

IBM Application Performance Analyzer for z/OS



Customization Guide

Version 7 Release 1

IBM Application Performance Analyzer for z/OS



Customization Guide

Version 7 Release 1

Second Edition (February 2007)

Note: Before using this information and the product it supports, be sure to read the general information under Appendix E, "Notices," on page 57.

| This edition applies to IBM Application Performance Analyzer for z/OS Version 7 Release 1 (5697-N53) as modified
| by PTFs listed in "About this document" on page v and to any subsequent releases until otherwise indicated in
| new editions. Make sure you are using the correct edition for the level of Application Performance Analyzer.

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You can find out more about IBM Application Performance Analyzer for z/OS by visiting the IBM Web site for Application Performance Analyzer at: www.ibm.com/software/awdtools/apa/

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About this document

This document describes IBM Application Performance Analyzer for z/OS, Version 7 Release 1 plus the following PTFs:

| PTF (English) | for APAR | Date |
|---------------|----------|---------------|
| UK20439 | PK34099 | December 2006 |
| UK19133 | PK31684 | October 2006 |

| PTF (Japanese) | for APAR | Date |
|----------------|----------|--------------|
| UK19154 | PK32225 | October 2006 |

For the latest Application Performance Analyzer PTF information, see <http://www.ibm.com/software/awdtools/apa/support/>.

IBM Application Performance Analyzer for z/OS, hereafter referred to as Application Performance Analyzer, is an application program performance measurement tool for use on z/OS® systems. This document explains how to configure Application Performance Analyzer with parameters that offer the greatest advantage to your installation for monitoring job performance. Application Performance Analyzer shows total resource utilization within a target address space for items such as a job, started task, or TSO/E session. This document explains how to configure Application Performance Analyzer after it has been installed.

If you need to install Application Performance Analyzer, refer to the *IBM Application Performance Analyzer for z/OS Program Directory* for installation instructions.

Who might use this document

This document is intended for system programmers and system administrators who plan for, customize, and maintain Application Performance Analyzer.

To use this document, you need to be familiar with the z/OS operating system, the publications that describe your system, and job control language (JCL) and REXX exec processing.

The following operating systems and subsystems are supported:

- z/OS Version 1 Release 4 (or later)
 - CICS®
 - IMS™
 - DB2 Universal Database™
 - TSO/E

Other documentation that you might need

For the installation of IBM Application Performance Analyzer you will need to refer to the *IBM Application Performance Analyzer for z/OS Program Directory*.

For information about how to use the product, see the publication *IBM Application Performance Analyzer for z/OS User's Guide*.

For details about messages, see the publication *IBM Application Performance Analyzer for z/OS Messages Guide*.

For further information about how to do specific configuration tasks for DB2®, IMS, and CICS (as might be described in this book), see the product documentation for these subsystems.

IBM Application Performance Analyzer publications, related product publications, and their order numbers are listed in the “Bibliography” on page 61.

Document conventions

The following typographical conventions are used throughout this document:

| Category | Convention | Examples |
|---|---------------------|--|
| Command names | ALL CAPITAL LETTERS | RDEFINE |
| Member names | ALL CAPITAL LETTERS | CAZ@SPF |
| Variables | <i>italics</i> | <i>xxx</i> OPERAND invalid <i>hlq</i> .SCAZSAMP |
| JCL code | monospace type | // <i>jobname</i> JOB |
| JCL lines that need to be altered for your system | Bold | DSN=xxxxxx |
| High-level qualifiers that you chose | <i>hlq</i> | <i>hlq</i> .SCAZSAMP |

Some basic concepts and terminology

Sampling

The process by which Application Performance Analyzer measures activity – recording data observed during repeated, timed “snapshots” – is called “sampling.” Application Performance Analyzer saves the observed data in a “measurement file,” sometimes referred to as a “sample file.”

Non-intrusive technology

Application Performance Analyzer’s sampling mechanism is efficient, effective, and, above all, non-intrusive. Application Performance Analyzer’s measurement engine will never schedule any task to execute in the address space being measured.

The Application Performance Analyzer started task

This started task performs all of Application Performance Analyzer’s measurements. Normally, a single Application Performance Analyzer started task is active in a single MVS™ instance. In a multiple-MVS instance installation (including a sysplex), a Application Performance Analyzer started task needs to be active in each MVS in which measurements are to be performed.

Multiple started tasks

In special situations you might want to run multiple Application Performance Analyzer started tasks in a single operating system instance. For example, you might want to do this when making a transition from one product version to the next. Each Application Performance Analyzer

instance is identified by a unique four-character instance identifier. For simplicity, this manual discusses Application Performance Analyzer in the context of a single-instance configuration.

The Application Performance Analyzer product code and Application Performance Analyzer instance ID

The module name prefix (product code) used by Application Performance Analyzer is CAZ. We have chosen CAZ0 as the default Application Performance Analyzer instance identifier, and it is used for examples in this document.

The ISPF component

Application Performance Analyzer's ISPF component provides the user with full, interactive access to the product's functionality. A single, gateway dialog serves as the entry point to all interactive services. The interactive services fall into two basic categories: scheduling and managing measurement requests; and analyzing measurement data.

IEFUSI exit routine

One Application Performance Analyzer module will receive control during the initiation of all job steps and started tasks, via the Step Initiation Exit (IEFUSI). During execution of this exit routine, Application Performance Analyzer determines whether a measurement has been scheduled for the job step, or started task. If it has, the exit routine will initiate sampling for the target address space. Application Performance Analyzer requires that the exit module (CAZ00990) in library *hlq.SCAZLINK* be added to the LNKLIST.

How to send your comments

Your feedback is important in helping us to provide accurate, high-quality information. If you have comments about this book or any other IBM Application Performance Analyzer documentation, contact us in one of these ways:

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Chapter 1. Preparing to customize Application Performance Analyzer

To help you prepare to customize Application Performance Analyzer, this chapter provides planning information. You can use the checklist to get an overview of the tasks and to note your progress.

Checklist for installing and customizing Application Performance Analyzer

To customize Application Performance Analyzer, you will need to ensure that the appropriate tasks in the following checklist are completed.

- ___ 1. If you ordered Application Performance Analyzer using the Custom-Built Product Delivery Offering (CBPDO), follow the steps in the *IBM Application Performance Analyzer for z/OS Program Directory* for installation. (If Application Performance Analyzer is delivered through a ServerPac, the installation is completed for you.)
- ___ 2. Ensure that security access is configured.
- ___ 3. Place SCAZLINK in the LNKLST.
- ___ 4. Enable the SMF step initiation exit (IEFUSI).
- ___ 5. APF-authorize libraries *hlq.SCAZAUTH* and *hlq.SCAZLINK*.
- ___ 6. Modify the TSO/E logon procedure.
- ___ 7. Choose a started task instance identifier.
- ___ 8. Make the CAZ0 started task available.
- ___ 9. Create installation-level settings and settings for the started task.
- ___ 10. Pre-allocate a checkpoint file (optional).
- ___ 11. Create your own descriptive program attribution table (optional).
- ___ 12. Modify Application Performance Analyzer procedure to provide access to third party repository products for source program mapping support (optional).
- ___ 13. Start the CAZ0 started task.
- ___ 14. Start Application Performance Analyzer.
- ___ 15. Run an IVP to verify the customization of Application Performance Analyzer (optional).

You do not need to customize your DB2 Universal Database to use IBM Application Performance Analyzer. However, if you want Application Performance Analyzer to gather the necessary data to report plan and package BIND timestamps, do the following tasks:

- ___ 1. Create and bind a DB2 UDB access package and plan.
- ___ 2. Create a PLAN_TABLE.
- ___ 3. Provide DB2 authorization.
- ___ 4. Update the started task JCL.
- ___ 5. Update the started task configuration settings.

Migration considerations

If you are migrating from an earlier version of Application Performance Analyzer to Version 7.1, you must include the following tasks in your customization.

Applying a new applid for Version 7.1

The applid for Application Performance Analyzer is changed from CAZ1 to CAZ3. If you currently start Application Performance Analyzer from an ISPF Primary Option menu, you must change NEWAPPL(CAZ1) to NEWAPPL(CAZ3). To retain your existing ISPF profiles, you must also rename CAZ1PROF and CAZ1EDIT to CAZ3PROF and CAZ3EDIT, respectively, in your ISPF profile data set.

Running earlier versions simultaneously with Version 7.1

You can run a previous version of Application Performance Analyzer in the same image as the Version 7.1., however, each version must use unique started task names, unique STCID, unique checkpoint data set, and unique SPXGroupName. Also, use the appropriate version of the Application Performance Analyzer ISPF front-end for the Application Performance Analyzer started task(s) to which you are connecting.

Library names after you finish installing

After you install Application Performance Analyzer, you have the data sets available as listed in Table 1. If you changed the names during installation, you can add the current names to the table for easy reference.

Table 1. Application Performance Analyzer library names

| Default name | Contents | Site name if different |
|----------------------|-------------------------|------------------------|
| <i>hlq</i> .SCAZLINK | LNKLST module | |
| <i>hlq</i> .SCAZAUTH | Load library modules | |
| <i>hlq</i> .SCAZEXEC | REXX exec library | |
| <i>hlq</i> .SCAZMENU | ISPF messages (English) | |
| <i>hlq</i> .SCAZPENU | ISPF panels (English) | |
| <i>hlq</i> .SCAZTENU | ISPF tables (English) | |
| <i>hlq</i> .SCAZDBRM | Data | |
| <i>hlq</i> .SCAZSAMP | Sample JCL | |

Note: The library name prefix *hlq* above should not be confused with the *yourhlq* value described below for data sets created by Application Performance Analyzer started task when you run your applications. The same library prefix *hlq* can be used by all Application Performance Analyzer started task instances, but the *yourhlq* prefix for the checkpoint, log, and sample data sets must be unique for each Application Performance Analyzer instance.

Library names created by Application Performance Analyzer

The Application Performance Analyzer started task creates various data sets as part of its normal operation. The table shown below lists these data sets and indicates the names assigned by Application Performance Analyzer.

Table 2. Application Performance Analyzer data set names and descriptions

| Data set name | Description |
|--|--|
| <i>yourhlq.CheckpointDSN</i> | Application Performance Analyzer checkpoint data set |
| <i>yourhlq.LOGxx.Dyyddd.Thhmm###</i> | Optional log data set |
| <i>yourhlq.userid.Rnnnn.jobname.SF</i> | Measurement data set or sample data set |

With the exception of the checkpoint file, the rightmost qualifiers are determined by Application Performance Analyzer. You choose a prefix that replaces the *yourhlq* symbol shown above; however, it must comply with the JCL rule for specifying a data set name. In this case your prefix can have a maximum of 17 characters.

