU Util.', '3. Environment', '4. CPU/Modules', and '5. Data Mgmt'. The '5. Data Mgmt' option is selected, and the screen displays 'View 5. Data Mgmt Service Time (CURRENT)'. Below this, a table shows file activity with columns for 'DDNAME', 'Type', 'EXCPs', 'CPU-Wait-Queued', and 'Dataset Name'. The 'CPU-Wait-Queued' column has a red bar next to the value '99' for the 'CST2FILE' entry with 'VSAM' type. A callout box on the right side of the screenshot contains the text: 'Notice the speed bar shows Wait activity on the file during the sampling process.'

DDNAME	Type	EXCPs	CPU-Wait-Queued	Dataset Name
CST2FILE		402		DNET047.ADLAB.CUST2.WORK.KSDS
CST2FILE		401		DNET047.ADLAB.CUST2.WORK.KSDS
CST2FILE		401		DNET047.ADLAB.CUST2.WORK.KSDS
CST2FILE		401		DNET047.ADLAB.CUST2.WORK.KSDS
CST2FILE		400		DNET047.ADLAB.CUST2.WORK.KSDS
CST2FILE		400		DNET047.ADLAB.CUST2.WORK.KSDS
CST2FILE	VSAM	399	99	DNET047.ADLAB.CUST2.WORK.KSDS
CST2FILE		99		DNET047.ADLAB.CUST2.WORK.KSDS
STEPLIB		6		DNET047.ADLAB.LOAD

18. The Real-Time CPU/Modules report shows the active program(s) at any given point in time. In this case almost half of the time in execution is being used by a single module. When you are done viewing this report navigate to the Environment report.

Type “**3**” in command line and press **ENTER**

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19. When each step of the job completes or when you have reached the number of samples requested, you will receive a message from APA letting you know that it has completed sampling for the step.

```

CAZ3398I IBM APA for z/OS sampling complete for DNET047A
*** █
    
```

Application Performance Analyzer Mentor Workshop Lab Exercises



20. Press **PF3** to return to the selection menu. A - (minus sign) will close the request window.

```
File View Navigate Help
R02: IBM APA for z/OS Observation List (CAZ0) Row 00001 of 00159
Command ==> Scroll ==> CSR
```

ReqNum	Owned By	Description	Job Name	Date/Time	Samples	Status
-0394 +	DNET047		DNET047A	Jun-7 20:40	30,000	STEPS
+0395	0001	IKJEFT01 CUSTKSDS	CHECKV	Jun-7 20:41	17	Ended
+0396	0002	IEFBR14 CUSTKSDS	ALLOCV	Jun-7 20:41	1	Failed
+0397	0003	IDCAMS CUSTKSDS	COPYV	Jun-7 20:41	1	Failed
+0398	0004	IKJEFT01 CUSTKSDS	CHECKV	Jun-7 20:41	18	Ended
+0399	0005	IEFBR14 CUSTKSDS	ALLOCV	Jun-7 20:41	1	Failed
+0400	0006	IDCAMS CUSTKSDS	COPYV	Jun-7 20:41	1	Failed
+0401	0007	IDCAMS	VERIFY	Jun-7 20:41	47	Ended
+0402	0008	SAM1V	RUNSAM	Jun-7 20:44	30,000	Ended
0381	DBA022		DBA022W	Jun-6 11:18	3	Ended
0379 +	DNET603		DNET603D	Jun-4 14:02	10,000	STEPS
0378	DBA022		DBA022W	Jun-4 13:49	1,000	Ended
0376	DNET100	THIS IS A TEST	DNET100R	May-29 2:17	100,000	Ended
0375	DNET290	Test	DNET290R	May-28 4:09	100,000	Ended

21. Each report has a series of Setup options which may be used to customize the report you are viewing. Report options can be accessed by placing your cursor on the **VIEW** command in the CUA action bar and press **ENTER** or you may issue the **SETUP** primary command.

```
File View Navigate Help
R02: 1 1. Report Setup (SETUP) t (CAZ0) Row 00001 of 00148
Comma Scroll ==> CSR
```

ReqNum	Owned By	Description	Job Name	Date/Time	Samples	Status
0394 +	DNET047		DNET047A	Jun-7 20:40	30,000	STEPS
0381	DBA022		DBA022W	Jun-6 11:18	3	Ended
0379 +	DNET603		DNET603D	Jun-4 14:02	10,000	STEPS
0378	DBA022		DBA022W	Jun-4 13:49	1,000	Ended
0376	DNET100	THIS IS A TEST	DNET100R	May-29 2:17	100,000	Ended
0375	DNET290	Test	DNET290R	May-28 4:09	100,000	Ended
0374	DNET290	Demo Sample	DNET290R	May-28 3:58	100,000	Ended
0373	ADPOT25	CHECK THRESHOLD	ADPOT25R	May-27 19:00	1,000	Thresh
0370 +	DNET047		DNET047X	May-24 13:38	10,000	STEPS
0367 +	DNET047	this is the des	DNET047X	May-24 13:29	1,000	STEPS
0366	DNET047	description	DNET047X	May-24 10:42	23,517	Cancel
0363 +	DNET047	description	DNET047X	May-24 10:29	2,000	STEPS
0360	DNET047	ACI Demonstrati	DNET047X	May-24 9:39	1,000	STEPS
0359	ADPOT04	demo	ADPOT04R	May-23 9:18	100,000	Ended
0358	ADPOT04	demo sample	ADPOT04R	May-23 9:12	100,000	Ended
0357	ADPOT04	demo sample	ADPOT04R	May-23 9:07	100,000	Ended
0356	ADPOT04	3rd try	ADPOT04R	May-23 4:09	100,000	Ended

Application Performance Analyzer Mentor Workshop Lab Exercises



22. In this example, the pop-up menu allows you to activate the Real-Time Monitor or to prompt you with a confirmation for Observations which are being deleted. Press **PF3** to close the pop-up window.

```
File View Navigate Help
-
R  █ Options for Observation Session List
C
R  Display requests according to 'wildcard' patterns:
   Owner User Id . . . *
   Job Name . . . . *

Enter "/" to select an option
/ Automatically launch Realtime Monitor for new
- Prompt for confirmation before deleting
  measurement request.

001 of 00148
ll ==> CSR
Status
STEPS
Ended
STEPS
Ended
STEPS
Ended
STEPS
Ended
Thresh
STEPS
STEPS
Cancel
0363 + DNET047 description DNET047X May-24 10:29 2,000 STEPS
0360 DNET047 ACI Demonstrati DNET047X May-24 9:39 1,000 STEPS
0359 ADPOT04 demo ADPOT04R May-23 9:18 100,000 Ended
0358 ADPOT04 demo sample ADPOT04R May-23 9:12 100,000 Ended
0357 ADPOT04 demo sample ADPOT04R May-23 9:07 100,000 Ended
0356 ADPOT04 3rd try ADPOT04R May-23 4:09 100,000 Ended
```

23. This completes this exercise. Return to the Observation list by pressing **PF3**.

Application Performance Analyzer Mentor Workshop Lab Exercises



Lab Exercise 4

In this exercise you will:

- Enter an observation for a job that's already running.
 - Discuss difference between monitoring a running job vs job that is not yet running
 - Run job in ADLAB.JCL(XSAMAPA)
 - change (job name = userid + B)
 - Submit
 - NEW command
 - specify 10,000 observations for 1 minute
 - specify jobname = userid + *
 - select job on panel 4
 - Notice that observation goes active
 - Wait until observation is complete, then cancel the job

1. Log on to TSO.

2. Navigate to the APA main panel. If you do not know where APA is installed at your site, please ask your instructor.

3. To submit your job, open the following dataset in an EDIT session:

'your-tso-id.ADLAB.JCL(XSAMAPA)'

```
File Edit Edit_Settings Menu Utilities Compilers Test Help
-IPT- EDIT DNET047.ADLAB.JCL(XSAMAPA) - 01.00 Columns 00001 00072
Command ==> | Scroll ==> CSR
***** ***** Top of Data *****
000001 /* - - - ADD A JOB CARD ABOVE THIS LINE - - -
000002 /******
000003 /* RUN SAMPLE PROGRAM SAM1V
000004 /*
000005 /* CREATE WORKLOAD TO BE MONITORED IN APA WORKSHOP
000006 /******
000007 /*
000008 /*
000009 /* _____
000009 /* PROC TO ALLOCATE AND POPULATE A VSAM DATASET
000010 /*
000011 /*ALLOCVS PROC FILNAM='NONAME',XSPACE='CYL,(1,1)',
000012 /* XLRECL=2048,XKEYOFF=0,XKEYLEN=10,XRECOrg=KS
000013 /*
000014 /* CHECK TO SEE IF FILE IS ALREADY ALLOCATED
000015 /*CHECKV EXEC PGM=IKJEFT01,REGION=4M,
000016 /* PARM='%@FILECHK &SYSUID &FILNAM'
000017 /*SYSEXEC DD DSN=&SYSUID..ADLAB.FILES,DISP=SHR
000018 /*SYSTSPRT DD SYSOUT=*
000019 /*SYSTSIN DD DUMMY
```

Application Performance Analyzer

Mentor Workshop Lab Exercises



4. Customize the JCL to run on your system by making the following changes:
 - Add a JOB card (if necessary)
 - Change the jobname to your TSO Userid plus the character “**B**”.
 - The instructor may tell you about other customizations needed for your system.
5. Submit the job. (type **SUB** on the command line, then **ENTER**)
6. Navigate to the APA main panel and create an APA Observation Session by issuing the NEW command.

Type **NEW** in the command line and press the **ENTER** key.

The screenshot shows the main panel of the Application Performance Analyzer (APA) for z/OS. The title bar reads "File View Navigate Help". The main window title is "R02: IBM APA for z/OS Observation List (CAZ0)". The command line shows "Command ==> NEW" and the status line shows "SDSF executed Scroll ==> CSR". The main display is a table with the following columns: ReqNum, Owned By, Description, Job Name, Date/Time, Samples, and Status. The table contains 20 rows of job information, including job numbers, user IDs, descriptions, job names, dates and times, sample counts, and statuses.

ReqNum	Owned By	Description	Job Name	Date/Time	Samples	Status
0422	+ DNET047		DNET047X	Jun-28 12:17	1,000	STEPS
0413	+ DNET047		DNET047X	Jun-28 11:43	1,000	STEPS
0412	DNET187	test 1	DNET187B	Jun-27 14:09	7,357	Ended
0411	DNET187	test 1	DNET187A	Jun-27 13:54	6,412	Ended
0410	DNET187	test 1	DNET187A	Jun-27 13:50	298	Ended
0399	DNET328		DNET3282	Jun-26 8:30	433	Ended
0398	DNET328		DNET3282	Jun-26 8:20	495	Ended
0379	SYS029	KJC - APA CICS	CICSA0R5	Jun-19 15:37	50,000	Ended
0376	+ DNET427	XSAMY APA Demo	DNET427B	Nov-17 14:29	10,000	STEPS
0375	DNET603		CICSA0R1	Nov-17 12:41	20,000	Ended
0374	DNET603		DNET603	Nov-17 12:35	1,000	Ended
0370	+ DNET603		DNET603W	Nov-17 12:25	10,000	STEPS
0365	ADPOT07	JIMMS TEST	ADPOT07J	Nov-16 1:16	100,000	Ended
0360	DNET100	TODAYS SAMPLES	DNET100R	Nov-14 0:58	100,000	Ended
0358	+ DNET603		DNET603D	Nov-13 11:21	10,000	STEPS
0357	DNET603		CICSA0R1	Nov-13 11:18	10,000	Ended
0356	DNET603		DNET603W	Nov-13 10:40	1,000	Ended

7. On the Job Information panel supply the name of the job to be observed using an * to indicate a wild card character, step(s) to be monitored, the number of samples and the duration at which the samples should take place.