Note: In the event that you execute multiple Application Performance Analyzer started tasks, each one must be assigned its own unique *yourhlq* value; each creates its own set of data sets. It is a useful convention to include the started task instance identifier as part of this prefix.

The log data set will have the “xx” identifier suffix on the second qualifier in sysplex environments to make sure the file is unique. The “###” at the end of the log data set is a sequence number assigned when each new log file is created.

By default, the sample data set and log data set will use the value in the **HLQ** parameter of the CONFIG BASIC statement. Optionally, a different sample *yourhlq* and log *yourhlq* can be specified on the CONFIG SAMPLE and CONFIG LOGFILE statements, and the checkpoint data set can be a fully qualified name.

Planning for security

Application Performance Analyzer runs on a z/OS system as a started task. The user ID assigned to the started task must have READ access or higher to the resources used by monitored systems and applications.

Establishing external security system access rules

The following applies to your External Security System (such as RACF®). Application Performance Analyzer also provides its own access rules facility to complement the external security system. The Application Performance Analyzer access rules are described in “Configuring Application Performance Analyzer” on page 10.

Load library (SCAZAUTH)

You need to grant Application Performance Analyzer users execute access to the product load library SCAZAUTH.

Other libraries

Users should be granted read-only access to all other Application Performance Analyzer libraries.

Checkpoint file

The Application Performance Analyzer started task will allocate a checkpoint file. Application Performance Analyzer uses this data set to record the status of all measurement requests. The checkpoint file is named in the format *yourhlq.CheckpointDSN*. The Application Performance Analyzer started task must have full access to this data set. Additionally,

you should grant full access to the appropriate product support personnel, and read-only access to all other users of Application Performance Analyzer.

Note: Some installations might need to pre-allocate the checkpoint file. See “Pre-allocating a checkpoint data set” on page 31 to determine if this applies to your installation.

Log files

If you choose to activate the logging option, the Application Performance Analyzer started task will allocate and write to log data sets. These data sets record activity within the started task. The Application Performance Analyzer started task must have full access to these data sets. Additionally, you should grant full access to the appropriate product support personnel and deny access to all other users. These data sets have a name in the form:

yourhlq.LOG.Dyyyyddd.Thhmsst

Sample (measurement) files

The Application Performance Analyzer started task creates a measurement file (or “sample” file) for each measurement request that has completed. These data sets contain the measurement data that Application Performance Analyzer uses to produce the performance analysis reports. The Application Performance Analyzer started task must have full access to these data sets. Additionally, you should grant full access to the appropriate product support personnel, and read-only access to all other Application Performance Analyzer users. These data sets are named in the format:

yourhlq.userid.Rnnnn.jobname.SF

SAF FACILITY class authorities

If your installation has activated the SAF FACILITY class for CSVDYNL and or CSVDYNEX, you must authorize the Application Performance Analyzer started task as described in the table below:

Table 3. Class authorities required for SAF FACILITY

| Class entity | Access authority |
|--|------------------|
| CSVDYNL. <i>linklist</i> .TEST 1 | READ |
| CSVDYNEX.LIST | READ |
| CSVDYNEX.SYS.IEFUSI.CAZ00990 | UPDATE |
| CSVDYNEX.SYSJES2.IEFUSI.CAZ00990 (for JES2 environments) | UPDATE |
| CSVDYNEX.SYSJES3.IEFUSI.CAZ00990 (for JES3 environments) | UPDATE |
| CSVDYNEX.SYSSTC.IEFUSI.CAZ00990 | UPDATE |
| CSVDYNEX.SYSTSO.IEFUSI.CAZ00990 | UPDATE |

Note: **1** Where *linklist* is the name of the active LNKLST. This can be displayed on the console with the command:

```
D PROG, LNKLST, NAME=CURRENT
```

Non-RACF security

If you are running a security system other than RACF, you might need to give Application Performance Analyzer read access to any protected load libraries it might need to search. Application Performance Analyzer requires access to load libraries in order to gather information about all

modules it encounters during an observation session. If the Application Performance Analyzer started task gets S913 abends in a non-RACF environment, protected loadlibs are a likely cause.

Deciding on the Application Performance Analyzer configuration settings

Application Performance Analyzer allows you to customize the product through the use of configuration settings. You must review these settings and decide on appropriate values for your installation. For more information, see “Installation-level configuration settings” on page 11.

Deciding on the Application Performance Analyzer access rules

Application Performance Analyzer allows you to set up access rules for your user community. These rules enable you to control levels of access to the product on a user by user basis. The product is shipped with some sample rules, but these rules limit access to some functionality, and are of course not specific to any of your users. To provide access suitable for your installation, you will need to specify your own access rules.

You can use either the internal security scheme, or a RACF-compatible external security product. For internal rules, see “Installation-level configuration settings” on page 11. For external rules, see “Configuring external security (RACF)” on page 24.

Assigning priority

If your installation is running Workload Manager (WLM) in GOAL mode, Application Performance Analyzer should be assigned to the IBM-supplied SYSSTC class. This must be configured in WLM.

If running in COMPAT mode, put Application Performance Analyzer in the same performance group as other high priority system started tasks such as VTAM® and TCP/IP. This is done by updating member IEAICS00 in SYS1.PARMLIB.

The dispatch priority and service class assigned should be verified using primary command “DA” in SDSF. Column “DP” shows the dispatch priority and column “SrvClass” shows the WLM service class.

Using the sysplex feature

This feature provides the ability to observe/sample and report on application programs that execute on an MVS system in a sysplex other than the one on which the user has started the Application Performance Analyzer user interface. To accommodate this ability, the Application Performance Analyzer started task will communicate with other instances of the Application Performance Analyzer started task on different MVS systems in the sysplex.

The communication between Application Performance Analyzer instances is facilitated by the implementation of an Application Performance Analyzer sysplex group. It is assumed that all images in a sysplex participate in DASD sharing. To take advantage of the sysplex support in Application Performance Analyzer, a unique instance of Application Performance Analyzer must be installed on every MVS system in the sysplex. Each of these instances must be defined to the same Application Performance Analyzer sysplex group during the installation of

Application Performance Analyzer. Only one instance of Application Performance Analyzer on the same MVS system can be a member in the same Application Performance Analyzer sysplex group, that is, you cannot have two or more instances of Application Performance Analyzer on the same MVS system as members of the same Application Performance Analyzer sysplex group.

See parameter “SPXGroupName” on the “CONFIG BASIC statement” on page 16 in the member CAZCNFG0 in *hlq.SCAZSAMP*. This parameter is coded as “SPXGroupName=Sysplexname” and identifies the Application Performance Analyzer sysplex group that the Application Performance Analyzer instance will be a member of. It can be a maximum of eight alphanumeric characters. All Application Performance Analyzer instances that will communicate with each other must code an identical “SPXGroupName=Sysplexname”. The Application Performance Analyzer instances in a Application Performance Analyzer sysplex group must be from different MVS systems.

All Application Performance Analyzer instances defined in the same Application Performance Analyzer sysplex group must share a common checkpoint file; therefore, it is important that the HLQ, UNIT, and CheckpointDSN parameters are identical. Failure to do so will cause the started task to fail upon startup with an appropriate error message. Application Performance Analyzer’s checkpoint file uses shared DASD on a sysplex to synchronize all the started tasks. It is important that you choose an HLQ that will allow Application Performance Analyzer to allocate all new data sets to volumes that are shared across the sysplex. These data sets include the checkpoint file, sample files, and optional log files. For more information, see “CONFIG BASIC statement” on page 16.

In summary, the CONFIG BASIC statement for every Application Performance Analyzer instance defined in the same Application Performance Analyzer sysplex group must be coded identically, with the exception of the STCID, which might be unique.

Chapter 2. Customizing Application Performance Analyzer

You need to perform the following tasks to set up the basic product after installing it:

- “Adding Application Performance Analyzer module to the LNKLIST” on page 7
- “Enabling the SMF step initiation exit (IEFUSI)” on page 8
- “Authorizing Application Performance Analyzer modules” on page 9
- “Modifying the TSO/E logon procedure to include Application Performance Analyzer user interface” on page 9
- “Choosing an Application Performance Analyzer started task identifier” on page 10
- “Making the CAZ0 started task available” on page 10
- “Creating the installation-level and started task configuration settings” on page 10
- “Configuring external security (RACF)” on page 24
- “Pre-allocating a checkpoint data set” on page 31 (optional)
- “Updating the descriptive program attribution tables” on page 31 (optional)
- “Modifying Application Performance Analyzer procedure for third party products” on page 34 (optional)
- “Starting the CAZ0 started task” on page 35
- “Starting the IBM Application Performance Analyzer user interface” on page 35

Adding Application Performance Analyzer module to the LNKLIST

The library SCAZLINK contains Application Performance Analyzer’s step initiation exit (IEFUSI) routine, which receives control at job or step initiation. SCAZLINK must be added to the link list for the product to execute successfully. Add SCAZLINK to the LNKLIST by performing the following steps:

1. Create or update a PROGxx member in SYS1.PARMLIB (or any parmlib that will be used for IPL). Add one of the following statements, where *hlq* is the high-level qualifier that you used to install Application Performance Analyzer:
 - If the library is cataloged in the master catalog, use:
`LNKLIST ADD NAME(lnklist.name) DSNAME(hlq.SCAZLINK)`
 - If the library is cataloged in a user catalog, use:
`LNKLIST ADD NAME(lnklist.name) DSNAME(hlq.SCAZLINK) VOLUME(volser)`
2. To make the change effective, issue one of the following commands:
 - 'SET PROG=xx' where xx is the suffix of the PROG member
 - 'SETPROG LNKLIST,ACTIVATE,NAME=*lnklist.name*'
3. If your link list data set is managed by LLA, issue a 'F LLA,REFRESH' MVS command to refresh the Library Lookaside Directories.

Enabling the SMF step initiation exit (IEFUSI)

IEFUSI is a System Management Facilities (SMF) exit, and it must be enabled for the types of workloads that Application Performance Analyzer is going to report on. The IEFUSI exit point can be defined to SMF such that SMF will be called for the entire system, batch jobs, started tasks, and TSO logons. Enable IEFUSI by performing the following steps:

1. Create or update an SMFPRM xx member in SYS1.PARMLIB (or any parmlib that will be used for IPL). Specify IEFUSI on the EXITS option of the SYS or SUBSYS parameters. For example:

```
SYS(...,  
EXITS(IEFUSI,...)) /* enable IEFUSI for the entire system */  
  
SUBSYS(TSO,  
EXITS(IEFUSI,...)) /* enable IEFUSI for TSO workloads */  
  
SUBSYS(JES2,  
EXITS(IEFUSI,...)) /* enable IEFUSI for JES2 Batch workloads */  
  
SUBSYS(JES3,  
EXITS(IEFUSI,...)) /* enable IEFUSI for JES3 Batch workloads */  
  
SUBSYS(STC,  
EXITS(IEFUSI,...)) /* enable IEFUSI for Started Tasks */
```

2. To make the changes effective, issue the 'SET SMF= xx ' console command.

The recommended size for dataspace in the IEFUSI exit is 2GB or greater with 24 dataspace for the CAZ0 started task.

When you set up SMFPRM xx correctly, the CAZ0 started task will inform you of each exit point that Application Performance Analyzer is using. For example, if you set up SMFPRM xx to take SMF exit IEFUSI for TSO users, then you would see a message similar to the following for SYSTSO:

```
CAZ1221I CAZ0-MAIN (UTCPLXSB) Module CAZ00990 added to exit SYSTSO.IEFUSI.
```

Note: Before applying any maintenance or installing a new release of Application Performance Analyzer, make sure that you stop the started task CAZ0.

After applying any maintenance or installing a new release of Application Performance Analyzer, do one of the following actions:

- IPL the system and restart the start task CAZ0, which will load the new Application Performance Analyzer exits.
- Or to load the new exits without IPLing the system, issue the following commands so that the system deletes the Application Performance Analyzer exits at the IEFUSI exit point:

```
SETPROG EXIT,DELETE,EXITNAME=SYS.IEFUSI,MODNAME=CAZ00990 /* for the entire system */  
SETPROG EXIT,DELETE,EXITNAME=SYSJES2.IEFUSI,MODNAME=CAZ00990 /* for JES2 environment */  
SETPROG EXIT,DELETE,EXITNAME=SYSJES3.IEFUSI,MODNAME=CAZ00990 /* for JES3 environment */  
SETPROG EXIT,DELETE,EXITNAME=SYSTSO.IEFUSI,MODNAME=CAZ00990 /* for TSO logons */  
SETPROG EXIT,DELETE,EXITNAME=SYSSTC.IEFUSI,MODNAME=CAZ00990 /* for Started Tasks */
```

Then restart the started task CAZ0, which will load the new Application Performance Analyzer exits.

For more information about SMFPRM xx and its parameters, see *z/OS Initialization and Tuning Reference*.

Authorizing Application Performance Analyzer modules

The libraries *hlq.SCAZAUTH* and *hlq.SCAZLINK* contain all of the Application Performance Analyzer modules that must be authorized for the product to execute successfully. Add *hlq.SCAZAUTH* and *hlq.SCAZLINK* to the system APF list by performing the following steps:

1. Create or update a PROGxx member in SYS1.PARMLIB (or any parmlib that will be used for IPL). Add one of the following statements, where *hlq* is the high-level qualifier that you used to install Application Performance Analyzer:

- If the libraries are managed by SMS, use:

```
APF ADD DSN(hlq.SCAZAUTH) SMS
```

and

```
APF ADD DSN(hlq.SCAZLINK) SMS
```

- If the libraries are not managed by SMS, use:

```
APF ADD DSN(hlq.SCAZAUTH) VOLUME(parm)
```

and

```
APF ADD DSN(hlq.SCAZLINK) VOLUME(parm)
```

The variable *parm* is one of the following

- A six-character identifier for the volume on which *hlq.SCAZAUTH* and *hlq.SCAZLINK* reside
 - *********, which indicates that *hlq.SCAZAUTH* and *hlq.SCAZLINK* are located on the current SYSRES volume
 - ***MCAT***, which indicates that *hlq.SCAZAUTH* and *hlq.SCAZLINK* are located on the volume that contains the master catalog
2. To make the change effective, either issue the 'SET PROG=xx' command or IPL.

Modifying the TSO/E logon procedure to include Application Performance Analyzer user interface

The functional routines of Application Performance Analyzer are executed under ISPF in a TSO/E user's session. To allow users to start the Application Performance Analyzer user interface, you must make these ISPF libraries available to them.

To make the ISPF libraries available to users, do the following steps:

1. In members CAZ@SPF and CAZISPS in your REXX exec library *hlq.SCAZEXEC*, change the high-level qualifier as appropriate.
2. Add the Application Performance Analyzer user interface to your ISPF menu by inserting the additional lines (**NEW**) as shown in the following example:

```
...
) BODY  CMD(ZCMD)
...
9  IBM Products      IBM program development products
10 SCLM              SW Configuration Library Manager
11 Workplace        ISPF Object/Action Workplace
APA AppPerfAnalyzer Application Performance Analyzer for z/OS ( NEW )
...
) PROC
...
&ZSEL = TRANS( TRUNC  (&ZCMD, '.')
...
9, 'PANEL(ISRDIIS) ADDPOP'
```

```

10,'PGM(ISRSCLM) SCRNAME(SCLM) NOCHECK'
11,'PGM(ISRUDA) PARM(ISRWORK) SCRNAME(WORK) '
APA,'CMD(EX 'hlq.SCAZEXEC(CAZISPS)') +
MODE(FSCR) NEWAPPL(CAZ3)' /*Application Performance Analyzer*/ ( NEW )
...

```

For more information about configuring your ISPF Primary Option menu, see *z/OS ISPF Planning and Customizing*.

Choosing an Application Performance Analyzer started task identifier

An Application Performance Analyzer started task is identified by a four-character identifier. The IBM-default value shipped with the product is CAZ0. You can choose a different name to meet your site's requirement.

Making the CAZ0 started task available

To make the CAZ0 started task available, do the following steps:

1. Edit the procedure CAZ0 in your library *hlq.SCAZSAMP*. See the instructions in the sample job for more information.
2. Copy this procedure to a library in the JES2 or JES3 procedure library concatenation for started tasks.
3. Define a user ID for the CAZ0 started task.
4. Grant the user ID you created READ access to Application Performance Analyzer libraries.
5. Define a profile in the RACF STARTED class for the CAZ0 started task so that it can access protected resources. To do this, update your security definitions by using the RDEFINE command to associate CAZ0 with user IDs as follows:

```
RDEFINE STARTED CAZ0.* STDATA(USER(userid) GROUP(group))
```

Where *userid* is the user ID, and *group* is the group on your system that has access to the RACF-protected resources.

You can issue the above command under TSO/E or on the system console log.

For more information about using the STARTED class, see *z/OS Security Server (RACF) Security Administrator's Guide*.

6. Create or update a COMMNDxx parmlib member that will be used for IPL so that it contains the following command:

```
COM='START CAZ0'
```

Configuring Application Performance Analyzer

This section describes how to configure Application Performance Analyzer to suit your installation. There are two types of configuration: global installation-level settings, and settings for the started task.

Creating the installation-level and started task configuration settings

Application Performance Analyzer provides for two types of configuration:

Installation-level configuration settings

This is global, installation-level configuration information. You specify the settings in assembly macro statements and generate these into the load module CAZCNFG1 in *hlq.SCAZAUTH*. The key settings stored in this module are the Application Performance Analyzer access rules.

The member CAZCNFG1 in *hlq.SCAZSAMP* contains model source code. Modify and add settings to suit your installation. The member CAZASMCF in *hlq.SCAZSAMP* contains the assembly and linkedit JCL necessary to create the CAZCNFG1 module. Refer to the instructions in CAZASMCF for details of the necessary changes.

Started task configuration settings

You specify these settings in a SYSIN-type file which the Application Performance Analyzer started task processes when it begins execution. You can change these settings at any time by editing the member and then restarting the started task. The supplied member CAZCNFG0 in *hlq.SCAZSAMP* is an example of this file which you can copy and modify to suit your requirements. See “Started task configuration settings” on page 15 for more information.

Installation-level configuration settings

These settings are generated into the load module CAZCNFG1. You specify these in assembly macro statements then edit and submit sample job CAZASMCF in *hlq.SCAZSAMP* to generate the CAZCNFG1 module. Source member CAZCNFG1 in *hlq.SCAZSAMP* contains model source code. The following example illustrates the syntax of the statements in the CAZCNFG1 source member.

```
* ----- *
*   Configuration Section.
*
CAZCNFG1      CAZCVSET START
              CAZCVSET END

* ----- *
*   Access Rules (Security) Section.
*
01 CAZRULE   *,allow,ViewRequestsOwnedBy,=====
02 CAZRULE   *,allow,DeleteRequestsOwnedBy,=====
03 CAZRULE   *,allow,UpdateRequestsOwnedBy,=====
04 CAZRULE   *,allow,MeasureJOB,*
05 CAZRULE   *,allow,MeasureSTC,*
06 CAZRULE   *,allow,MeasureTSU,=====
07 CAZRULE   *,allow,UseDB2Plus,*
08 CAZRULE   *,allow,UseIMSPPlus,*
09 CAZRULE   *,allow,MonitorJOB,*
10 CAZRULE   *,allow,MonitorSTC,*
11 CAZRULE   *,allow,MonitorTSU,=====
              CAZRULE END
* ----- *
```

Specifying access rules

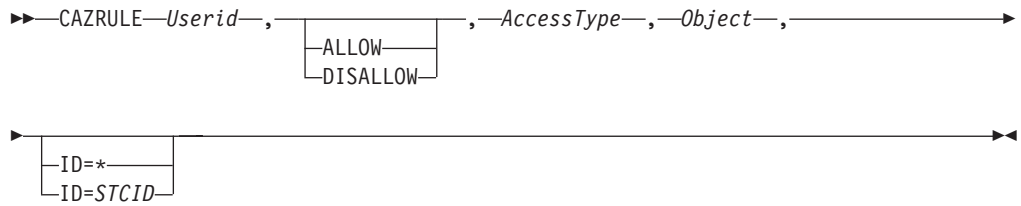
You specify access rules – rules controlling the type of access to Application Performance Analyzer functions granted by User ID – in the access rules section of CAZCNFG1. You define each access rule in the CAZCNFG1 source member using the CAZRULE statement. In each rule you specify:

- a User ID value, or pattern
- ALLOW or DISALLOW indicating if the rule specifies that the access is allowed or disallowed
- the type of access
- and the name, or name pattern, of an Object to be accessed.

The CAZRULE statement is an assembly macro statement and must follow the syntax rules for assembler macros. You specify the four values, noted above, in the

first through fourth positional macro parameters. You might also specify a value in the name field – starting in column 1. This is ignored by the CAZRULE; you can use this for your own purposes.