In the **Job Name/Pattern** prompt type your TSO **Userid + the “*”**

In the **Step No** prompt type an ***** to monitor all job steps

In the **Number of Samples** prompt type **10000** (ten thousand)

In the **Duration (min:sec)** type **0:60** or just **60** to represent 1 minute

Press **ENTER** to continue

Application Performance Analyzer Mentor Workshop Lab Exercises



```
File View Navigate Help
R03: Schedule New Measurement Row 00001 of 00013
Command ==> Scroll ==> CSR
1. Job Information 3. Multi Steps 5. CICS Options 7. Schedule
2. Options 4. Active Jobs 6. Sysplex 8. Sched Options

Panel 1. Job Information

Job Name/Pattern . . DNET047* System Name . . . DEMOMVS

Step Specification
Step No. . . . . * Specify step number, program name,
Program Name . . . step name or step name + Proc step
Step Name . . . name. Use panel 3 to specify more
ProcStepName . . . than one step.

Description . . . .
Number of Samples . 10000 Measure to step end . . . N
Duration (min:sec) . 0:50 Delay by (secs) . . . .
Notify TSO User . . DNET047 Retain file for (days) .
USS observations . . . . Max. 10

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```

8. The * (wild card character) in the Job Name field causes APA to display the Active Jobs panel. The Active Jobs panel allows you to complete the definition of the Observation Session by selecting the jobs to be observed from a list of jobs currently running on your system/SYSPLEX.

Application Performance Analyzer Mentor Workshop Lab Exercises



```
File View Navigate Help
R03: Schedule New Measurement Row 00001 of 00003
Command ==> Scroll ==> CSR
1. Job Information 3. Multi Steps 5. CICS Options 7. Schedule
2. Options 4. Active Jobs 6. Sysplex 8. Sched Options
Panel 4. Active Jobs
Enter S to select an active job step to be measured. Prefix . . DNET047*
JobName Type JobId StepName ProcStep ASIDX System CPU% SIO
- DNET047 TSO TSU02352 SPIFFY 0181 DEMOMVS 0.00 0.00
- DNET047B JOB JOB02404 RUNSAM 014B DEMOMVS 40.39 67.97
```

Notice the Prefix area allows you to filter the JobName column of this panel.

MA a 11/070

9. Complete the definition of the job to be observed by selecting the active job and pressing **ENTER**.

```
File View Navigate Help
R03: Schedule New Measurement Row 00001 of 00003
Command ==>
1. Job Information 3. Multi Steps 5. CICS Options 7. Schedule
2. Options 4. Active Jobs 6. Sysplex 8. Sched Options
Panel 4. Active Jobs
Enter S to select an active job step to be measured. Prefix . . DNET047*
JobName Type JobId StepName ProcStep ASIDX System CPU% SIO
- DNET047 TSO TSU02352 SPIFFY 0181 DEMOMVS 0.00 0.00
- S DNET047B JOB JOB02404 RUNSAM 014B DEMOMVS 40.39 67.97
```

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Application Performance Analyzer

Mentor Workshop Lab Exercises



Note: If you have used the **SETUP** command to automatically launch the Real Time Monitor for a new active measurement, you will automatically be placed in the Real Time Monitor window to view your Observation Session while the application executes.

10. At this point, you may select any subsystem collectors that should be turned on (none are needed for this job) or press **ENTER** to create the observation request.

```
File View Navigate Help
R03: Schedule New Measurement Row 00001 of 00013
Command ==> Scroll ==> CSR
1. Job Information 3. Multi Steps 5. CICS Options 7. Schedule
2. Options 4. Active Jobs 6. Sysplex 8. Sched Options
Panel 1. Job Information Input more data or ENTER to submit
Job Name/Pattern . . . DNET047B System Name . . . DEMOMVS
(Active)
Step Specification
Step No. . . . . _____ Specify step number, program name,
Program Name . . . . _____ step name or step name + Proc step
Step Name . . . . _____ name. Use panel 3 to specify more
ProcStepName . . . . _____ than one step.
Description . . . . >
Number of Samples . . . 10000 Measure to step end . . . . N
Duration (min:sec) . . . 0:60 Delay by (secs) . . . . . _____
Notify TSO User . . . DNET047 Retain file for (days) . . 0
USS observations . . . . . _____ Max. 10
MA a 11/025
```

11. The new Observation Session request appears on the APA main panel with the number of samples specified and a status of 'Scheduled'.

Application Performance Analyzer Mentor Workshop Lab Exercises



```
File View Navigate Help
R02: IBM APA for z/OS Observation List (CAZ0)           New request added
Command ==>                                           Scroll ==> CSR
```

ReqNum	Owned By	Description	Job Name	Date/Time	Samples	Status
0432	DNET047		DNET047B	Jun-28 13:03	10,000	Sched
0422 +	DNET047		DNET047X	Jun-28 12:17	1,000	STEPS
0413 +	DNET047		DNET047X	Jun-28 11:43	1,000	STEPS
0412	DNET187	test 1	DNET187B	Jun-27 14:09	7,357	Ended
0411	DNET187	test 1	DNET187A	Jun-27 13:54	6,412	Ended
0410	DNET187	test 1	DNET187A	Jun-27 13:50	298	Ended
0399	DNET328		DNET3282	Jun-26 8:30	433	Ended
0398	DNET328		DNET3282	Jun-26 8:20	495	Ended
0379	SYS029	KJC - APA CICS	CICSAOR5	Jun-19 15:37	50,000	Ended
0376 +	DNET427	XSAMY APA Demo	DNET427B	Nov-17 14:29	10,000	STEPS
0375	DNET603		CICSAOR1	Nov-17 12:41	20,000	Ended
0374	DNET603		DNET603	Nov-17 12:35	1,000	Ended
0370 +	DNET603		DNET603W	Nov-17 12:25	10,000	STEPS
0365	ADPOT07	JIMMS TEST	ADPOT07J	Nov-16 1:16	100,000	Ended
0360	DNET100	TODAYS SAMPLES	DNET100R	Nov-14 0:58	100,000	Ended
0358 +	DNET603		DNET603D	Nov-13 11:21	10,000	STEPS
0357	DNET603		CICSAOR1	Nov-13 11:18	10,000	Ended

MA a 04/015

12. After pressing **ENTER** the job status changes to 'Active' indicating that APA is now collecting statistics on your application.

```
File View Navigate Help
R02: IBM APA for z/OS Observation List (CAZ0)           Row 00001 of 00147
Command ==>                                           Scroll ==> CSR
```

ReqNum	Owned By	Description	Job Name	Date/Time	Samples	Status
0432	DNET047		DNET047B	Jun-28 13:03	3,286	Active
0422 +	DNET047		DNET047X	Jun-28 12:17	1,000	STEPS
0413 +	DNET047		DNET047X	Jun-28 11:43	1,000	STEPS
0412	DNET187	test 1	DNET187B	Jun-27 14:09	7,357	Ended
0411	DNET187	test 1	DNET187A	Jun-27 13:54	6,412	Ended
0410	DNET187	test 1	DNET187A	Jun-27 13:50	298	Ended
0399	DNET328		DNET3282	Jun-26 8:30	433	Ended
0398	DNET328		DNET3282	Jun-26 8:20	495	Ended
0379	SYS029	KJC - APA CICS	CICSAOR5	Jun-19 15:37	50,000	Ended
0376 +	DNET427	XSAMY APA Demo	DNET427B	Nov-17 14:29	10,000	STEPS
0375	DNET603		CICSAOR1	Nov-17 12:41	20,000	Ended
0374	DNET603		DNET603	Nov-17 12:35	1,000	Ended
0370 +	DNET603		DNET603W	Nov-17 12:25	10,000	STEPS
0365	ADPOT07	JIMMS TEST	ADPOT07J	Nov-16 1:16	100,000	Ended
0360	DNET100	TODAYS SAMPLES	DNET100R	Nov-14 0:58	100,000	Ended
0358 +	DNET603		DNET603D	Nov-13 11:21	10,000	STEPS
0357	DNET603		CICSAOR1	Nov-13 11:18	10,000	Ended

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Application Performance Analyzer

Mentor Workshop Lab Exercises



13. Remember that while the Observation Session is active you can begin to review the statistics being collected with the Real Time Monitor that was presented in the previous exercise. To enter the Real Time Monitor simply select the 'Active' jobs using either the 'S' or 'R' line command.

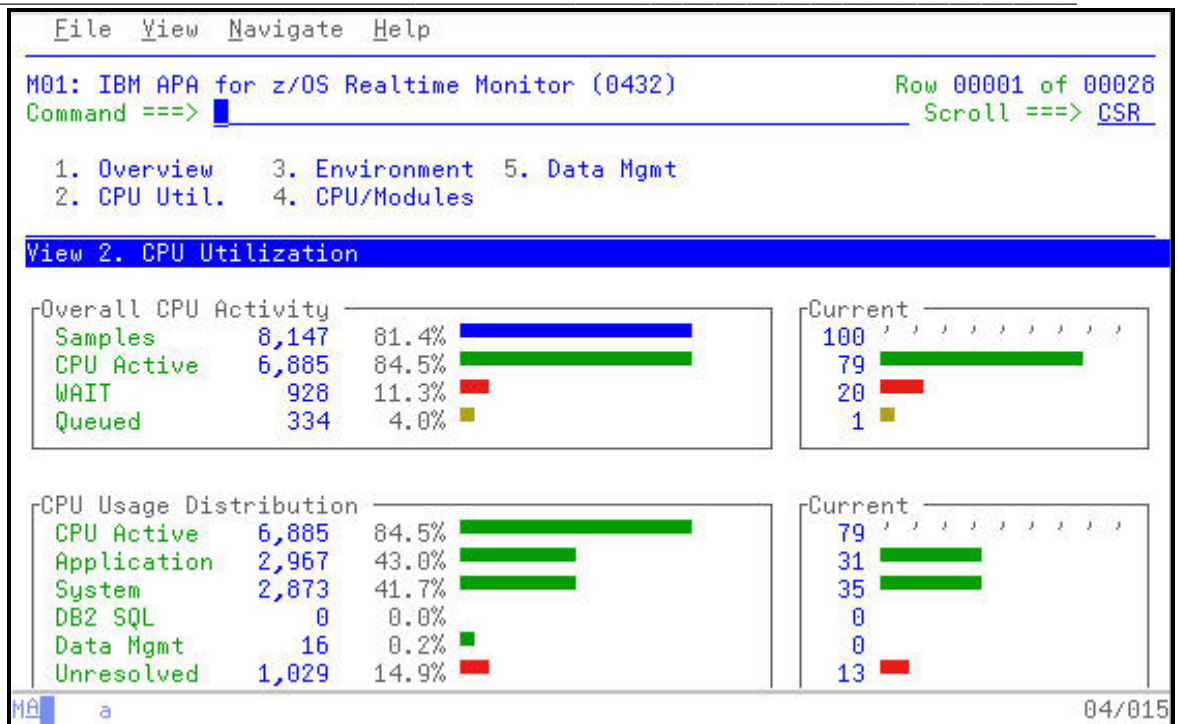
```
File View Navigate Help
R02: IBM APA for z/OS Observation List (CAZ0) Row 00001 of 00147
Command ==> Scroll ==> CSR
```

ReqNum	Owned By	Description	Job Name	Date/Time	Samples	Status
<u>S</u> 032	DNET047		DNET047B	Jun-28 13:03	4,925	Active
<u>0422</u> +	DNET047		DNET047X	Jun-28 12:17	1,000	STEPS
<u>0413</u> +	DNET047		DNET047X	Jun-28 11:43	1,000	STEPS
<u>0412</u>	DNET187	test 1	DNET187B	Jun-27 14:09	7,357	Ended
<u>0411</u>	DNET187	test 1	DNET187A	Jun-27 13:54	6,412	Ended
<u>0410</u>	DNET187	test 1	DNET187A	Jun-27 13:50	298	Ended
<u>0399</u>	DNET328		DNET3282	Jun-26 8:30	433	Ended
<u>0398</u>	DNET328		DNET3282	Jun-26 8:20	495	Ended
<u>0379</u>	SYS029	KJC - APA CICS	CICSAOR5	Jun-19 15:37	50,000	Ended
<u>0376</u> +	DNET427	XSAMY APA Demo	DNET427B	Nov-17 14:29	10,000	STEPS
<u>0375</u>	DNET603		CICSAOR1	Nov-17 12:41	20,000	Ended
<u>0374</u>	DNET603		DNET603	Nov-17 12:35	1,000	Ended
<u>0370</u> +	DNET603		DNET603W	Nov-17 12:25	10,000	STEPS
<u>0365</u>	ADPOT07	JIMMS TEST	ADPOT07J	Nov-16 1:16	100,000	Ended
<u>0360</u>	DNET100	TODAYS SAMPLES	DNET100R	Nov-14 0:58	100,000	Ended
<u>0358</u> +	DNET603		DNET603D	Nov-13 11:21	10,000	STEPS
<u>0357</u>	DNET603		CICSAOR1	Nov-13 11:18	10,000	Ended

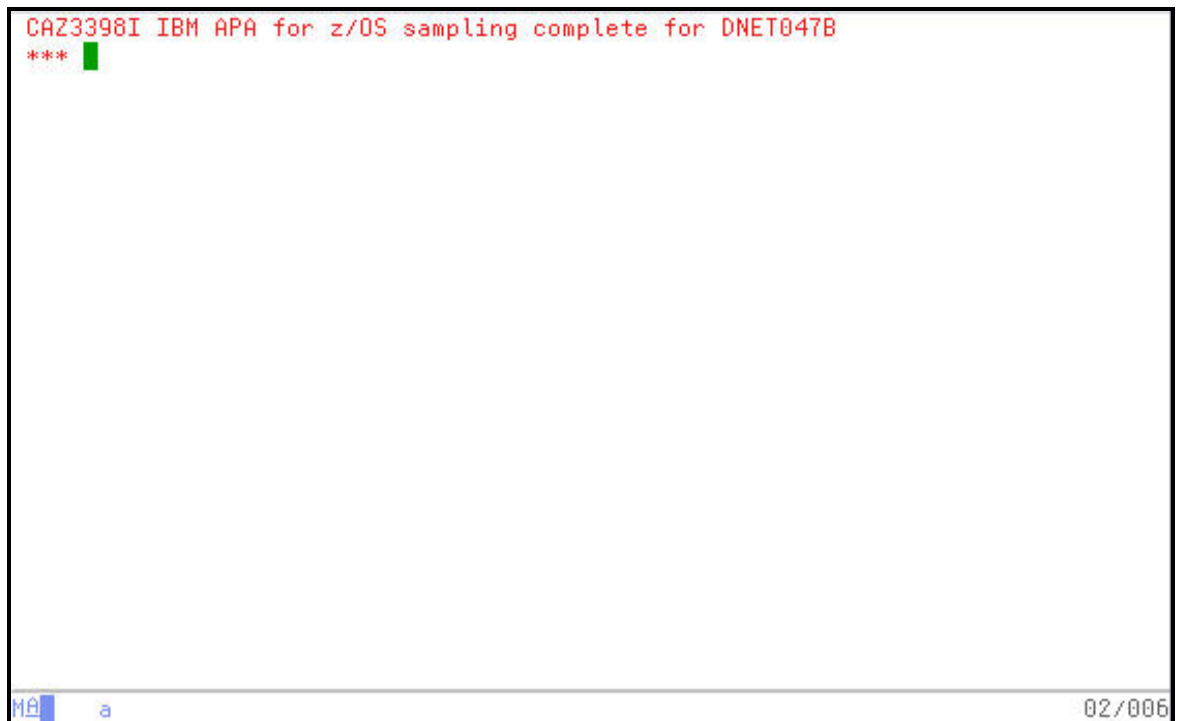
MA a 08/004

14. The Real Time Monitor displays various statistics/reports on the job as the job is executing. Each time to press the ENTER key, the statistics are refreshed. The previous exercise provides more detail on the Real Time Monitor. Press PF3 to leave the Real Time Monitor.

Application Performance Analyzer Mentor Workshop Lab Exercises



15. When the number of sample to be collected has been reached, APA will indicate that it is done sampling with a message.



Application Performance Analyzer Mentor Workshop Lab Exercises



16. For speed and efficiency, APA collects it's samples using z/OS Data Spaces. When sampling is complete the Data Space is written to a file. As this occurs you may see the 'Write' appear under the Status column.