CAZRULE syntax:



CAZRULE Statement Parameters:

Userid

Specify the User ID to which the rule applies in the first positional parameter. You can specify either a full User ID or a User ID pattern. The value is not case sensitive.

Specify patterns using the following special characters:

*** (asterisk)**

To specify a wildcard value. An asterisk must be the last character in the value. The characters up to the asterisk are compared for an exact match. For example, ABC* will match any User ID beginning with ABC.

? (question mark)

To specify any character match. A question mark specifies that any User ID character, in the same position, will be matched. For example, AB??EF will result in the match of any User ID characters in the third and fourth positions. The User ID ABCDEF will be matched, as will ABXYEF.

ALLOW or DISALLOW

The second positional parameter determines whether the CAZRULE statement specifies that the access is to be permitted (ALLOW) or denied (DISALLOW). The value is not case sensitive.

AccessType

The third positional parameter in the CAZRULE statement specifies the type of access. See “Access rule descriptions” on page 13 for a summary of all AccessType values. The value is not case sensitive.

Object

The fourth positional parameter specifies the Object to which the rule applies. Refer to “Access rule descriptions” on page 13 for information about which objects apply to which AccessType values.

The types of objects are:

- User ID name or pattern
- Job Name or pattern
- Application Performance Analyzer ID or asterisk (*) for any Application Performance Analyzer started task

User ID Object pattern

When the object type is a User ID, an additional special pattern character,

an equal sign (=), is permitted. Specifying '=' has the effect of substituting the character from the actual User ID (the User ID for which the rule is being checked) before the comparison is made.

ID The CAZRULE accepts one keyword parameter: ID=STCID. You can use this parameter to specify the Application Performance Analyzer ID to which the rule applies. Typically you omit the ID= parameter for a default value of '*'. The rule applies to all Application Performance Analyzer started tasks.

Examples: Some examples of CAZRULE statements are illustrated here. The examples specify a name field that is ignored. We assigned reference numbers 01, 02, 03 and 04 to the rules in the name field for easier identification.

```
01 CAZRULE FRANK01,Allow,ViewRequestsOwnedBy,*
02 CAZRULE *,Allow,MeasureJob,*
03 CAZRULE *,Allow,MeasureTSU,=====
```

Notes about CAZRULE statement examples:

1. The first example specifies an access rule that applies to User ID FRANK01. The second positional parameter, Allow, specifies that the access is granted to FRANK01. The third positional parameter specifies the type of access. In this case, ViewRequestsOwnedBy; it specifies which owners' measurement requests FRANK01 will be allowed to display. The fourth positional parameter specifies *. FRANK01 is allowed to display measurement requests owned by any user.
2. The second example specifies an access rule that applies to all users; the wildcard pattern * in the first positional parameter indicates this. The second positional parameter, Allow, specifies that the access is granted. The third positional parameter specifies the type of access. In this case, MeasureJob; it specifies those jobs are allowed to be measured. The fourth positional parameter specifies *. This grants all users permission to measure all job names.
3. The fourth example specifies an asterisk for the User ID, hence, applies to all users. The value '======' is specified for the Object. In the case of MeasureTSU the Object is the User ID of the user's TSO address space. Since each character of the Object field is an equal sign, the corresponding characters of the actual User ID are substituted. The effect is that the user is only allowed to measure his own TSO address space.

Access rule descriptions:

| Code this | For this type of access | Object type |
|-----------------------|--|--|
| ViewRequestsOwnedBy | Controls which measurement requests will be visible to the user. | User ID of user that created the request. |
| DeleteRequestsOwnedBy | Controls which measurement requests the user is allowed to delete. | User ID of user that created the request. |
| UpdateRequestOwnedBy | Controls which measurement requests the user is allowed to modify. | User ID of user that created the request. |
| MeasureJOB | Controls what job names the user is allowed to measure. | Job name of job to be measured. |
| MeasureSTC | Controls what STCs (started tasks) the user is allowed to measure. | Name of started task procedure to be measured. |

| Code this | For this type of access | Object type |
|------------|--|---|
| MeasureTSU | Controls what TSUs (TSO regions) the user is allowed to measure. | Name of TSO region (the TSO User ID). |
| UseDB2Plus | Controls whether the user is allowed to use the DB2+ data extractor. | User ID of user creating the request. |
| UseIMSP1us | Controls whether the user is allowed to use the IMS+ data extractor. | User ID of user creating the request. |
| MonitorJOB | Controls what job names the user is allowed to threshold-monitor. | Job name of job to be monitored. |
| MonitorSTC | Controls what STCs (started tasks) the user is allowed to threshold-monitor. | Name of started task procedure to be monitored. |
| MonitorTSU | Controls what TSUs (TSO regions) the user is allowed to threshold-monitor. | Name of TSO region (the TSO User ID). |

Precedence of rules: Whenever separate CAZRULE statements specify conflicting effects for the same User ID, the statements specified later in the source member take precedence over earlier ones.

For example:

```
CAZRULE *,allow,ViewRequestsOwnedBy,=====
CAZRULE FRANK01,allow,ViewRequestsOwnedBy,*
```

The first statement above specifies that all users are allowed to view only their own requests. The second statement, however, specifies that User ID FRANK01 is allowed to view all requests. This statement overrides the previous one, for FRANK01.

The approach is to first code statements for the most inclusive rules and then follow these with less inclusive rules.

Suggested Application Performance Analyzer rules: Member CAZCNFG1 in *hlq.SCAZSAMP* contains suggested Application Performance Analyzer rules. You need to carefully review these, and make changes for your own installation. For example, rule number 06 allows all users to measure stated tasks. However, you might want to control who is able to run measurements of, for example, your CICS regions, in which case you would have to specify more specific rules controlling started task measurement. Measurement of CICS regions can either be permitted or restricted, more detailed options are not available.

The rules supplied in CAZCNFG1 leave access fairly open, and their equivalent RACF profiles are shown below:

```
01 CAZRULE *,allow,ViewRequestsOwnedBy,=====
   /* This is a default, no RACF profile required. */
02 CAZRULE *,allow,DeleteRequestsOwnedBy,=====
   /* This is a default, no RACF profile required. */
03 CAZRULE *,allow,UpdateRequestsOwnedBy,=====
   /* This is a default, no RACF profile required. */
04 CAZRULE *,allow,MeasureJOB,*
   /* RDEFINE FACILITY CAZ0.MEASURE.JOB.* UACC(READ) */
```



```

05 CAZRULE *,allow,MeasureSTC,*
   /* RDEFINE FACILITY CAZ0.MEASURE.STC.* UACC(READ) */
06 CAZRULE *,allow,MeasureTSU,=====
   /* This is a default, no RACF profile required. */
07 CAZRULE *,allow,UseDB2Plus,*
   /* RDEFINE FACILITY CAZ0.USE.DB2PLUS UACC(READ) */
08 CAZRULE *,allow,UseIMSPlus,*
   /* RDEFINE FACILITY CAZ0.USE.IMSPLUS UACC(READ) */
09 CAZRULE *,allow,MonitorJOB,*
   /* RDEFINE FACILITY CAZ0.MONITOR.JOB.* UACC(READ) */
10 CAZRULE *,allow,MonitorSTC,*
   /* RDEFINE FACILITY CAZ0.MONITOR.STC.* UACC(READ) */
11 CAZRULE *,allow,MonitorTSU,=====
   /* This is a default, no RACF profile required. */

```

| Rule number | Explanation |
|-------------|---|
| 01 | Users can view only their own measurement requests. Other users' requests are hidden. |
| 02 | Users can only delete their own measurement requests. |
| 03 | Users can only modify/cancel their own measurement requests. |
| 04 | Any user can measure jobs with any jobname. |
| 05 | Any user is allowed to measure a started task. |
| 06 | Any user is allowed to measure his/her own TSO region. |
| 07 | Any user is allowed to turn on the DB2+ data extractor. |
| 08 | Any user is allowed to turn on the IMS+ data extractor. |
| 09 | Any user is allowed to threshold-monitor jobs with any jobname. |
| 10 | Any user is allowed to threshold-monitor a started task. |
| 11 | Any user is allowed to threshold-monitor his or her own TSO region. |

Started task configuration settings

The Application Performance Analyzer started task CAZ0 obtains these settings from a file allocated to DDname CONFIG. The file is a SYSIN-type member which you edit in order to change the settings. The member CAZCNFG0 in *hlq.SCAZSAMP* contains the initial settings. A group of configuration settings is specified by a CONFIG statement. Settings are organized into categories or classes. Each CONFIG statement will define settings for a particular class.

The general syntax for a CONFIG statement is illustrated here:

```

CONFIG class
keyword1=value1
keyword2=value2 // this is a comment
..
keywordn=valuen ; // end with semicolon

```

You must code a single keyword/value pair expression within a single line; it cannot span two lines. Separate keyword/value pair expressions from each other using one or more blanks. A CONFIG statement, including all its keyword/value pair expressions must be terminated by a semicolon.

A CONFIG statement might be coded anywhere within columns 1 to 72 inclusive. An asterisk in column 1 denotes a comment line. A double slash (//) anywhere in the line indicates the remaining text in the line is a comment.

The following CONFIG BASIC statement, which is supplied in the predefined CAZCNFG0 member, illustrates the CONFIG syntax.

```
CONFIG BASIC           // Basic settings:
  STCid=CAZ0          // . Application Performance Analyzer instance ID
  HLQ=CAZ0            // . DSN high level qualifier
  UNIT=SYSDA         // . unit name for new data sets
  CheckpointDSN='.CHKP'; // . checkpoint file DSN
                    // (appended to HLQ)
```

CONFIG statement parameters

Class Specifies the category of settings that the CONFIG statement is to modify. The allowable values for class are:

- BASIC
- SAMPLE
- LOGFILE

keywordn

This specifies the name of the setting variable and is paired with a value expression in *keyword=value* format. The name is not case sensitive.

valuen This is paired with a keyword name and specifies the value to be set.

CONFIG BASIC statement

BASIC settings allow you specify values for basic characteristics of the Application Performance Analyzer installation. The following settings can be specified:

STCID Required.

This is the Application Performance Analyzer ID, a four-character value that uniquely identifies the Application Performance Analyzer started task.

HLQ Required.

Specifies the high-level qualifier for data sets created by the Application Performance Analyzer started task as part of its normal operation. The value that you specify for HLQ must comply with the JCL rule for specifying a data set name. It can be no more than 17 characters long.

Note: If this Application Performance Analyzer instance is a member of a sysplex group, you must select a high-level qualifier that will allow Application Performance Analyzer to allocate all new data sets to volumes that are shared across the sysplex. These data sets include the checkpoint file, sample files, and optional log files. See SampleHLQ in “CONFIG SAMPLE statement” on page 19, and LogHLQ in “CONFIG LOGFILE statement” on page 23 for descriptions of how to set a unique high-level qualifier for the sample files and log files.

Default: None.

CheckpointDSN

Required.

Specifies the name to be given to the Application Performance Analyzer checkpoint file. You have two options when specifying this value:

- If *CheckpointDSN* begins with a period (‘.’) then the value that you specify for HLQ above will be prefixed to the value you specify in

CheckpointDSN. In this case the length of the value specified in *CheckpointDSN* must be 44 characters less the length of the value of HLQ.

- Otherwise, *CheckpointDSN* must contain the fully qualified data set name. It can be up to 44 characters long.

Default: None

UNIT Optional.

Specifies the unit name to be used when allocating all new data sets of the following type:

- Application Performance Analyzer checkpoint file
- Application Performance Analyzer log data set
- Application Performance Analyzer sample files

Default: SYSDA

Unit can be either a device type such as 3390, or an esoteric such as SYSDA. A mount status of STORAGE or PUBLIC is nonspecific and does not require a VOLSER. (This release of Application Performance Analyzer does not allow a VOLSER to be specified.)

On a non-SMS-managed system, you must ensure that the UNIT name you specified contains one or more volumes mounted as either STORAGE or PUBLIC. If there are not such volumes mounted, then Application Performance Analyzer will be unable to allocate critical files and will terminate.

On an SMS-managed system, SMS will ignore the unit parameter. To ensure SMS control over all data sets allocated by Application Performance Analyzer, specify an HLQ value that is recognized and managed by SMS.

SPXGroupName

Optional.

Specifies the Application Performance Analyzer sysplex group that this Application Performance Analyzer instance will be a member of. It can be a maximum of eight alphanumeric characters. All Application Performance Analyzer instances that will communicate with each other must code an identical SPXGroupName=sysplexname.

Note: The value specified for SPXGroupName must be unique and not currently used by any other subsystems in the sysplex. Do not use the system's sysplex name for this value.

The Application Performance Analyzer instances in a Application Performance Analyzer sysplex group must be from different MVS systems. All Application Performance Analyzer instances defined in the same Application Performance Analyzer sysplex group must share a common checkpoint file; therefore, it is important that the HLQ, UNIT, and CheckpointDSN are identical.

In summary, the CONFIG BASIC statement for every Application Performance Analyzer instance defined in the same Application Performance Analyzer sysplex group must be coded identically, with the exception of the STCID, which might be unique.

Default: None.

ExpiryDays

Optional.

Specifies the default number of days a sample file should be retained. The user can override this when entering an observation request by over-typing the Retain File for (days) field in the Schedule New Measurement panel.

Security

Optional. (But Security=External is highly recommended.)

Specifies whether this started task should use Application Performance Analyzer's internal security scheme or use an external product, such as RACF. Specify Security=External if you use an external security product. To use Application Performance Analyzer's internal security scheme, you can specify Security=Internal or allow the default. (Application Performance Analyzer defaults to internal security.) You can also specify Security=None to run without security.

Default: Internal.

Note: The Security=Internal option is supported for backwards compatibility, but is not recommended. Similarly, you can specify the keyword COMPAT along with Security=External for backwards compatibility with an early version of the external security feature. The list below explains the available security options:

Security=Internal

Specifies that no external security will be used. This option is not recommended, particularly in sysplex environments.

Security=External

Specifies that external security will be used. This is the recommended option. It fully supports sysplex environments.

Security=(External,Compat)

Specifies that external security will be used. This option is for Application Performance Analyzer, Version 1.1 with PTF UK07430 applied for APAR PK10866 only. Do not use this option if you have not applied PTF UK07430, or if you have applied subsequent PTFs. (For external security with subsequent PTFs, use Security=External.) In this mode, the first node of a resource name is the STCID instead of the system name. For improved performance, migrate to the Security=External option.

Security=None

Specifies that no security will be used. This option is useful in test environments, in which security is not required.

Default: Internal

SecurityClassName

Optional.

Specifies an alternate class name will be used instead of FACILITY. This keyword is only used when Security=External is also specified; otherwise it is ignored.

Default: FACILITY

Rules for class name:

1. Must be between 1-8 characters, consisting of:
 - A-Z
 - 0-9
 - #, @, \$
2. Must contain at least one character from the following:
0-9, #, @, \$

SecurityHLQ

Optional.

Specifies an optional qualifier for security profiles to be placed in front of the sysplex system name when a SecurityClassName has been specified other than FACILITY. This can be a maximum of 17 characters and must follow the rules established for the class in the Class Descriptor Table (CDT). The contents of this field are not checked during startup.

If specified, it will be concatenated in front of the sysplex system name during security checks.

Default: None.

SecuritySuppMsg

Optional.

This option causes Application Performance Analyzer to either suppress or display messages issued as a result of RACROUTE calls made by Application Performance Analyzer. If not suppressed, messages will be displayed by RACROUTE via WTO.

Default: Y to suppress these messages.

MsgLevel

Optional.

Specifies the severity level of messages to be written to the log data sets. MsgLevel=I will write all messages, MsgLevel=W will write warning level and higher severity messages only. No SYSOUT data sets will be created for a sampling session with MsgLevel=W when only informational messages are produced.

Default: MsgLevel=I

DeleteOnJCLError

Optional.

Specifies whether multiple-step requests that get a JCL error in one of the steps should delete all the sample files and entries for the remaining steps. Specify DeleteOnJCLError=Y to have the entries for steps with a JCL error automatically deleted.

Default: DeleteOnJCLError=N

CONFIG SAMPLE statement

These settings pertain to the Sampling (measurement) process. The following settings might be specified:

BufSize

Optional.

Specifies the size that Application Performance Analyzer is to use as the blocksize when allocating a new sample file.

Default: 16,384 bytes.

SampleDur

Optional.

Specifies the default length of time that a measurement session collects sampling data. This value is used if the user omits a value when he creates measurement request. The value is specified in seconds. Normally, the user would enter this value.

Default: 60 seconds.

NSamples

Optional.

Specifies the default number of samples that a measurement session collects during the measurement session. This value is used if the user omits a value when he creates a measurement request. Normally, the user would enter this value.

Default: 1,000 samples.

MaxSampleRate

Optional.

Specifies the maximum rate at which a measurement session is permitted to sample. When the user submits a measurement request, the user's requested sampling rate is compared to this value for validity. The value is specified in samples per second.

Default: 1,000 samples per second.

MaxSampleSize

Optional.

Specifies the maximum number of samples that a measurement session can record. When the user submits a measurement request, the requested number of samples is compared to this value for validity. The value is specified in samples.

The maximum value you can specify is 175,000.

Default: 30,000 samples.

MaxMIPPercent

Optional.

Specifies the maximum percentage of MIPS (or machine instructions that a computer can execute in one second) that Application Performance Analyzer will be allowed to consume. The MaxMIPPercent parameter is used to ensure that the total number of MIPS used concurrently by Application Performance Analyzer observation requests does not exceed the specified percentage. It is recommended that this value be set somewhere between 10 and 50 percent. Typically, a lower value is used on a production machine and a higher value on a development machine.

Default: 25 percent.

SampleHLQ

Optional.

Specifies the high-level qualifier to be used when creating sample data sets. SampleHLQ must comply with the JCL rule for specifying a data set name. It can be no more than 17 characters long. Optionally, the keyword &USERID might be specified as the first qualifier of the SampleHLQ. At sample data set allocation time, the TSO userid of the user requesting the

sample will be substituted for this variable. The length of SampleHLQ is still restricted to 17 characters, including the keyword &USERID.

If this parameter is not specified, the value that you specify for HLQ on the CONFIG BASIC statement will be used.

Default: none.

DB2I Optional.

This is used to specify that the DB2 Intercept should be turned on. Specify DB2I=YES to turn on this feature. Turning this feature on makes the DB2+ data extractor available, which allows additional DB2 data to be collected.

Default: NO.

Note: Running Application Performance Analyzer measurements with the DB2+ data extractor turned on causes each DB2 call to be intercepted to collect additional data. This might have a small impact on the performance of the target address space. Care should be taken when using this feature with other products that also intercept DB2 calls because unpredictable results might occur. You might want to restrict its use in production environments. You can use Access Rules to restrict the DB2+ feature to specific users. See UseDB2Plus in “Access rule descriptions” on page 13.

DB2PlanName

Optional.

The plan name must be specified if you want Application Performance Analyzer to gather the necessary data to report plan and package BIND timestamps. You must also bind the Application Performance Analyzer DB2 plan to use this feature.

DB2EXPLAIN

Optional. Multiple DB2EXPLAIN entries are allowed.

The DB2EXPLAIN parameter must be specified to use the DB2 EXPLAIN feature in DB2 reports. (DB2+ must also be specified.)

The syntax for the DB2EXPLAIN keyword is as follows:

```
DB2EXPLAIN=(ssid,D|Q|A,Yes|No,Yes|No,dbname,tsname)
```

This entry is made up of from one to six positional parameters. The first parameter specifies a DB2 subsystem name. The next five positional parameters are optional.

The second parameter indicates the SQL STRING DELIMITER value specified in the application programming defaults panel (DSNTIPF) for the specified DB2 subsystem at installation. The values are as follows:

- D - Default
- Q - Quote (")
- A - Apostrophe (')

The default value is D. This value must match the DB2 subsystem installation value.

The third parameter indicates the USE FOR DYNAMICRULES value specified in the application programming defaults panel (DSNTIPF) for the specified DB2 subsystem at installation. The values are as follows:

- Y or Yes

- N or No

The default value is Yes. This value must match the DB2 subsystem installation value.

The fourth parameter specifies whether automatic PLAN_TABLE creation is required for the DB2 subsystem. This does not apply to DB2, Version 8, except when it is in COMPAT mode. A value of Y or Yes specifies that dynamic creation is required. The parameter can be omitted if dynamic creation is not required.

The fifth parameter specifies the database name to be used for automatic PLAN_TABLE creation. It only applies if the fourth parameter has a value of Y or Yes and there is a database name specified in the fifth parameter.

The DB2EXPLAIN keyword can be repeated for each DB2 subsystem that the customer wants to enable for EXPLAIN requests. To make it easier to enable EXPLAIN requests on all DB2 subsystems, an asterisk can be specified for the subsystem name. In its simplest form, a single entry can be specified as follows:

```
DB2EXPLAIN=(*)
```

This specifies that EXPLAIN requests can be run on all DB2 subsystems, with default values for SQL STRING DELIMITER and USE FOR DYNAMICRULES, and without automatic PLAN_TABLE creation.