```
File View Navigate Help
R02: IBM APA for z/OS Observation List (CAZ0) Row 00001 of 00147
Command ==> Scroll ==> CSR
```

ReqNum	Owned By	Description	Job Name	Date/Time	Samples	Status
0432	DNET047		DNET047B	Jun-28 13:03	10,000	Write
0422	+ DNET047		DNET047X	Jun-28 12:17	1,000	STEPS
0413	+ DNET047		DNET047X	Jun-28 11:43	1,000	STEPS
0412	DNET187	test 1	DNET187B	Jun-27 14:09	7,357	Ended
0411	DNET187	test 1	DNET187A	Jun-27 13:54	6,412	Ended
0410	DNET187	test 1	DNET187A	Jun-27 13:50	298	Ended
0399	DNET328		DNET3282	Jun-26 8:30	433	Ended
0398	DNET328		DNET3282	Jun-26 8:20	495	Ended
0379	SYS029	KJC - APA CICS	CICSAOR5	Jun-19 15:37	50,000	Ended
0376	+ DNET427	XSAMY APA Demo	DNET427B	Nov-17 14:29	10,000	STEPS
0375	DNET603		CICSAOR1	Nov-17 12:41	20,000	Ended
0374	DNET603		DNET603	Nov-17 12:35	1,000	Ended
0370	+ DNET603		DNET603W	Nov-17 12:25	10,000	STEPS
0365	ADPOT07	JIMMS TEST	ADPOT07J	Nov-16 1:16	100,000	Ended
0360	DNET100	TODAYS SAMPLES	DNET100R	Nov-14 0:58	100,000	Ended
0358	+ DNET603		DNET603D	Nov-13 11:21	10,000	STEPS
0357	DNET603		CICSAOR1	Nov-13 11:18	10,000	Ended

MA a 04/015

17. When the APA Reports are ready for viewing you will see 'Ended' in the Status column.

Application Performance Analyzer Mentor Workshop Lab Exercises



```
File View Navigate Help
R02: IBM APA for z/OS Observation List (CAZ0) Row 00001 of 00147
Command ==> Scroll ==> CSR
```

ReqNum	Owned By	Description	Job Name	Date/Time	Samples	Status
0432	DNET047		DNET047B	Jun-28 13:04	10,000	Ended
0422 +	DNET047		DNET047X	Jun-28 12:17	1,000	STEPS
0413 +	DNET047		DNET047X	Jun-28 11:43	1,000	STEPS
0412	DNET187	test 1	DNET187B	Jun-27 14:09	7,357	Ended
0411	DNET187	test 1	DNET187A	Jun-27 13:54	6,412	Ended
0410	DNET187	test 1	DNET187A	Jun-27 13:50	298	Ended
0399	DNET328		DNET3282	Jun-26 8:30	433	Ended
0398	DNET328		DNET3282	Jun-26 8:20	495	Ended
0379	SYS029	KJC - APA CICS	CICSAOR5	Jun-19 15:37	50,000	Ended
0376 +	DNET427	XSAMY APA Demo	DNET427B	Nov-17 14:29	10,000	STEPS
0375	DNET603		CICSAOR1	Nov-17 12:41	20,000	Ended
0374	DNET603		DNET603	Nov-17 12:35	1,000	Ended
0370 +	DNET603		DNET603W	Nov-17 12:25	10,000	STEPS
0365	ADPOT07	JIMMS TEST	ADPOT07J	Nov-16 1:16	100,000	Ended
0360	DNET100	TODAYS SAMPLES	DNET100R	Nov-14 0:58	100,000	Ended
0358 +	DNET603		DNET603D	Nov-13 11:21	10,000	STEPS
0357	DNET603		CICSAOR1	Nov-13 11:18	10	

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18. This is the end of Exercise 4. If your job is still active you may cancel the remainder of the job.

Lab Exercise 5

In this exercise you will:

- Use the 'R' line command to view APA Reports
- Navigate and review a sampling of reports including the:
 - Measurement Overview – S01 Report
 - CPU Usage by Category – C01 Report
 - Source Program Mapping – A01 Report
 - CPU Usage by Category (with drill down to source) – C01 Report
 - Wait Time by Task/Category – W01 Report
 - Wait Time Referred Attribution – W03 Report
- Identify information on the reports by answering some common questions regarding the reports being reviewed
- Discuss performance improvements to this example based on the reports viewed

1. Log on to TSO.
2. Navigate to the Application Performance Analyzer main panel. Using the output of the previous exercise, select the report viewing panel.

Type "**R**" on the first character of the Request Number. Press "**Enter**".

Did You Know: You can also use an "S" line command to select the report viewing screen? Either and "R" or and "S" will navigate you to the report selection panel.

Application Performance Analyzer Mentor Workshop Lab Exercises



```
File View Navigate Help
```

R02: IBM APA for z/OS Observation List (CAZ0) Row 00001 of 00147
Command ==> Scroll ==> CSR

ReqNum	Owned By	Description	Job Name	Date/Time	Samples	Status
<u>R032</u>	DNET047		DNET047B	Jun-28 13:04	10,000	Ended
<u>0422</u> +	DNET047		DNET047X	Jun-28 12:17	1,000	STEPS
<u>0413</u> +	DNET047		DNET047X	Jun-28 11:43	1,000	STEPS
<u>0412</u>	DNET187	test 1	DNET187B	Jun-27 14:09	7,357	Ended
<u>0411</u>	DNET187	test 1	DNET187A	Jun-27 13:54	6,412	Ended
<u>0410</u>	DNET187	test 1	DNET187A	Jun-27 13:50	298	Ended
<u>0399</u>	DNET328		DNET3282	Jun-26 8:30	433	Ended
<u>0398</u>	DNET328		DNET3282	Jun-26 8:20	495	Ended
<u>0379</u>	SYS029	KJC - APA CICS	CICSAOR5	Jun-19 15:37	50,000	Ended
<u>0376</u> +	DNET427	XSAMV APA Demo	DNET427B	Nov-17 14:29	10,000	STEPS
<u>0375</u>	DNET603		CICSAOR1	Nov-17 12:41	20,000	Ended
<u>0374</u>	DNET603		DNET603	Nov-17 12:35	1,000	Ended
<u>0370</u> +	DNET603		DNET603W	Nov-17 12:25	10,000	STEPS
<u>0365</u>	ADPOT07	JIMMS TEST	ADPOT07J	Nov-16 1:16	100,000	Ended
<u>0360</u>	DNET100	TODAYS SAMPLES	DNET100R	Nov-14 0:58	100,000	Ended
<u>0358</u> +	DNET603		DNET603D	Nov-13 11:21	10,000	STEPS
<u>0357</u>	DNET603		CICSAOR1	Nov-13 11:18	10,000	Ended

MA a A 08/004

3. The resulting panel displays the reports that are available for this Observation Request. In this sample the reports that do not appear as highlighted (V, I, E, F Q, J, etc) indicate one of two things. Either the data collector (option) was not turned on to capture the information or that no information was observed for this data collector during the Observation Session.

```
File View Navigate Help
```

R01: IBM APA for z/OS Performance Reports (0432) Row 00001 of 00007
Command ==> Scroll ==> CSR

Select a category from the list to the right to view the available reports in the selection list below.

- A Admin/Miscellaneous	- I IMS Measurement
- S Statistics/Storage	- E CICS Measurement
- C CPU Usage Analysis	- F DB2 Measurement
- D DASD I/O Analysis	- Q MQ Measurement
- W CPU WAIT Analysis	- G Coupling Facility
- V Variance Reports	- J Java Measurement

More: +

Enter S to make a selection or enter the report code on the command line

- S01 Measurement Profile	- S07 TCB Execution Summary
- S02 Load Module Attributes	- S08 Processor Utilization Summary
- S03 Load Module Summary	
- S04 TCB Summary	
- S05 Memory Usage Timeline	
- S06 Data Space Usage Timeline	

MA a A 04/015

Application Performance Analyzer Mentor Workshop Lab Exercises



4. Select the S01 Measurement Profile report for viewing

Type “S” next to the report number S01. Press “Enter”.

Did You Know: Each report is numbered for ease of navigation? As you become more familiar with APA you may navigate to specific reports simply by typing the report number, such as “C01” directly on the Command Line followed by an Enter.

```
File View Navigate Help
-----
R01: IBM APA for z/OS Performance Reports (0432)          Row 00001 of 00007
Command ==> _____ Scroll ==> CSR

Select a category from the list to the right to view the available reports in the selection list below.
- A Admin/Miscellaneous          - I IMS Measurement
- S Statistics/Storage           - E CICS Measurement
- C CPU Usage Analysis          - F DB2 Measurement
- D DASD I/O Analysis           - Q MQ Measurement
- W CPU WAIT Analysis           - G Coupling Facility
- V Variance Reports             - J Java Measurement

More: +
Enter S to make a selection or enter the report code on the command line

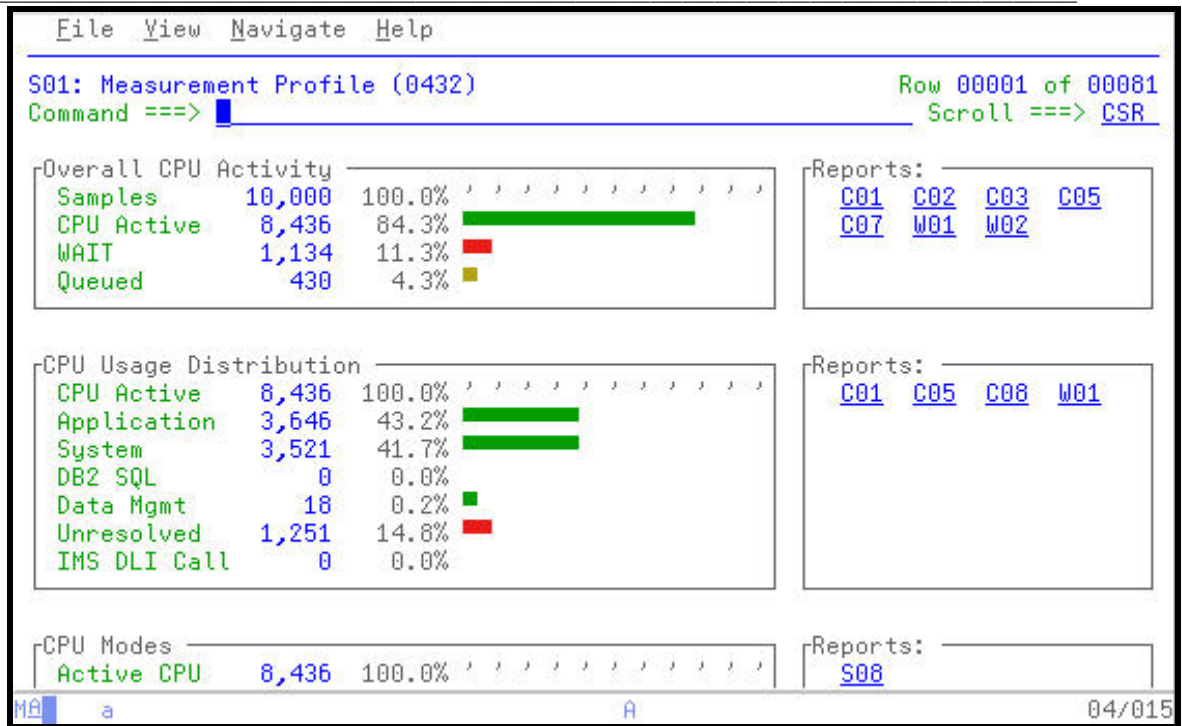
S S01 Measurement Profile          S07 TCB Execution Summary
- S02 Load Module Attributes      - S08 Processor Utilization Summary
- S03 Load Module Summary
- S04 TCB Summary
- S05 Memory Usage Timeline
- S06 Data Space Usage Timeline

MA a A 16/042
```

5. The Measurement Profile report is displayed. During the Observation Session a majority of the samples collected, 84+% occurred when the CPU was active. An additional 11+% occurred when the application was in a WAIT state. These statistics appear in the first box of the report. To the right are ISPF “Hot Spots” that can quickly link to other APA reports where more detail on the statistics to the left can be found.

Notice the next box down. The CPU Usage Distribution uses the number from the CPU Active Samples to further define what occurred during the Observation Session. In this case almost and equal number of samples were attributed to the Application code and the System level. Again, to the box at the right you can see additional APA reports that provide more detail on these statistics.

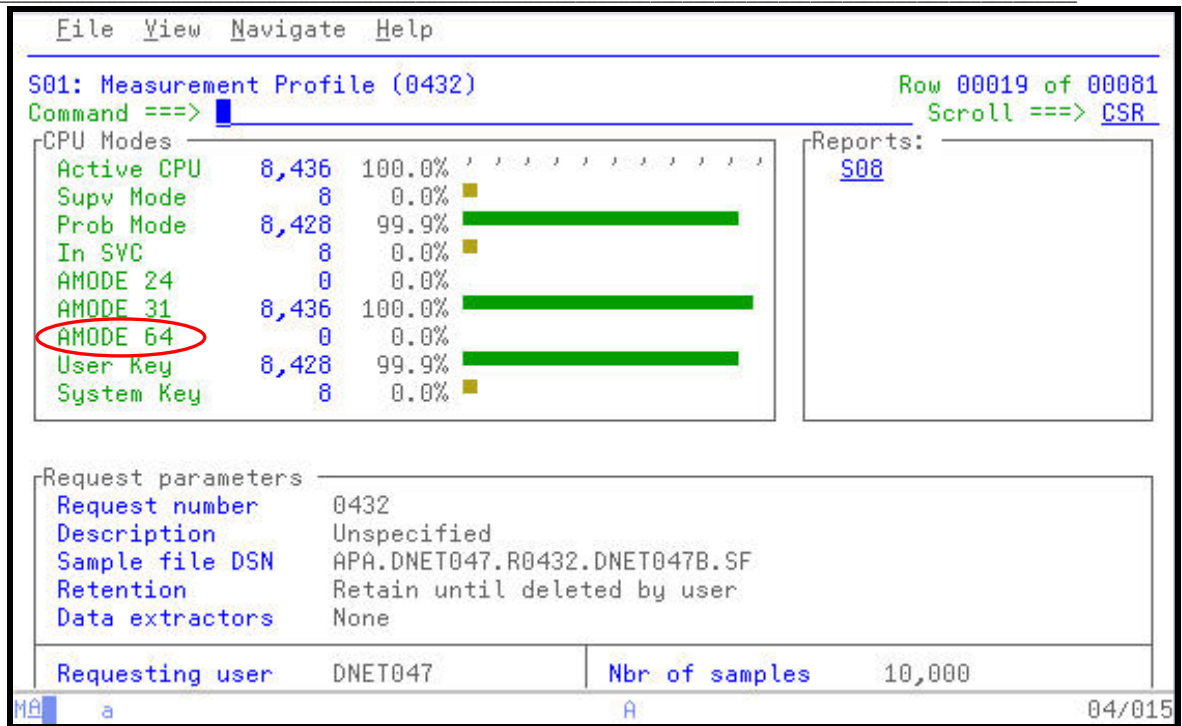
Application Performance Analyzer Mentor Workshop Lab Exercises



6. Press “**PF8**” to PageDn to other areas of the Measurement Profile.

99+% of the samples observe red occurred in the Problem Mode, indicating that the application was not waiting on any assignment or Supervisor Mode (system resources) to be allocated to the application. Notice also, that the application did not take advantage of any resources above the 64M line.

Application Performance Analyzer Mentor Workshop Lab Exercises



7. Press “**PF8**” to PageDn to other areas of the Measurement Profile.

Notice the name of the Sample File that was automatically created by APA to hold the results of the Observation Session. This file is tied directly to the Observation Request Number. When the Observation Session is deleted using a “D” line command on the main APA panel, the accompanying Sample File is automatically deleted.

Application Performance Analyzer Mentor Workshop Lab Exercises



File View Navigate Help			
S01: Measurement Profile (0432)		Row 00031 of 00081	
Command ==>		Scroll ==> CSR	
Request parameters			
Request number	0432		
Description	Unspecified		
Sample file DSN	APA.DNET047.R0432.DNET047B.SF		
Retention	Retain until deleted by user		
Data extractors	None		
Requesting user DNET047		Nbr of samples	10,000
Time of request 13:03:08		Duration	60 sec
Date of request Thu Jun-28-2007		Active/pending	Active
Job name DNET047B		Proc step name	n/a
Step name/number n/a		Delay time	none
Step program n/a			
Measurement environment			
Job name	DNET047B	Region size <16MB	4,160K
Job number	JOB02404	Region size >16MB	32,768K
Step name	RUNSAM	Step program	SAM1V
Proc step name		Region type	Batch

Press “PF8” to PageDn to further into the Measurement Profile.

APA indicates the number of CPU’s in use at the SYSPLEX.

Did You Know: ZIPP and ZAPP processors used in many DB2 and IMS environments are supported by APA. These processors are included in the Number of CPUs count. The S08 Processor Utilization Summary provides a further breakdown of the CPU usage by the application. ZIPP and ZAPP processors appear in this report simply as an available engine. No distinction is made in the processor name or number.

Application Performance Analyzer Mentor Workshop Lab Exercises



File View Navigate Help			
S01: Measurement Profile (0432)		Row 00046 of 00081	
Command ==>		Scroll ==> CSR	
Measurement environment			
Job name	DNET047B	Region size <16MB	4,160K
Job number	JOB02404	Region size >16MB	32,768K
Step name	RUNSAM	Step program	SAM1V
Proc step name		Region type	Batch
ASID	331	DB2 Attach type	n/a
System ID	DEMONVS	IBM APA Version	7.100F
SMFID	MVSA		
O/S level	z/OS 01.08.00		
Nbr of CPUs	7	CPU model	2094
CPU rate factor	626	CPU version	00
MIPS per CPU	526	SUs per second	25559.1
Measurement statistics			
Start time	13:03:09	Start date	Thu Jun-28-2007
End time	13:04:09	End date	Thu Jun-28-2007
MA a		A 04/015	

8. Press “PF8” once more to move the bottom of the report.

Application Performance Analyzer Mentor Workshop Lab Exercises



9. APA is a non-intrusive 'self reporting' tool. In other words it does not attach anything to the application in order observe the application running AND it reports how much time it took to conduct the Observation Session. This can be found Measurement SRB value. The application will run as slow or as fast as it normally would if APA was not active.

```
File View Navigate Help
S01: Measurement Profile (0432) Row 00062 of 00081
Command ==> Scroll ==> CSR
Measurement statistics
Start time 13:03:09 Start date Thu Jun-28-2007
End time 13:04:09 End date Thu Jun-28-2007
Total samples 10,000 Duration 59.99 sec
Sampling rate 166.69 per sec Sample file size 2.29MB
CPU/WAIT samples 9,570 Meas significance 95.70%
TCB samples 10,000 CPU queued samples 430
Overall CPU 19.72%
Pages in 0 EXCPs 2,408
Pages out 0
CPU consumption
CPU active samples 8,436 CPU time TCB 49.97 sec
CPU active time 84.36% CPU time SRB 0.15 sec
CPU WAIT samples 1,134 Service Units 1,281,022
CPU WAIT time 11.34% Measurement SRB 0.33 sec
MA a A 04/015
```

Measurement statistics		Start time		Start date	
Start time	13:03:09	Start date	Thu Jun-28-2007	End time	13:04:09
End time	13:04:09	End date	Thu Jun-28-2007	Total samples	10,000
Duration	59.99 sec	Sampling rate	166.69 per sec	Sample file size	2.29MB
CPU/WAIT samples	9,570	Meas significance	95.70%	CPU queued samples	430
TCB samples	10,000	Overall CPU	19.72%	Pages in	0
Overall CPU	19.72%	EXCPs	2,408	Pages out	0
CPU consumption		CPU time TCB	49.97 sec	CPU time SRB	0.15 sec
CPU active samples	8,436	Service Units	1,281,022	Measurement SRB	0.33 sec
CPU active time	84.36%				
CPU WAIT samples	1,134				
CPU WAIT time	11.34%				

Application Performance Analyzer Mentor Workshop Lab Exercises



10. Return to the Performance Reports panel and select the CPU Usage Analysis category of reports.

- Press “**PF3**” to return to the main Performance Reports panel .
- Type an “**S**” next to the CPU Usage Analysis reports category, then **ENTER** .

```
File View Navigate Help
R01: IBM APA for z/OS Performance Reports (0432) Row 00001 of 00007
Command ==> Scroll ==> CSR

Select a category from the list to the right to view the available reports in the selection list below.
- A Admin/Miscellaneous - I IMS Measurement
- S Statistics/Storage - E CICS Measurement
- C CPU Usage Analysis - F DB2 Measurement
- D DASD I/O Analysis - Q MQ Measurement
- W CPU WAIT Analysis - G Coupling Facility
- V Variance Reports - J Java Measurement

More: +
Enter S to make a selection or enter the report code on the command line
- S01 Measurement Profile - S07 TCB Execution Summary
- S02 Load Module Attributes - S08 Processor Utilization Summary
- S03 Load Module Summary
- S04 TCB Summary
- S05 Memory Usage Timeline
- S06 Data Space Usage Timeline

MA a A 08/056
```

11. Select the CPU Usage by Category report.

Place and “**S**” next to the C01 CPU Usage by Category report, then **ENTER**.

Tip: You could also type “**C01**” in the Command Line followed by **ENTER** to bring up this report.

Application Performance Analyzer Mentor Workshop Lab Exercises



```

File View Navigate Help
R01: IBM APA for z/OS Performance Reports (0432) Row 00001 of 00007
Command ==> Scroll ==> CSR

Select a category from the list to the right to view the available reports in the selection list below.
  _ A Admin/Miscellaneous      _ I IMS Measurement
  _ S Statistics/Storage      _ E CICS Measurement
  _ C CPU Usage Analysis      _ F DB2 Measurement
  _ D DASD I/O Analysis       _ Q MQ Measurement
  _ W CPU WAIT Analysis       _ G Coupling Facility
  _ V Variance Reports        _ J Java Measurement

More: +
Enter S to make a selection or enter the report code on the command line

 S C01 CPU Usage by Category      C07 CPU Usage by Procedure
  _ C02 CPU Usage by Module       _ C08 CPU Referred Attribution
  _ C03 CPU Usage by Code Slice   _ C09 CPU Usage by PSW/ObjCode
  _ C04 CPU Usage Timeline
  _ C05 CPU Usage Task/Category
  _ C06 CPU Usage Task/Module
  
```

12. The CPU Usage by Category shows the major collections of CPU activity with drill down capabilities to the Load Modules, CSECTS, and Program Source statements in each category.