If automatic PLAN_TABLE creation is required on all DB2 subsystems (for DB2, Version 7 or earlier, or Version 8 in COMPAT mode), and default values apply for SQL STRING DELIMITER and USE FOR DYNAMICRULES, then the following syntax can be used:

```
DB2EXPLAIN=(*,,Y)
```

If the same database name is to be used for automatic PLAN_TABLE creation on all DB2 subsystems, the following syntax can be used:

```
DB2EXPLAIN=(*,,Y,dbname)
```

If the same table space name is to be used for automatic PLAN_TABLE creation on all DB2 subsystems, the following syntax can be used:

```
DB2EXPLAIN=(*,,Y,dbname,tsname)
```

A maximum of 22 DB2 subsystems can be identified by 22 separate DB2EXPLAIN entries. If more than one entry is specified, and one of those has an asterisk for the DB2 subsystem name, then the started task will reject the configuration and fail to start.

DB2Qualifier

Optional.

This entry specifies the qualifier to be used for the PLAN_TABLE that is dedicated to the Application Performance Analyzer started task. If omitted, it defaults to the authorization ID of the started task. It should be used only if more than one Application Performance Analyzer started task is running in the same MVS image.

The primary purpose for DB2Qualifier is to prevent using the same PLAN_TABLE for more than one started task. If two started tasks are each processing an EXPLAIN request at the same time using the same

PLAN_TABLE, then one will have to wait while the other executes. Giving each started task its own qualifier prevents serializing the EXPLAIN requests among the started tasks.

IMSI Optional.

This is used to specify that the IMS Intercept should be turned on. Specify IMSI=YES to turn on this feature. Turning this feature on makes the IMS+ data extractor available, which allows additional IMS data to be collected.

Default: NO.

Note: Running Application Performance Analyzer measurements with the IMS+ data extractor turned on causes each IMS call to be intercepted to collect additional data. This might have a small impact on the performance of the target address space. Care should be taken when using this feature with other products that also intercept IMS calls because unpredictable results might occur. You might want to restrict its use in production environments. You can use Access Rules to restrict the IMS+ feature to specific users. See UseIMSPPlus in “Access rule descriptions” on page 13.

MLPALibs

Optional.

Application Performance Analyzer can find PLPA library names, but not MPLA library names. This parameter is used to specify up to 10 MPLA loadlib DSNs to be searched for MLPA modules. Add a new MLPALibs parameter for each data set name in the format:

MLPALibs=(your.dataset.name)

CONFIG LOGFILE statement

Logging records activity within the Application Performance Analyzer started task. Log data will always be written to SYSOUT, but you have the option of also writing this data to log data sets. LOGFILE settings allow you manage these data sets. The following settings might be specified:

LogToFile

Optional.

Specifies whether you want log data to be written to permanent data sets. YES and NO are the only valid values.

Default: NO.

Note: It is recommended that LogToFile be set to YES. The log can be used to help diagnose problems.

LogUNIT

Optional.

If you have specified LogToFile=YES, then LogUNIT allows you to specify whether you want the log data set to be allocated in Tracks or Cylinders. T and C are the only valid values.

Default: T.

LogPRIM

Optional.

If you have specified LogToFile=YES, then LogPRIM allows you to specify the size of each log data set that is allocated. No secondary specification is permitted; therefore, when the log data set has filled, it will be closed and a new log data set will be allocated.

Default: 15.

LogGDG Optional.

If you have specified LogToFile=YES, then LogGDG allows you to specify whether the log data sets will be allocated as GDGs or normal sequential data sets. If you specify LogGDG=YES, you must first create the Generation Data Group Index using an index name of *yourhlq.LOG* (or LogHLQ.LOG if you choose to use LogHLQ). YES and NO are the only valid values.

Default: NO.

LogHLQ Optional.

Specifies the high-level qualifier to be used when creating log data sets. LogHLQ must comply with the JCL rule for specifying a data set name. It can be no more than 17 characters long. A data set will only be created if LogToFile=YES is specified.

If this parameter is not specified, the value that you specify for HLQ on the CONFIG BASIC statement will be used.

Default: none.

Configuring external security (RACF)

This section describes how to use RACF, or a RACF-compatible external security product. When using an external security product, you must code Security=External in the CONFIG BASIC section in CAZCNFG0, see “Security” parameter in “CONFIG BASIC statement” on page 16.

Defining RACF profiles

When using external security, Application Performance Analyzer functions are protected using general resource profiles – defined in the default FACILITY class, or in a user-specified class that has been previously defined (it can be an existing class or a new class defined specifically for Application Performance Analyzer).

The profile name is specified as:

HLQ.MVS_system_name.action.object

- *HLQ* is an optional high-level qualifier for the resource profile
- *MVS_System_name* is the target or servicing system
- *Action* is the Application Performance Analyzer action or function to be performed
- *Object* identifies the entity to be accessed

HLQ

The optional high-level qualifier can be used to define generic rules for all members of a sysplex.

MVS system name

The MVS system name, as it applies to an observation, represents the system on which the observation was finally serviced. In a non-sysplex environment the system name is the same as the name of the system where the observation request was made.

In a sysplex environment, the intent of the system name is to control an observation request based on the target system or servicing system name, which prevents a user from adding an observation request that targets a job that will execute on a system to which that the user does not have access.

In determining the resource profile to be used for authorization, Application Performance Analyzer derives the system name based on the status of the observation, the action to be performed, and the sysplex options specified on the observation request. For observation requests that are to be scheduled or are in schedule status in which the target system is specified, the target system name is used. If the target system is specified as * or ALL, an attempt is made to evaluate the user's authority based on the current system name and the system names of the systems in the sysplex group – if authority cannot be determined definitively, the request is provisionally accepted and user authorization will be performed again when the request runs. For completed or active observations, the system name used will be the servicing system name. See “Examples” on page 27 for specific examples of how Application Performance Analyzer derives the system name.

Action

The action represents the type of access involved in the function being performed. The types of access are:

- VIEW to be able to view observations
- UPDATE to be able to update a scheduled observation
- DELETE to be able to delete an observation
- MEASURE.JOB for measuring a batch job
- MEASURE.STC for measuring a started task
- MEASURE.TSU for measuring TSO users
- USE.DB2PLUS to be able to request a DB2 PLUS measurement
- USE.IMSPLUS to be able to request an IMS PLUS measurement
- MONITOR.JOB for threshold-monitoring a batch job
- MONITOR.STC for threshold-monitoring a started task
- MONITOR.TSU for threshold-monitoring TSO users

By default, all users have access to VIEW, UPDATE and DELETE any observation they create, as well as monitor their own TSO userid. Therefore, profiles do not need to be specified for a user to have access to their own observations. All other types of access are protected by default and must have a profile written for any user to have access to them. Access is denied if RACF denies access or if RACF cannot find an applicable profile.

Objects

The types of objects are:

- User ID name or pattern
- Job Name or pattern

The User ID or Job Name pattern follows standard RACF syntax and can be a full name, a name pattern, a partial name with an *, or just an * to indicate any name is acceptable. See the *IBM z/OS Security Server RACF Security Administrator's Guide*, (SA22-7683), for coding details on generic profiles.

Profile names

For any authorization call, Application Performance Analyzer determines the profile name to be used based on the derived MVS system name, status, and action. The following table lists some of the values for these criteria and the resulting profile name in a sysplex group.

| Status | System name | Action | RACF profile names |
|-----------|------------------------------|--------------------|--|
| Complete | Servicing system name | New (line command) | <hlq.>service_system_name.VIEW.userid <hlq.>service_system_name.UPDATE.userid <hlq.>service_system_name.MEASURE.xxx.jobname <hlq.>service_system_name.MONITOR.xxx.jobname |
| | | Submit | <hlq.>service_system_name.VIEW.userid <hlq.>service_system_name.UPDATE.userid <hlq.>service_system_name.MONITOR.xxx.jobname |
| | | Report/ Select | <hlq.>service_system_name.VIEW.userid |
| | | Detail | <hlq.>service_system_name.VIEW.userid |
| | | Delete | <hlq.>service_system_name.DELETE.userid |
| | | Keep | <hlq.>service_system_name.UPDATE.userid |
| Scheduled | Target system name specified | New (line command) | <hlq.>target_system_name.VIEW.userid <hlq.>target_system_name.UPDATE.userid <hlq.>target_system_name.MEASURE.xxx.jobname <hlq.>target_system_name.MONITOR.xxx.jobname |
| | | Submit | <hlq.>target_system_name.VIEW.userid <hlq.>target_system_name.UPDATE.userid <hlq.>target_system_name.MEASURE.xxx.jobname <hlq.>target_system_name.MONITOR.xxx.jobname |
| | | Modify | <hlq.>target_system_name.VIEW.userid <hlq.>target_system_name.UPDATE.userid <hlq.>target_system_name.MEASURE.xxx.jobname <hlq.>target_system_name.MONITOR.xxx.jobname |
| | | Detail | <hlq.>target_system_name.VIEW.userid |
| | | Delete | <hlq.>target_system_name.DELETE.userid |
| | | Scheduled | * or all specified |
| | | Submit | <hlq.>current_system_name.VIEW.userid <hlq.>all_sysplex_system_names.MEASURE.xxx.jobname <hlq.>all_sysplex_system_names.MONITOR.xxx.jobname |
| | | Modify | <hlq.>current_system_name.VIEW.userid <hlq.>current_system_name.UPDATE.userid <hlq.>all_sysplex_system_names.MEASURE.xxx.jobname <hlq.>all_sysplex_system_names.MONITOR.xxx.jobname |
| | | Detail | <hlq.>originating_system_name.VIEW.userid |

| Status | System name | Action | RACF profile names |
|--------|-----------------------|--------------------|---|
| | | Delete | <hlq.>originating_system_name.DELETE.userid |
| Active | Servicing system name | New (line command) | <hlq.>service_system_name.VIEW.userid <hlq.>service_system_name.MEASURE. xxx.jobname <hlq.>service_system_name.MONITOR. xxx.jobname |
| | | Submit | <hlq.>service_system_name.VIEW.userid <hlq.>service_system_name.MEASURE. xxx.jobname <hlq.>service_system_name.MONITOR. xxx.jobname |
| | | Detail | <hlq.>service_system_name.VIEW.userid |
| | | Cancel | <hlq.>service_system_name.UPDATE.userid |
| | | RTM | <hlq.>service_system_name.VIEW.userid |

Examples

The following table provides examples of how a system name is derived. The examples assume the following:

- SYSTEMD is a development system
- SYSTEMP is a production system
- SYSTEMD and SYSTEMP are part of the same sysplex group
- There is one instance of Application Performance Analyzer running on SYSTEMD and one running on SYSTEMP, and both instances are part of the same Application Performance Analyzer sysplex group
- Users DEV1 and DEV2 have full access to all observations owned by DEV* users whose servicing system was SYSTEMD
- DEV1 and DEV2 have full access to creating observations for address spaces that execute on SYSTEMD
- When signed on to SYSTEMP, users DEV1 and DEV2 are limited to sampling their own TSO session and updating those observations
- Users DEV1 and DEV2 can view, keep, or delete any observation that was serviced by SYSTEMD
- User ADM1 is an administrator who has full access to all observations on all systems

| User ID | Action | Logon system | Target system | Servicing system | Comments |
|---------|------------------------------|--------------|---------------|------------------|--|
| DEV1 | Add new observation | SYSTEMD | SYSTEMD | n/a | Access granted based on target system. |
| DEV1 | Add new observation | SYSTEMD | SYSTEMP | n/a | Access denied based on target system. |
| DEV1 | Add new observation | SYSTEMD | * (any) | n/a | Access provisionally granted. Access will be checked again based on the system where the job finally executes. |
| DEV1 | Delete completed observation | SYSTEMD | SYSTEMD | SYSTEMD | Access granted based on servicing system. |

| User ID | Action | Logon system | Target system | Servicing system | Comments |
|---------|--|--------------|---------------|------------------|---|
| DEV1 | Delete completed observation | SYSTEMD | * (any) | SYSTEMP | Access denied based on servicing system. |
| DEV1 | Delete completed observation of DEV1 TSO session | SYSTEMD | SYSTEMP | SYSTEMP | Access granted. User is allowed to update observation that he owns. |
| DEV1 | Delete scheduled observation owned by DEV2 | SYSTEMD | * (any) | n/a | Access granted. Since the system name is not known, SYSTEMD (the logon system) will be used to determine the resource profile name. |
| DEV1 | Delete scheduled observation owned by DEV2 | SYSTEMD | SYSTEMD | n/a | Access granted. Target system used to determine the resource profile name. |
| DEV1 | Modify scheduled observation | SYSTEMD | SYSTEMD | n/a | Access granted based on target system. |
| DEV1 | Modify scheduled observation | SYSTEMD | * (any) | n/a | Access denied based on logon system and owner ADM1. |
| DEV1 | Add new observation | SYSTEMP | SYSTEMD | n/a | Access granted based on target system. |
| DEV1 | Add new observation | SYSTEMP | SYSTEMP | n/a | Access denied based on target system. |
| DEV1 | Add new observation to measure DEV1's active TSO session | SYSTEMP | SYSTEMP | SYSTEMP | Access granted. User is allowed to measure his own TSO session. |
| DEV1 | Delete completed observation owned by DEV2 | SYSTEMP | * (any) | SYSTEMP | Access granted based on servicing system. |

The following examples illustrate how to define RACF profiles based on the examples in the table above. The examples assume the following:

- The RACF group, ADMGRP, contains user IDs ADM1 and ADM2
- The RACF group, DEVGRP, contains user IDs DEV1 and DEV2
- SYSTEMD and SYSTEMP are part of the same sysplex group
- The RACF database is shared by SYSTEMD and SYSTEMP
- There is one instance of Application Performance Analyzer running on SYSTEMD and one instance of Application Performance Analyzer running on SYSTEMP

The following RACF commands define the resource profiles that are dependant on the MVS system name.

```
RDEFINE FACILITY SYSTEMD.VIEW.* UACC(NONE)
RDEFINE FACILITY SYSTEMD.UPDATE.* UACC(NONE)
RDEFINE FACILITY SYSTEMD.DELETE.* UACC(NONE)
RDEFINE FACILITY SYSTEMD.MEASURE.** UACC(NONE)
RDEFINE FACILITY SYSTEMD.MONITOR.** UACC(NONE)

RDEFINE FACILITY SYSTEMD.VIEW.DEV% UACC(NONE)
RDEFINE FACILITY SYSTEMD.UPDATE.DEV% UACC(NONE)
RDEFINE FACILITY SYSTEMD.DELETE.DEV% UACC(NONE)

RDEFINE FACILITY SYSTEMD.USE.DB2PLUS UACC(NONE)
RDEFINE FACILITY SYSTEMD.USE.IMSPLUS UACC(NONE)

RDEFINE FACILITY SYSTEMP.VIEW.* UACC(NONE)
RDEFINE FACILITY SYSTEMP.UPDATE.* UACC(NONE)
RDEFINE FACILITY SYSTEMP.DELETE.* UACC(NONE)
RDEFINE FACILITY SYSTEMP.MEASURE.** UACC(NONE)
RDEFINE FACILITY SYSTEMP.MONITOR.** UACC(NONE)

RDEFINE FACILITY SYSTEMP.VIEW.DEV1 UACC(NONE)
RDEFINE FACILITY SYSTEMP.VIEW.DEV2 UACC(NONE)
RDEFINE FACILITY SYSTEMP.UPDATE.DEV1 UACC(NONE)
RDEFINE FACILITY SYSTEMP.UPDATE.DEV2 UACC(NONE)
RDEFINE FACILITY SYSTEMP.DELETE.DEV1 UACC(NONE)
RDEFINE FACILITY SYSTEMP.DELETE.DEV2 UACC(NONE)

RDEFINE FACILITY SYSTEMP.USE.DB2PLUS UACC(NONE)
RDEFINE FACILITY SYSTEMP.USE.IMSPLUS UACC(NONE)
```

The following RACF commands permit users ADM1 and ADM2 to view, update, or delete any observations. The RACF commands also allow users ADM1 and ADM2 to measure or threshold-monitor any address space type in which SYSTEMD is the servicing system.

```
PERMIT SYSTEMD.VIEW.* CLASS(FACILITY) ID(ADMGRP) ACCESS(READ)
PERMIT SYSTEMD.UPDATE.* CLASS(FACILITY) ID(ADMGRP) ACCESS(READ)
PERMIT SYSTEMD.DELETE.* CLASS(FACILITY) ID(ADMGRP) ACCESS(READ)
PERMIT SYSTEMD.MEASURE.** CLASS(FACILITY) ID(ADMGRP) ACCESS(READ)
PERMIT SYSTEMD.MONITOR.** CLASS(FACILITY) ID(ADMGRP) ACCESS(READ)
```

The following RACF commands permit users DEV1 and DEV2 to view, update, or delete any observations owned by either DEV1 or DEV2 in which SYSTEMD is the servicing system. The RACF commands also allow users DEV1 and DEV2 to measure or threshold-monitor any address space type in which the target system or servicing system is SYSTEMD.

```
PERMIT SYSTEMD.VIEW.DEV% CLASS(FACILITY) ID(DEVGRP) ACCESS(READ)
PERMIT SYSTEMD.UPDATE.DEV% CLASS(FACILITY) ID(DEVGRP) ACCESS(READ)
PERMIT SYSTEMD.DELETE.DEV% CLASS(FACILITY) ID(DEVGRP) ACCESS(READ)
PERMIT SYSTEMD.MEASURE.** CLASS(FACILITY) ID(DEVGRP) ACCESS(READ)
PERMIT SYSTEMD.MONITOR.** CLASS(FACILITY) ID(DEVGRP) ACCESS(READ)
```

The following RACF commands permit all users to activate either DB2Plus or IMSPlus for observations in which the target system or servicing system is SYSTEMD.

```
PERMIT SYSTEMD.USE.DB2PLUS CLASS(FACILITY) ACCESS(READ)
PERMIT SYSTEMD.USE.IMSPLUS CLASS(FACILITY) ACCESS(READ)
```

The following RACF commands permit users ADM1 and ADM2 to view, update, or delete any observations. The RACF commands also allow users ADM1 and ADM2 to measure or threshold-monitor any address space type in which the servicing system is SYSTEMP.

Note: By default, all users can measure their own TSO sessions.

```
PERMIT SYSTEMP.VIEW.* CLASS(FACILITY) ID(ADMGRP) ACCESS(READ)
PERMIT SYSTEMP.UPDATE.* CLASS(FACILITY) ID(ADMGRP) ACCESS(READ)
PERMIT SYSTEMP.DELETE.* CLASS(FACILITY) ID(ADMGRP) ACCESS(READ)
PERMIT SYSTEMP.MEASURE.** CLASS(FACILITY) ID(ADMGRP) ACCESS(READ)
PERMIT SYSTEMP.MONITOR.** CLASS(FACILITY) ID(ADMGRP) ACCESS(READ)
```

The following RACF commands permit users ADM1 and ADM2 to activate either DB2Plus or IMSPlus for observation in which the target system or the servicing system is SYSTEMD.

```
PERMIT SYSTEMD.USE.DB2PLUS CLASS(FACILITY) ID(ADMGRP) ACCESS(READ)
PERMIT SYSTEMD.USE.IMSPLUS CLASS(FACILITY) ID(ADMGRP) ACCESS(READ)
```

Suggested profiles

Some basic RACF profiles and explanations are shown here:

1. RDEFINE FACILITY SYSTEMD.MEASURE.JOB.* UACC(READ)
Any user can measure jobs with any jobname when the servicing system is SYSTEMD.
2. RDEFINE FACILITY SYSTEMD.MEASURE.STC.* UACC(READ)
Any user is allowed to measure a started task when the servicing system is SYSTEMD.
3. RDEFINE FACILITY SYSTEMD.USE.DB2PLUS UACC(READ)
Any user is allowed to turn on the DB2+ data extractor when the servicing system is SYSTEMD.
4. RDEFINE FACILITY SYSTEMD.USE.IMSPLUS UACC(READ)
Any user is allowed to turn on the IMS+ data extractor when the servicing system is SYSTEMD.

External security when Application Performance Analyzer is in a sysplex group

When Application Performance Analyzer operates as a member of a sysplex group, it must use the same security method (Internal, External, or External (Compat)) as the other members of the group. The first Application Performance Analyzer member to initialize sets the security method, all other Application Performance Analyzer members that start must use the same method or they will fail. In addition, it is highly recommended that the External security method be used by all members. Internal and External (Compat) will not produce desired results and are only supported for backward compatibility.

For more information about external security, see Appendix B, “Sysplex External Security Conversion Aid,” on page 49.