```

File View Navigate Help
C01: CPU Usage by Category (0432) Row 00001 of 00004
Command ==> Scroll ==> CSR

Name      Description      Percent of CPU Time * 10.00% ±1.0%
          *.....1.....2.....3.....4.....5.....6.....7.....8
APPLCN    Application Code    43.21 ██████████
SYSTEM    System/OS Services  41.73 ██████████
NOSYMB    No Module Name     14.82 ████████
DATAMG    DataMgmt Processing 0.21 ██████
  
```

Application Performance Analyzer Mentor Workshop Lab Exercises



13. Open the APPLCN collection to see the names of the Load Modules which appear in the sampling.

Type “+” line command over the APPLCN group, then **ENTER**.

Did You Know: Similar to a workstation product, APA uses familiar “+” and “-” signs to expand and collapse various sections of the reports. Remember the “/” is always available to provide a quick command help pop-up!

Name	Description	Percent of CPU Time * 10.00%	+1.0%
+APPLCN	Application Code	43.21	1
SYSTEM	System/OS Services	41.73	2
NOSYMB	No Module Name	14.82	3
DATAMG	DataMgmt Processing	0.21	4

14. The only Load Module in the APPLCN collection is the SAV2V Load Module. SAM2V consumed all of the CPU resource attributed to the APPLCN collection.

Application Performance Analyzer Mentor Workshop Lab Exercises



```
File View Navigate Help
C01: CPU Usage by Category (0432) Row 00001 of 00006
Command ==> Scroll ==> CSR
Name Description Percent of CPU Time * 10.00% ±1.0%
*.....1.....2.....3.....4.....5.....6.....7.....8
APPLCN Application Code 43.21 ██████████
+ SAM2V Application Program 43.21 ██████████
SYSTEM System/OS Services 41.73 ██████████
NOSYMB No Module Name 14.82 ████████
DATAMG DataMgmt Processing 0.21 ██████
```

MA a A 08/002

15. Since Load Modules can contain multiple programs or CSECTS which are link-edited together for execution, expand the SAM2V program to reveal the individual programs that were observed during the Observation Session.

Type a “+” over the SAM2V Load Module Name, and then **ENTER**.

Application Performance Analyzer Mentor Workshop Lab Exercises



```
File View Navigate Help
C01: CPU Usage by Category (0432) Row 00001 of 00006
Command ==> Scroll ==> CSR
Name Description Percent of CPU Time * 10.00% ±1.0%
*.....1.....2.....3.....4.....5.....6.....7.....8
APPLCN Application Code 43.21 ██████████
+ +M2V Application Program 43.21 ██████████
SYSTEM System/OS Services 41.73 ██████████
NOSYMB No Module Name 14.82 ████████
DATAMG DataMgmt Processing 0.21 ██████
```

MA a A 09/005

16. The resulting panel shows that only one application level CSECT was observed during the Observation Session.

Tip: You can easily expand all collection to the lowest level in a single command. Place the same “+” used to open a collection level over the column heading and press **ENTER**.

Application Performance Analyzer Mentor Workshop Lab Exercises



```
File View Navigate Help
C01: CPU Usage by Category (0432) Row 00001 of 00007
Command ==> Scroll ==> CSR
```

Time	Description	Percent of CPU Time * 10.00% ±1.0%	
APPLCN	Application Code	43.21	████████████████████
+ SAM2V	Application Program	43.21	████████████████████
+ SAM2V	CSECT in SAM2V	43.21	████████████████████
SYSTEM	System/OS Services	41.73	████████████████████
NOSYMB	No Module Name	14.82	████████████
DATAMG	DataMgmt Processing	0.21	

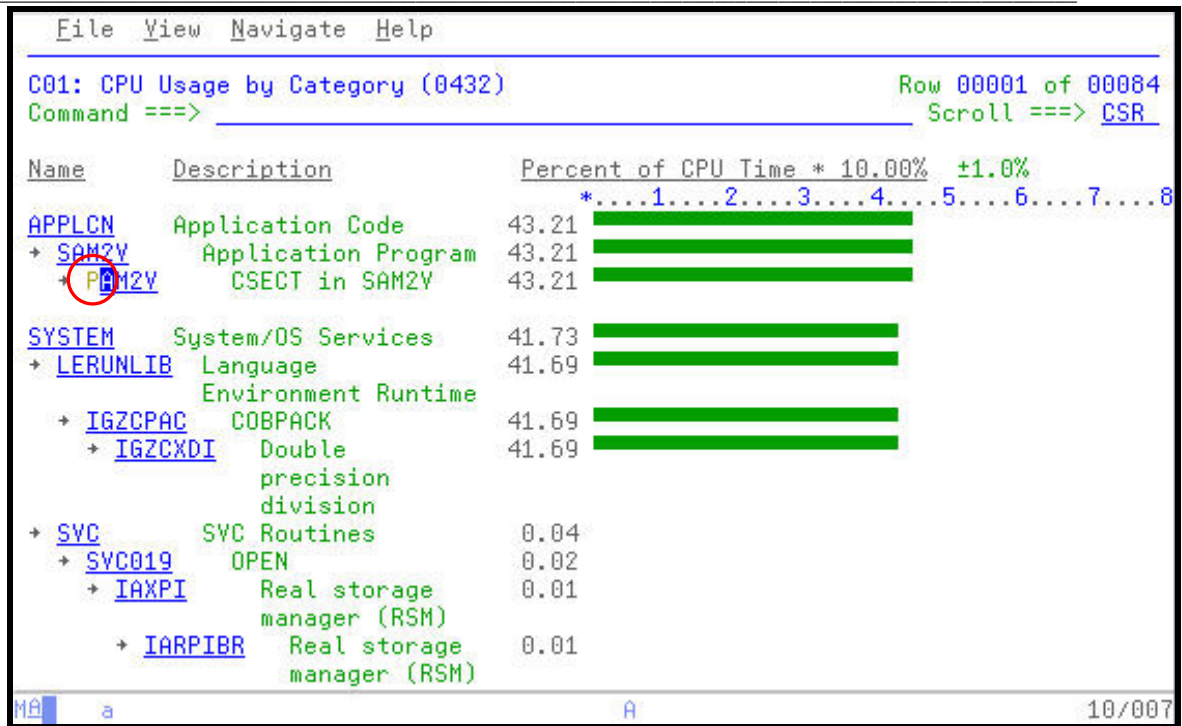
MA a A 06/003

17. APA provides the ability to view the Program Source statements for CSECTS.

Use the TAB Key to navigate to the SAM2V CSECT entry.

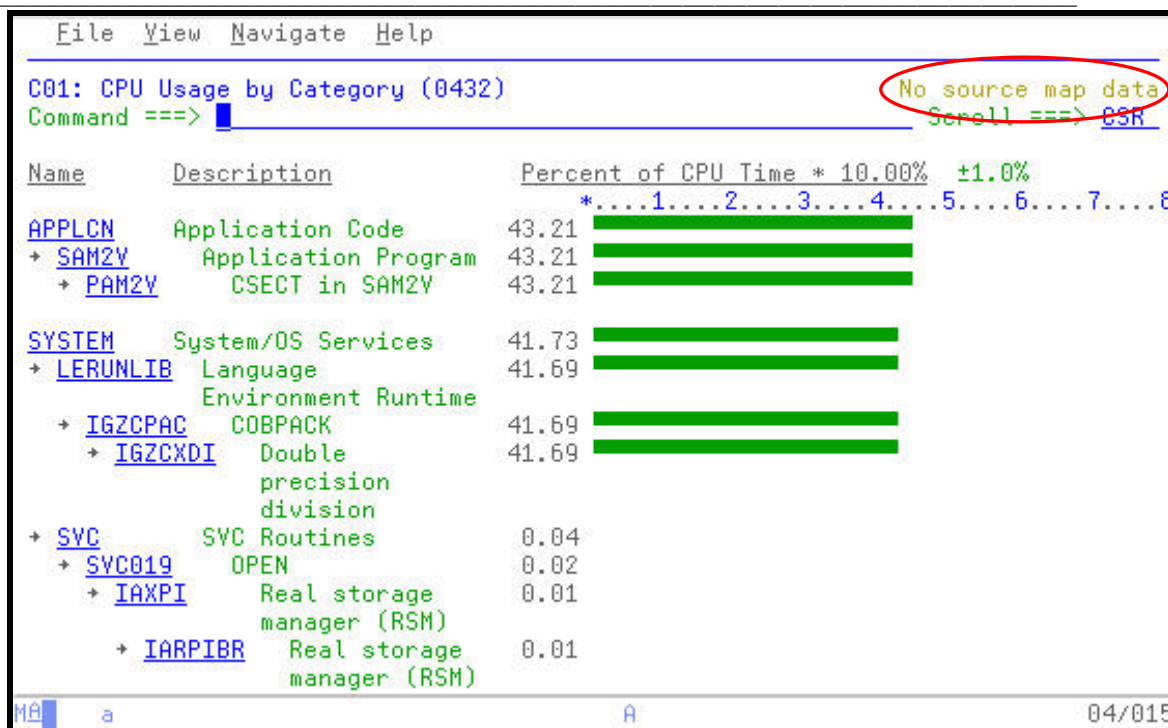
Type “**P**” over the SAM2V entry to access the Program Source, and then **ENTER**.

Application Performance Analyzer Mentor Workshop Lab Exercises



18. Notice the short message area in the upper right hand corner. This message, “No source map data” indicates that APA does not know where to find the compiler listings to display the Program Source.

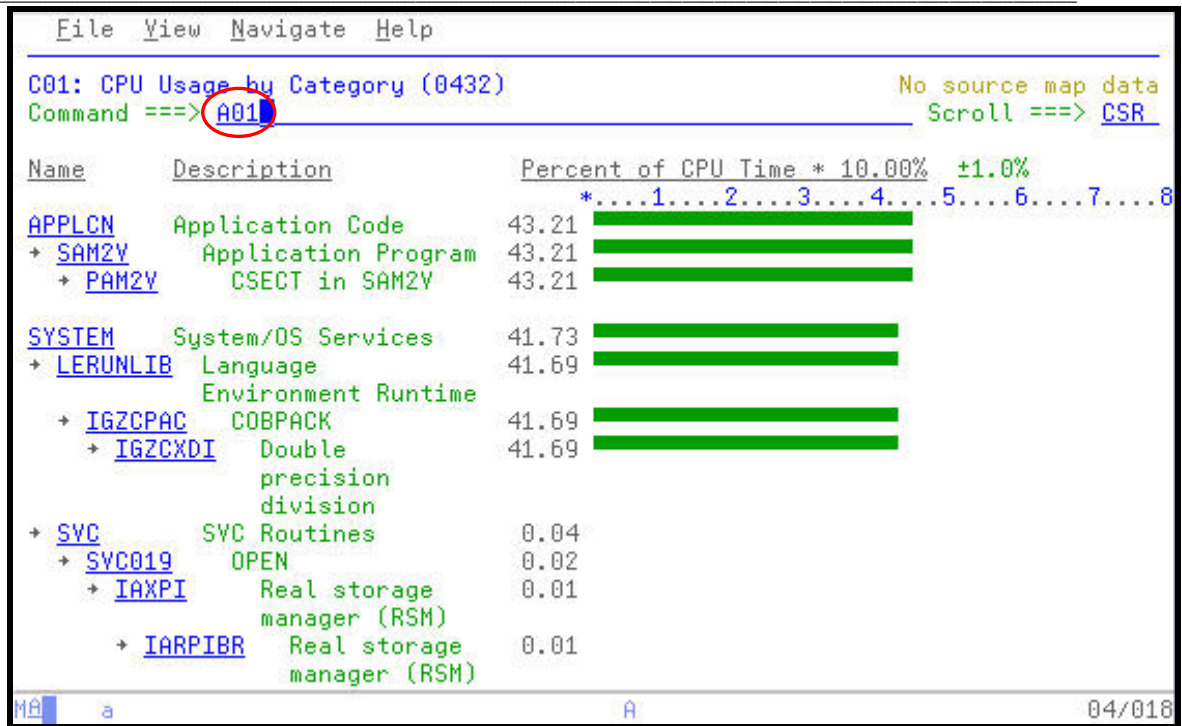
Application Performance Analyzer Mentor Workshop Lab Exercises



19. Defining the location of the compiler/source files is an administrative function in APA. COBOL, Assembler, and PL/I compiler listings may be defined on the A01 panel. Navigate to the A01 Source Program Mapping panel:

Type “A01” in the command line, and then ENTER.

Application Performance Analyzer Mentor Workshop Lab Exercises



20. For this exercise, our compiler listings were stored in a SYSDEBUG formatted datasets. To communicate this to APA:

Type “**D**” in the File Type prompt, for SYSDEBUG.

At the Data Set Name prompt, type “**your-tso-id.ADLAB.SYSDEBUG**” replacing your-tso-id with your userID.

Type the name of the CSECT, “**SAM2V**” in the Member Name prompt, and then **ENTER**.

Did You Know: APA can accept several compiler/assembly listing formats. Consult the APA Users Guide for the meaning of each dataset type or your Systems Program for the listing type used by your installation.

Application Performance Analyzer Mentor Workshop Lab Exercises



```
File View Navigate Help
A01 - Source Program Mapping (0432) Row 00001 of 00004
Command ==> Scroll ==> CSR

Enter the following information to specify a source mapping file to be
used in the analysis of this measurement information.

File type . . . . D (L=listing, A=ADATA, S=LANGX SideFile, D=SYSDEBUG)
Data set name . . 'DNET047.ADLAB.SYSDEBUG'
Member name . . . SAM2V

Seqn ID-ReqNum Load Type/Status Lang Member DSN
0001 CAZ0-0118 NO D-Inact COB SAM2V DNET047.ADLAB.SYSDEBUG
0002 CAZ0-0141 Auto D-Inact COB SAM2V DNET047.ADLAB.SYSDEBUG
0003 CAZ0-0366 Auto D-Inact COB SAM2V DNET047.ADLAB.SYSDEBUG
0004 CAZ0-0372 Auto D-Inact COB SAM2V DNET047.ADLAB.SYSDEBUG

MA a A 11/027
```

21. APA ties the program listings to the specific Observation Session request number. In this case, the request number being viewed is 0432. The pop-up Help panel is also available on this panel.

Type a “/” over the first character in the Seqn (sequence number) column, and then **ENTER**.

Application Performance Analyzer Mentor Workshop Lab Exercises



```
File View Navigate Help
A01 - Source Program Mapping (0432) Source map data loaded
Command ==> Scroll ==> CSR

Enter the following information to specify a source mapping file to be
used in the analysis of this measurement information.

File type . . . . _ (L=listing, A=ADATA, S=LANGX SideFile, D=SYSDEBUG)
Data set name . . . .
Member name . . . .

Seqn ID-ReqNum Load Type/Status Lang Member DSN
/001 CAZ0-0432 NO D-Loaded COB SAM2V DNET047.ADLAB.SYSDEBUG
0002 CAZ0-0110 NO D-Loaded COB SAM2V DNET047.ADLAB.SYSDEBUG
0003 CAZ0-0141 Auto D-Loaded COB SAM2V DNET047.ADLAB.SYSDEBUG
0004 CAZ0-0366 Auto D-Loaded COB SAM2V DNET047.ADLAB.SYSDEBUG
0005 CAZ0-0372 Auto D-Loaded COB SAM2V DNET047.ADLAB.SYSDEBUG

MA a A 14/003
```

22. The entries which appear in the pop-up help panel allow for simple management of the Source Program Mapping entries via line commands.

Tip: Source Program Mapping is loaded by APA when the entry is first defined. To have APA automatically load the Source Program Mapping entry the next time this request number is viewed, type an “A” line command on the source entry.

Application Performance Analyzer Mentor Workshop Lab Exercises



```
File View Navigate Help
-
A
C Enter S to select a function from this menu. The line
  command (Yellow) can also be entered on the main panel.
E
u  S  To Perform the Following          LineCmd
-
-  display context help information      ?
-  show additional details about this line ++
-  copy into current request number      C
-  delete this entry                     D
S  -  load this source mapping data       L
/  -  toggle on/off autoloading map file  A
0
0
0
0
0

001 of 00005
ll ==> CSR
o be
D=SYSDEBUG)
AB.SYSDEBUG
AB.SYSDEBUG
AB.SYSDEBUG
AB.SYSDEBUG
AB.SYSDEBUG

MA a A 03/005
```

23. Return to the C01 CPU Usage by Category report and use the Program Source command to access the source listing for the CSECT SAM2V.

Press “**PF3**” which returns back to the C01 report.

Type “**P**” over the SAM2V CSECT name, and then press **ENTER**.

Application Performance Analyzer Mentor Workshop Lab Exercises



Name	Description	Percent of CPU Time * 10.00% ±1.0%
APPLCN	Application Code	43.21
+ SAM2V	Application Program	43.21
+ PH2V	CSECT in SAM2V	43.21
SYSTEM	System/OS Services	41.73
+ LERUNLIB	Language Environment Runtime	41.69
+ IGZCPAC	COBPACK	41.69
+ IGZCXDI	Double precision division	41.69
+ SVC	SVC Routines	0.04
+ SVC019	OPEN	0.02
+ IAXPI	Real storage manager (RSM)	0.01
+ IARPIBR	Real storage manager (RSM)	0.01

24. The Count column indicates how many times APA saw this statement executing during the sampling process.

Did You Know: You may use ISPF “**FIND**” commands to review data items or to find other areas of the listing. You may also use the “**SETUP**” command to customize the view of this listing.

Question?: From reviewing the source listing with the APA counts, what have you observed from the statements indicated as high usage/executed statements?

Application Performance Analyzer Mentor Workshop Lab Exercises



```

File View Navigate Help
P01: Source Program Attribution (0432) Row 00001 of 00038
Command ==> Scroll ==> CSR

LineNo Offset Count Source Statement
000090 00036C MOVE 'PROGRAM ENDED' TO WS-PROGRAM-STATUS.
000091 00037C GOBACK.
000092
000093 000384 050-CALC-BALANCE-STATISTICS.
000094 000384 MOVE 0 TO LOOP-COUNT.
000095 00038E 130 PERFORM 100-CRUNCH-LOOP
000096 UNTIL LOOP-COUNT > CRUNCH-CPU-LOOPS .
000097
000098 0003C2 47 100-CRUNCH-LOOP.
000099 0003C2 47 MOVE 'CALCULATING BALANCE STATS' TO WS-PROGRAM-
000100 * *** Increment Record Count ***
000101 0003D2 420 ADD +1 TO BALANCE-COUNT
000102 * *** Add this customer's BALANCE to the grand tot
000103 0003EA 814 COMPUTE BALANCE-TOTAL =
000104 BALANCE-TOTAL + CUST-ACCT-BALANCE
000105 * *** Calculate Average ***
000106 000412 1046 COMPUTE BALANCE-AVERAGE =

```

25. APA also indicates when system level activity is taking place on behalf of a source statement. In this example the Count column carries a high number and the statement under the Compute indicates that the SYSTEM is executing logic on behalf of the Compute statement.

Application Performance Analyzer Mentor Workshop Lab Exercises



```
File View Navigate Help
P01: Source Program Attribution (0432) Row 00017 of 00038
Command ==> Scroll ==> CSR

LineNo Offset Count Source Statement
000105 * *** Calculate Average ***
000106 000412 1046 COMPUTE BALANCE-AVERAGE =
4093 <- CPU time attributed to above statement
000107 BALANCE-TOTAL / BALANCE-COUNT
000108 * *** Calculate Minimum ***
000109 00045A 138 IF WS-FIRST-TIME-SW = 'Y'
000110 00046A MOVE CUST-ACCT-BALANCE TO BALANCE-MIN.
000111 000474 186 IF CUST-ACCT-BALANCE < BALANCE-MIN
000112 000486 MOVE CUST-ACCT-BALANCE TO BALANCE-MIN.
000113 * *** Calculate Maximum ***
000114 000490 100 IF WS-FIRST-TIME-SW = 'Y'
000115 0004A0 MOVE CUST-ACCT-BALANCE TO BALANCE-MAX.
000116 0004AA 212 IF CUST-ACCT-BALANCE > BALANCE-MAX
000117 0004BC MOVE CUST-ACCT-BALANCE TO BALANCE-MAX.
000118 * *** CALCULATE RANGE ***
000119 0004C6 195 COMPUTE BALANCE-RANGE = BALANCE-MAX - BALANCE-MI
000120 0004D8 358 ADD 1 TO LOOP-COUNT.
000121
```

26. Navigate to the WAIT series of reports to investigate the cause of the WAITs in the Observation Session.

Type “**W01**” in the command line to access the WAIT Time by Task/Category report, and then **ENTER**.

Application Performance Analyzer Mentor Workshop Lab Exercises



```

File View Navigate Help
C01: CPU Usage by Category (0432) Row 00001 of 00084
Command ==> W01 Scroll ==> CSR
Name Description Percent of CPU Time * 10.00% ±1.0%
*.....1.....2.....3.....4.....5.....6.....7.....8
APPLCN Application Code 43.21 ██████████
+ SAM2V Application Program 43.21 ██████████
+ SAM2V CSECT in SAM2V 43.21 ██████████
SYSTEM System/OS Services 41.73 ██████████
+ LERUNLIB Language 41.69 ██████████
Environment Runtime
+ IGZCPAC COBPACK 41.69 ██████████
+ IGZCXDI Double 41.69 ██████████
precision
division
+ SVC SVC Routines 0.04
+ SVC019 OPEN 0.02
+ IAXPI Real storage 0.01
manager (RSM)
+ IARPIBR Real storage 0.01
manager (RSM)

```

27. Most the WAIT activity is indicated to have occurred in the SAM1V module.

Did You Know: APA reports usage down to the hundredth of a percent. The modules prefixed by IEA and IEF are internal IBM modules and appear on the this report with a 0.00% entry because their activity was in the thousandth of a percent, but still contributed to a WAIT condition.

Application Performance Analyzer Mentor Workshop Lab Exercises



```
File View Navigate Help
-----
W01: WAIT Time by Task/Category (0432)          Row 00001 of 00005
Command ==>                                     Scroll ==> CSR
-----
Name          Description          Percent of Time in WAIT * 10.00% ±1.0%
*.....1....2....3....4....5....6....7....8.
SAM1V-001     TCB=006C9B08          11.34
IEAYAR00-002  TCB=006FDF30          0.00
IEAVTSDT-003  TCB=006FD350          0.00
IEESB605-004  TCB=006FD038          0.00
IEFIIC-005    TCB=006FF290          0.00
-----
Mâ a                                     A                                     04/015
```

28. Expand the SAM1V entry to reveal additional levels of detail on the WAIT.

Type “+4” to indicate to APA that it should expand the SAM1V CSECT to 4 levels of detail, then press **ENTER**.

Application Performance Analyzer Mentor Workshop Lab Exercises



```
File View Navigate Help
-----
W01: WAIT Time by Task/Category (0432) Row 00001 of 00005
Command ==> Scroll ==> CSR
-----
Name          Description          Percent of Time in WAIT * 10.00% ±1.0%
*.....1....2....3....4....5....6....7....8.
+4  IEAVY-001      TCB=006C9B08        11.34
IEAYAR00-002  TCB=006FDF30         0.00
IEAVTSDT-003  TCB=006FD350         0.00
IEESB605-004  TCB=006FD038         0.00
IEFIIC-005    TCB=006FF290         0.00
-----
MA a A 08/004
```

29. The report now shows 4 levels of detail on the WAIT condition.

Question?: What is occurring in the application that is causing a majority of the 10.47% WAIT? What DD statement is being observed by APA? What is the module name? Is there a specific location in the module where this condition is occurring?

Application Performance Analyzer Mentor Workshop Lab Exercises



```
File View Navigate Help
W01: WAIT Time by Task/Category (0432) Row 00001 of 00086
Command ==> Scroll ==> CSR
Name Description Percent of Time in WAIT * 10.00% ±1.0%
*.....1.....2.....3.....4.....5.....6.....7.....8.
SAM1V-001 TCB=006C9B08 11.34 ██████████
+ DATAMG Data Mgmt 10.47 ██████████
 Processing
+ CST2FILE-005 VSAM 1.83 █
+ ERASE SAM1V+185A 1.78 █
+ IDA019L1 Virtual 1.78 █
 I/O (VIO)
 and VSAM
+ PUT SAM1V+1796 0.04
+ IDA019L1 Virtual 0.04
 I/O (VIO)
 and VSAM
+ GET SAM1V+185A 0.01
+ IDA019L1 Virtual 0.01
 I/O (VIO)
 and VSAM
+ CST2FILE-004 VSAM 1.81 █
```







MA a A 04/015

30. At it's lowest level of detail, APA can display pop-up panels containing information about specific components of the application being Observed.

Type “++” over the CUST2FLE entry, followed by **ENTER**.

Application Performance Analyzer Mentor Workshop Lab Exercises



File View Navigate Help		
W01: WAIT Time by Task/Category (0432)		Row 00001 of 00086
Command ==>		Scroll ==> CSR
Name	Description	Percent of Time in WAIT * 10.00% ±1.0%
*.....1.....2.....3.....4.....5.....6.....7.....8.		
SAM1V-001	TCB=006C9B08	11.34 
+ DATAMG	Data Mgmt Processing	10.47 
+ ++ CST2FILE-005	VSAM	1.83 
+ ERASE	SAM1V+185A	1.78 
+ IDA019L1	Virtual I/O (VIO) and VSAM	1.78 
+ PUT	SAM1V+1796	0.04
+ IDA019L1	Virtual I/O (VIO) and VSAM	0.04
+ GET	SAM1V+185A	0.01
+ IDA019L1	Virtual I/O (VIO) and VSAM	0.01
+ CST2FILE-004	VSAM	1.81 

MA a A 11/008

31. The pop-up panel shows information about the VSAM file in use. This scrollable panel shows detailed information on how the file and its components were allocated and the results of processing this file during the Observation Session.

Application Performance Analyzer Mentor Workshop Lab Exercises



33. APA displays information on the both the Cluster and Index portion of the VSAM file.

```
File View Navigate Help
Index Component of CST2FILE(5)
Dataset Name          DNET047.ADLAB.CUST2.WORK.KSDS.INDEX
Management Class     USRMGMT
Storage Class        USRBASE
Device Type          3390
% Free Bytes in CI   0%
Volume Serial        DMPU18
CI Size              512
Record Size (LRECL) 505
Number of Extents    1
SHAREOPTIONS         (1 3)
Organization         KSDS
CIs per CA           49
Free CIs per CA      0
Free Bytes per CI    0
% Free CIs in CA     0%
CI Splits            0
CA Splits            0
Logical Records      1
Deleted Records      0
Insrted Records      0
Retrvd Records       0
Updated Records      73
Bytes Free Space     24,576
Number of EXCPs     460
Initial              0
Last                 0
Last                 1
Last                 0
Last                 0
Last                 0
Last                 0
Last                 74
Last                 24,576
Last                 461
I/O (VIO) and VSAM
+ CST2FILE-004 VSAM 1.81
MA a A 03/004
```

34. Review the W03 Referred Attribution by Task report.

Press “**PF3**” to exit the detail pop-up windows.

Type “**W03**” in the command line, followed by **ENTER** to navigate to the W03 report.

Application Performance Analyzer Mentor Workshop Lab Exercises



```

File View Navigate Help
W01: WAIT Time by Task/Category (0432) Row 00001 of 00086
Command ==> W03 Scroll ==> CSR
Name Description Percent of Time in WAIT * 10.00% ±1.0%
*....1....2....3....4....5....6....7....8.
SAM1V-001 TCB=006C9B08 11.34 ██████████
+ DATAMG Data Mgmt 10.47 ██████████
Processing
+ CST2FILE-005 VSAM 1.83 █
+ ERASE SAM1V+185A 1.78 █
+ IDA019L1 Virtual 1.78 █
I/O (VIO)
and VSAM
+ PUT SAM1V+1796 0.04
+ IDA019L1 Virtual 0.04
I/O (VIO)
and VSAM
+ GET SAM1V+185A 0.01
+ IDA019L1 Virtual 0.01
I/O (VIO)
and VSAM
+ CST2FILE-004 VSAM 1.81 █
MA a A 04/018

```

35. Expand all of the entries in the W03 report.

Type “+” on the column heading “Name”, followed by **ENTER**. (not shown)

```

File View Navigate Help
W03: WAIT Referred Attribution by Task (0432) Row 00001 of 00001
Command ==> + Scroll ==> CSR
Name Description Percent of Time in WAIT * 10.00% ±1.0%
*....1....2....3....4....5....6....7....8.
SAM1V-001 TCB=006C9B08 11.34 ██████████

```

Application Performance Analyzer Mentor Workshop Lab Exercises



36. In this report it is easier to see that all of the 11.34% is attributed to the SAM1V Load Module and CSECT. Specifically, 10.28% of the 11.34% total occurs at offset 00185A in the SAM1V CSECT.

```
File View Navigate Help
W03: WAIT Referred Attribution by Task (0432) Row 00001 of 00038
Command ==> Scroll ==> CSR
```

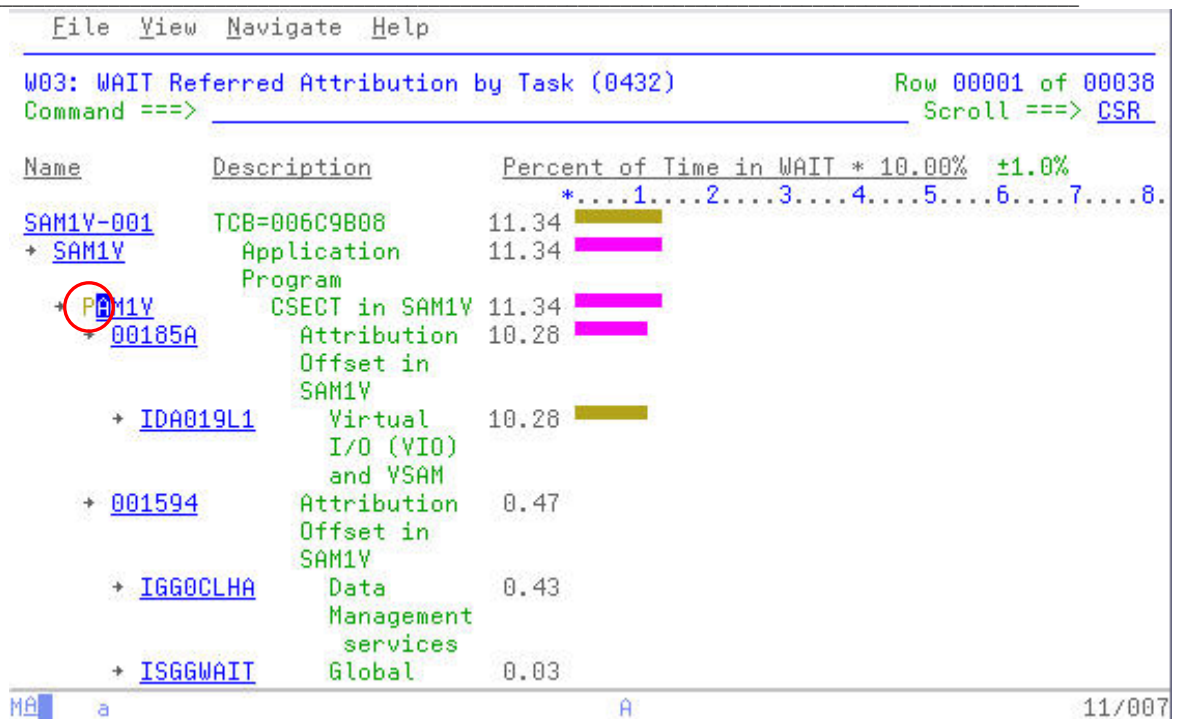
Name	Description	Percent of Time in WAIT * 10.00%	±1.0%
SAM1V-001	TCB=006C9B08	11.34	
+ SAM1V	Application	11.34	
+ SAM1V	Program	11.34	
+ 00185A	CSECT in SAM1V Attribution Offset in SAM1V	10.28	
+ IDA019L1	Virtual I/O (VIO) and VSAM	10.28	
+ 001594	Attribution Offset in SAM1V	0.47	
+ IGG0CLHA	Data Management services	0.43	
+ ISGGWAIT	Global	0.03	

MA a A 06/002

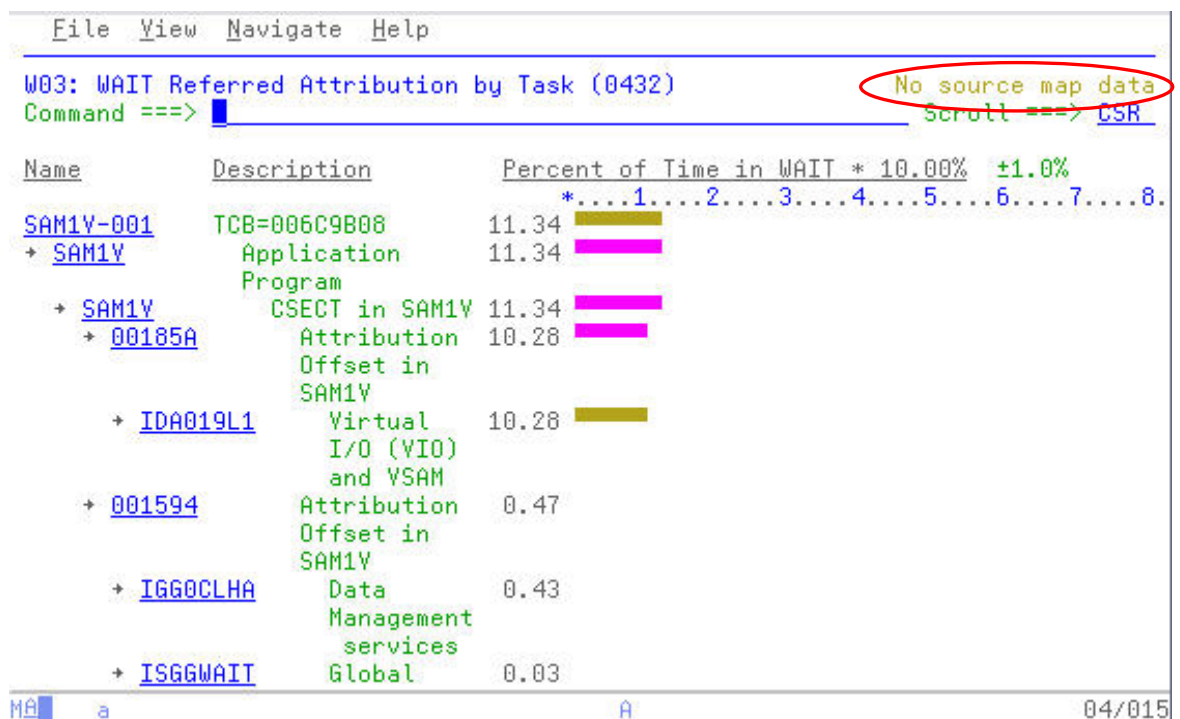
37. Display the Program Source for the SAM1V CSECT.

Type “**P**” on the line containing the SAM1V CSECT name, followed by **ENTER**.

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38. The short message area displays an informational message that the source for this program, SAM1V has not been defined to APA.



Application Performance Analyzer

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39. Navigate to the A01 Source Program Mapping panel to define the location of the source listing for the SAM1V module.

Type “**A01**” in the command line, followed by **ENTER**. (not shown)

Type “**D**” in the File Type prompt, for SYSDEBUG.

At the Data Set Name prompt, type “**your-tso-id.ADLAB.SYSDEBUG**” replacing your-tso-id with your userID.

Type the name of the CSECT, “**SAM1V**” in the Member Name prompt, and then **ENTER**.

```
File View Navigate Help
A01 - Source Program Mapping (0432) Row 00001 of 00005
Command ==> Scroll ==> CSR

Enter the following information to specify a source mapping file to be
used in the analysis of this measurement information.

File type . . . . D (L=listing, A=ADATA, S=LANGX SideFile, D=SYSDEBUG)
Data set name . . 'DNET047.ADLAB.SYSDEBUG'
Member name . . . SAM1V

Seqn ID-ReqNum Load Type/Status Lang Member DSN
0001 CAZ0-0432 NO D-Loaded COB SAM2V DNET047.ADLAB.SYSDEBUG
0002 CAZ0-0118 NO D-Loaded COB SAM2V DNET047.ADLAB.SYSDEBUG
0003 CAZ0-0141 Auto D-Loaded COB SAM2V DNET047.ADLAB.SYSDEBUG
0004 CAZ0-0366 Auto D-Loaded COB SAM2V DNET047.ADLAB.SYSDEBUG
0005 CAZ0-0372 Auto D-Loaded COB SAM2V DNET047.ADLAB.SYSDEBUG
```

40. The resulting screen shows that the listing file has been added for this request number.

Application Performance Analyzer Mentor Workshop Lab Exercises



```
File View Navigate Help
A01 - Source Program Mapping (0432) Source map data loaded
Command ==> | Scroll ==> CSR

Enter the following information to specify a source mapping file to be
used in the analysis of this measurement information.

File type . . . . _ (L=listing, A=ADATA, S=LANGX SideFile, D=SYSDEBUG)
Data set name . . |
Member name . . . |

Seqn ID-RegNum Load Type/Status Lang Member DSN
0001 CAZ0-0432 NO D-Loaded COB SAM2V DNET047.ADLAB.SYSDEBUG
0002 CAZ0-0432 NO D-Loaded COB SAM1V DNET047.ADLAB.SYSDEBUG
0003 CAZ0-0118 NO D-Loaded COB SAM2V DNET047.ADLAB.SYSDEBUG
0004 CAZ0-0141 Auto D-Loaded COB SAM2V DNET047.ADLAB.SYSDEBUG
0005 CAZ0-0366 Auto D-Loaded COB SAM2V DNET047.ADLAB.SYSDEBUG
0006 CAZ0-0372 Auto D-Loaded COB SAM2V DNET047.ADLAB.SYSDEBUG

MA a A 04/015
```

41. Navigate back to the W03 report and access the Program Source for the SAM1V module.

Press “**PF3**” to return to the W03 report.

Type “**P**” on the SAM1V CSECT, followed by **ENTER** to access the Program Source for SAM1V.

Application Performance Analyzer Mentor Workshop Lab Exercises



```
File View Navigate Help
```

W03: WAIT Referred Attribution by Task (0432) Row 00001 of 00038
Command ==> Scroll ==> CSR

Name	Description	Percent of Time in WAIT * 10.00% ±1.0%
SAM1V-001	TCB=006C9B08	11.34
+ SAM1V	Application	11.34
+ PAM1V	Program	11.34
+ 00185A	CSECT in SAM1V	11.34
	Attribution	10.28
	Offset in SAM1V	
+ IDA019L1	Virtual I/O (VIO) and VSAM	10.28
+ 001594	Attribution	0.47
	Offset in SAM1V	
+ IGG0CLHA	Data Management services	0.43
+ ISGGWAIT	Global	0.03

MA a A 11/007

42. The resulting screen shows the source listing positioned at the first line containing an APA observation count. From here you could scroll up and scroll down to review the listing and specific offset(s) in question.

```
File View Navigate Help
```

P01: Source Program Attribution (0432) Row 00001 of 00049
Command ==> Scroll ==> CSR

LineNo	Offset	Count	Source Statement
000488	00153E		500-CRUNCH-CONTROL.
000489	00153E		COMPUTE CRUNCH-IO-LOOPS = WS-CRUNCH-IO * 10.
000490	001550		COMPUTE CRUNCH-CPU-LOOPS = WS-CRUNCH-CPU * 500.
000491			
000492	001562		IF CRUNCH-IO-LOOPS > 0
000493	001570	47	OPEN I-O CUSTOMER-FILE2
000494	001594		EVALUATE WS-CST2FILE-STATUS
000495			WHEN '00'
000496	0015A2		MOVE 'Y' TO WS-CUST2-FILE-OPEN
000497	0015A6		CONTINUE
000498			WHEN OTHER
000501			WS-CST2FILE-STATUS
000502	0015C6		DISPLAY 'Terminating Program due to Fil
000503			END-EVALUATE
000504	0015D4		IF WS-CUST2-FILE-OPEN = 'Y'
000505	0015E0		PERFORM 510-CRUNCH-CUSTFILE

MA a A 04/015

Application Performance Analyzer Mentor Workshop Lab Exercises



43. End your Application Performance Analyzer session by exiting the product by pressing “**PF3**”.

Lab Exercise 5 Question Answers

In this section you will find the answers to some of the basic questions posed during the course of the previous exercise. You may also see some additional commands that were discussed but not demonstrated during the course of Exercise 5.

1. One of the steps in the previous exercise asked the following:

Question?: From reviewing the source listing with the APA counts, what have you observed from the statements indicated as high usage/executed statements?

```
File View Navigate Help
P01: Source Program Attribution (0432) Row 00001 of 00038
Command ==> Scroll ==> CSR
LineNo Offset Count Source Statement
000090 00036C MOVE 'PROGRAM ENDED' TO WS-PROGRAM-STATUS.
000091 00037C GOBACK.
000092
000093 000384 050-CALC-BALANCE-STATISTICS.
000094 000384 MOVE 0 TO LOOP-COUNT.
000095 00038E 130 PERFORM 100-CRUNCH-LOOP
000096 UNTIL LOOP-COUNT > CRUNCH-CPU-LOOPS .
000097
000098 0003C2 47 100-CRUNCH-LOOP.
000099 0003C2 47 MOVE 'CALCULATING BALANCE STATS' TO WS-PROGRAM-
000100 * *** Increment Record Count ***
000101 0003D2 420 ADD +1 TO BALANCE-COUNT
000102 * *** Add this customer's BALANCE to the grand tot
000103 0003EA 814 COMPUTE BALANCE-TOTAL =
000104 BALANCE-TOTAL + CUST-ACCT-BALANCE
000105 * *** Calculate Average ***
000106 000412 1046 COMPUTE BALANCE-AVERAGE =
MA a A 04/015
```

Application Performance Analyzer Mentor Workshop Lab Exercises



```

File View Navigate Help
P01: Source Program Attribution (0432) Row 00017 of 00038
Command ==> Scroll ==> CSR

LineNo Offset Count Source Statement
000105 * *** Calculate Average ***
000106 000412 1046 COMPUTE BALANCE-AVERAGE =
4093 <- CPU time attributed to above statement
000107 BALANCE-TOTAL / BALANCE-COUNT
000108 * *** Calculate Minimum ***
000109 00045A 138 IF WS-FIRST-TIME-SW = 'Y'
000110 00046A MOVE CUST-ACCT-BALANCE TO BALANCE-MIN.
000111 000474 186 IF CUST-ACCT-BALANCE < BALANCE-MIN
000112 000486 MOVE CUST-ACCT-BALANCE TO BALANCE-MIN.
000113 * *** Calculate Maximum ***
000114 000490 100 IF WS-FIRST-TIME-SW = 'Y'
000115 0004A0 MOVE CUST-ACCT-BALANCE TO BALANCE-MAX.
000116 0004AA 212 IF CUST-ACCT-BALANCE > BALANCE-MAX
000117 0004BC MOVE CUST-ACCT-BALANCE TO BALANCE-MAX.
000118 * *** CALCULATE RANGE ***
000119 0004C6 195 COMPUTE BALANCE-RANGE = BALANCE-MAX - BALANCE-MI
000120 0004D8 358 ADD 1 TO LOOP-COUNT.
000121
MA a A 04/015

```

In the two previous source panels a pattern begins to emerge. Notice that many of the statements with counts are using data items beginning with the word BALANCE. The highest usage statement, which is causing some system resources to be expended uses three of these data items BALANCE-AVERAGE, BALANCE-TOTAL, and BALANCE-COUNT.

Using ISPF FIND commands it would be prudent to look at how these data items are defined to the application. In the panel below we can see that each variable is defined as a decimal numeric in using a print format. However our application is using these three variables to perform arithmetic functions. Each time the statement is encountered the system will internally convert these variables into a COMP-3 format for processing. Hence, the system resources being expended on behalf of the COMPUTE statements. More efficient processing would take place if these were defined as COMP-3 data items instead of forcing the system to convert these each time for processing.

Application Performance Analyzer Mentor Workshop Lab Exercises



```
File View Navigate Help
P01: Source Program Attribution (0432) Row 00070 of 00133
Command ==> Scroll ==> CSR
Count Source Statement
      05 CUST-OCCUPATION          PIC X(28).
*
  01 CUST-BALANCE-STATS.
    05 BALANCE-COUNT             PIC S9(13)V99.
    05 BALANCE-TOTAL             PIC S9(15)V99.
    05 BALANCE-MIN               PIC S9(7)V99    COMP-3.
    05 BALANCE-MAX               PIC S9(7)V99    COMP-3.
    05 BALANCE-RANGE             PIC S9(7)V99    COMP-3.
    05 BALANCE-AVERAGE           PIC S9(15)V99.
*
  01 CRUNCH-CPU-LOOPS            PIC S9(9)  COMP-3.

*****
PROCEDURE DIVISION USING CUST-REC, CUST-BALANCE-STATS,
                        CRUNCH-CPU-LOOPS.
000-MAIN.
  MOVE 'PROGRAM STARTED' TO WS-PROGRAM-STATUS.
  IF WS-FIRST-TIME-SW = 'Y'
```

2. In the previous exercise one of the steps posed the following questions using the W01 WAIT Time by Task/Category report.

Question?: What is occurring in the application that is causing a majority of the 10.47% WAIT? What DD statement is being observed by APA? What is the module name? Is there a specific location in the module where this condition is occurring?

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Name	Description	Percent of Time in WAIT * 10.00% ±1.0%
SAM1V-001	TCB=006C9B08	11.34
+ DATAMG	Data Mgmt Processing	10.47
+ CST2FILE-005	VSAM	1.83
+ ERASE	SAM1V+185A	1.78
+ IDA019L1	Virtual I/O (VIO) and VSAM	1.78
+ PUT	SAM1V+1796	0.04
+ IDA019L1	Virtual I/O (VIO) and VSAM	0.04
+ GET	SAM1V+185A	0.01
+ IDA019L1	Virtual I/O (VIO) and VSAM	0.01
+ CST2FILE-004	VSAM	1.81

Each of the questions can be answered from the W01 report, although other reports might present this same information more readily. You become familiar with the various reports as you use and apply APA.

What is occurring in the application that is causing a majority of the 10.47% WAIT? Using “PF7” and “PF8” to scroll up and down in the W01 report shows that the ERASE function, when totaled, makes up a majority of the 10.47% being consumed by the application in WAITS.

What DD statement is being observed by APA? The DD statement is the CUT2FILE DD.

What is the module name? In case where the ERASE function is consuming resource, APA is pointing to the SAM1V Load Module and the SAM1V CSECT.

Is there a specific location in the module where this condition is occurring? Each the ERASE function is observed it points to a single location in the SAM1V CSECT, offset 185A.

3. Instead of using the “PF7” and “PF8” keys to scroll up and down through the listing, the SETUP command could be used to customize you ISPF view of the list and consolidate the listing. In the display below note that each line which contains an APA count is preceded and proceeded by 4 or 5 lines of additional source code.

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- The report customization panel for the Source Program Mapping report is displayed. The first entry on this pop-up panel allows you to customize the “Nbr of adjacent lines to display” before and after a line containing an APA count.

Other options on this panel allow to display the source listing in its entirety or to remove columns of information from the report display.

Type “1” in the “Nbr of adjacent lines to display” prompt, followed by **ENTER**.

```
File View Navigate Help
-
P Options for Source Program Mapping
C
L Nbr of adjacent lines to display . . . . 1
L This specifies the number of statements without
O measured activity to be displayed before/after
O lines with activity.
O
O Enter "/" to select an option
O █ Display ALL statements of the source program.
O (Otherwise only those at or near statements
O with measured activity are displayed.)
O / Include assembler object code.
O / Show statement count graphically.
O - Show detailed information in heading.
O / Show C/C++ pseudo-assembly
O
000540 00176C WRITE CUST2-REC .
          19  <- Wait time attributed to above statement
000541 001796          IF WS-CUSTFILE-STATUS NOT = '00'
000542 0017A4          DISPLAY 'I/O ERROR ON CUST2 VSAM WRITE' .
000543          * GENERATE CPU USAGE IN SAM2V
000544 0017B2          MOVE CRUNCH-BALANCE-STATS-ZEROS TO CRUNCH-BALANC

MA a                                     A                                     11/009
```

- The resulting display consolidates the lines containing APA counts while still providing one line to context around each count line.

Application Performance Analyzer Mentor Workshop Lab Exercises



```
File View Navigate Help
P01: Source Program Attribution (0432) Row 00001 of 00017
Command ==> | Scroll ==> CSR

LineNo Offset Count Source Statement
000492 001562 IF CRUNCH-IO-LOOPS > 0
000493 001570 OPEN I-O CUSTOMER-FILE2
47 <- Wait time attributed to above statement
000494 001594 EVALUATE WS-CST2FILE-STATUS
000505 0015E0 PERFORM 510-CRUNCH-CUSTFILE
000506 0015FC CLOSE CUSTOMER-FILE2
40 <- Wait time attributed to above statement
000507 END-IF
000539 001762 MOVE WORK-KEY TO CUST2-KEY .
000540 00176C WRITE CUST2-REC .
19 <- Wait time attributed to above statement
000541 001796 IF WS-CUSTFILE-STATUS NOT = '00'
000550 00182C MOVE WORK-KEY TO CUST2-KEY .
000551 001836 DELETE CUSTOMER-FILE2 .
1028 <- Wait time attributed to above statement
000552 00185A IF WS-CUSTFILE-STATUS NOT = '00'
```

Notice that the offset mentioned with the ERASE function, 185A is shows at Statements 551 and 552.