Using the SecurityHLQ and SecurityClassName parameters

When using the SecurityHLQ parameter, the SecurityClassName parameter must also be specified. For example, using the parameters:

```
SecurityHLQ=CAZ
SecurityClassName=CAClass1
```

The VIEW rules for the parameters above would be written as:

```
RDEFINE CAClass1 CAZ.SYSTEMD.VIEW.* UACC(NONE)
PERMIT CAZ.SYSTEMD.VIEW.* CLASS(FACILITY) ID(ADMGRP) ACCESS(READ)
```

To allow VIEW access on all systems in the sysplex, the rule could be written as:

```
PERMIT CAZ.*.VIEW.* CLASS(FACILITY) ID(ADMGRP) ACCESS(READ)
```


The SecurityHLQ allows the rules to be written for all members of the sysplex rather than having to code a rule for each member.

For more information about external security, see Appendix B, “Sysplex External Security Conversion Aid,” on page 49.

Pre-allocating a checkpoint data set

In most cases, you can just let Application Performance Analyzer dynamically allocate and initialize the checkpoint file, which Application Performance Analyzer will try to do the first time the Application Performance Analyzer started task runs.

Your installation might have special requirements such as to what volume the checkpoint file is allocated, or under what SMS rules to allocate the checkpoint file.

Under these conditions, use the JCL provided in sample job CAZCHKPT in *hlq.SCAZSAMP* to pre-allocate a new checkpoint file prior to starting the Application Performance Analyzer started task for the first time. Application Performance Analyzer will detect the file and initialize it. To pre-allocate a checkpoint file, edit and submit member CAZCHKPT in *hlq.SCAZSAMP*. Consult the instructions in the sample job for more information.

The following rules apply to allocating the checkpoint file:

1. The file must reside on a direct access device.
2. It must not be allocated as a compressed format data set.
3. It must not be allocated as an extended-format data set.
4. The data set name (*yourhlq.checkpointDSN*) must conform to the rules specified in the “CheckpointDSN” parameter described in “CONFIG BASIC statement.” For more information, see “CONFIG BASIC statement” on page 16.

Updating the descriptive program attribution tables

Application Performance Analyzer comes with the descriptive program attribution (DPA) tables containing descriptions of known IBM modules. You can also create your own user DPA table to enter custom descriptions of load modules, control section names, and CICS transactions. This feature allows Application Performance Analyzer to report descriptions of customer programs or non-IBM system software modules.

DPA table entry elements

Each DPA table entry contains the following elements:

Program Name (keyword: NAME)

This can be specified as either a control section (CSECT) name or a load module name. In most cases, load module name is specified. Support for control section name provides for additional granularity. Wildcard matching of this field is supported. For example, DSN* could be specified to provide a single description for all DB2 system components. The matching algorithm will resort to a wildcard match only if it does not find a more exact name match.

Program Group (keyword: GRP)

A unique eight-character name defines a program group to which the program belongs. The supplied table uses a group name of CUSTOMER.

The GRP keyword only needs to be specified in a CAZDPAGN SUBGROUP definition. It must match a previously defined CAZDPAGN GROUP definition, and it specifies which GROUP the SUBGROUP belongs to.

Sub Group (keyword: SUBGRP)

A unique (within the sub groups) eight-character name defines a program sub group to which the program belongs. The supplied table uses a sub group name of CUSTOMER. SUBGRP must be specified on all CAZDPAGN entries for CSECTS, load modules, and CICS transactions.

Description (keyword: DESCRP)

This field contains a description of the load module or control section function, or CICS transaction. In CAZDPAGN GROUP or CAZDPAGN SUBGROUP entries, it contains the description for the GROUP or SUBGROUP.

CAZDPAGN macro

The CAZDPAGN macro is used to generate assembly statements which, when assembled, produce an object module defining a DPA table. Several keyword parameters are specified in each CAZDPAGN statement. There are also a few special CAZDPAGN statements at the beginning and end of a table, which use positional parameters. The positional parameter specifies the function code and is one of the following values: PROLOG, GROUP, SUBGROUP, and END. These positional parameters are described below:

Special CAZDPAGN statements with positional parameters

PROLOG

Generates prologue logic at the beginning of the CAZDPAGN module. This must be the first statement in the assembly source. The label field specifies the DPA table CSECT and load module name. This must be CAZUSR01. No keyword parameters are required.

GROUP

Defines a Program Group. Placement of these statements is immediately after the PROLOG statement. The Program Group name must be coded in the label field. One keyword parameter must be specified: DESCRP. The supplied sample table uses CUSTOMER for the group name.

Additional GROUPs can be defined, and reporting will include these GROUPs in the SYSTEM category of the CPU Usage reports. These GROUPs will only affect reporting if there are DPA entries belonging to the groups that have TYPE=SYSTEM coded.

SUBGROUP

Defines a sub group within the Program Group. Placement of these statements is immediately after the GROUP CAZDPAGN statement. The SUBGROUP name must be coded in the label field. One keyword parameter must be specified: DESCRP. The supplied sample table uses CUSTOMER for the sub group name.

Additional SUBGROUPs can be defined, and reporting will include these SUBGROUPs in the SYSTEM category of CPU Usage reports. These SUBGROUPs will only affect reporting if there are DPA entries belonging to the groups that have TYPE=SYSTEM coded.

END Used to mark the end of the CAZDPAGN statements in module CAZUSR01.

Standard CAZDPAGN keyword parameters

The standard CAZDPAGN entries are described here. These are entries with no positional parameter specified, and are used to define individual entries for load modules, CSECTS, or CICS transactions.

NAME

Defines a program (load module or CSECT) name and its descriptive information. NAME is used to specify a program name (or wildcard pattern), a range of program names or a CICS Transaction. A range of program names is specified in the format NAME=(*pgm1*,*pgm2*) where *pgm1* is the name (or wildcard pattern) at the start of the range and *pgm2* is the name (or wildcard pattern) at the end of the range. A CICS Transaction is specified in the same format, by specifying a TYPE=CICSTXN keyword. CICS Transactions can also be specified as a range. The keyword parameter DESCRP specifies the functional description.

SUBGRP

The SUBGRP keyword specifies the associated SUBGROUP name. For entries with TYPE=USER, this will not affect reporting, so coding SUBGRP=CUSTOMER is recommended. (Assuming the CUSTOMER SUBGROUP has been created as supplied in the sample CAZUSR01 module).

For system modules, where TYPE=SYSTEM has been coded, the SUBGRP keyword can specify a custom SUBGROUP, as long as it has been defined in a CAZDPAGN SUBGROUP statement previously.

TYPE Specifies the type. Valid values are: USER, SYSTEM, and CICSTXN. If this keyword is omitted, it will default to SYSTEM. Specify TYPE=USER if the module is an application module; it will be reported under the Application category.

Specify TYPE=SYSTEM if this is a system module; it will be reported under the System category.

Example of CAZDPAGN Macros

The following illustrates the structure of an assembly source member which defines a DPA table:

```
1 CAZUSR01 CAZDPAGN PROLOG
2 CUSTOMER CAZDPAGN GROUP,DESCRP='Customer Programs'
3 CUSTOMER CAZDPAGN SUBGROUP,GRP=CUSTOMER,DESCRP='Customer Programs'
4 CAZDPAGN NAME=SAMP*,DESCRP='CICS Samples',SUBGRP=CUSTOMER
  CAZDPAGN NAME=(APPL1*,APPL4*),
  DESCRP='Batch Applications',SUBGRP=CUSTOMER,TYPE=USER X
5 CAZDPAGN NAME=CICSDB2,SUBGRP=CUSTOMER,
  DESCRP='DB2 Test Program',TYPE=USER X
  CAZDPAGN NAME=MQSAMP1,SUBGRP=CUSTOMER,
  DESCRP='MQ Test Program',TYPE=USER X
6 CAZDPAGN NAME=TDB2,SUBGRP=CUSTOMER,
  DESCRP='DB2 Test Trans',TYPE=CICSTXN X
  CAZDPAGN NAME=MQS1,SUBGRP=CUSTOMER,
  DESCRP='MQ Test Trans',TYPE=CICSTXN X
7 CAZDPAGN END
8 END CAZUSR01
```

Notes:

1. This generates prologue code.
2. These statements define Program Groups.
3. These statements define the Sub Groups within the Program Group entries.

4. This is an example of a wildcard name. Any program name beginning with SAMP will be described as "CICS samples." In the event that a more exact name match is found, the description associated with that match will prevail.
5. This is an example of an exact name match entry.
6. This is an example of a CICS transaction definition.
7. This marks the end of the table of program entries.
8. This marks the end of the assembly file.

Implementation

A sample DPA table is supplied in the *hlq.SCAZSAMP* library as member CAZUSR01. Modify this member as required with your program entries then assemble and link this member using the JCL provided in *hlq.SCAZSAMP* in member CAZASMDP. The load module name must be CAZUSR01. If this load module is found in *hlq.SCAZAUTH*, it will be used first to look up program descriptions.

Modifying Application Performance Analyzer procedure for third party products

The REXX procedure CAZRХОEM in *hlq.SCAZEXEC* must be customized to provide access to third party repository products for source program mapping support. This requires detailed knowledge of the utility used to extract listings from the repository into a fixed block file with a 132 or 133 character record length. CAZRХОEM is invoked whenever a user specifies a repository of T for "Third party" on the Source Program Mapping panel, A01.

Edit the member CAZRХОEM in the *hlq.SCAZEXEC* and make the following changes:

1. Comment out the line:

```
QUEUE "CAZRХОEM"
```

2. Replace "SYS1.LINKLIB" in the following statement:

```
QUEUE "ISPEXEC LIBDEF ISPLLIB DATASET",
      "ID('SYS1.LINKLIB') STKADD"
```

with the data set name of the library that contains the utility to be run.

3. Replace "OEMUTIL" in the statement:

```
QUEUE "ISPEXEC SELECT CMD(OEMUTIL)"
```

with the name of the utility to be run.

4. Increase the space to more than the default allocation of one track, if needed, in the statement:

```
QUEUE "INPUT SPACE(1) TRACKS"
```

5. Modify the ALLOC statements as required for space and format. The following statements might require changes:

```
QUEUE "ALLOC SYSUT1 DSN(@repository@) SHR REUSE"
QUEUE "ALLOC SYSUT2 DSN(@extract@)" ,
      "NEW REUSE SPACE(10 10) TRACKS" ,
      "RECFM(F B A) LRECL(133) BLKSIZE(13300) DSORG(PS)"
QUEUE "ALLOC SYSIN DSN(@parms@) OLD"
QUEUE "ALLOC SYSPRINT DSN(@sysprint@)" ,
      "NEW REUSE SPACE(1 1) TRACKS" ,
      "RECFM(F B A) LRECL(121) BLKSIZE(12100)"
```

Change only the SPACE, RECFM, LRECL, and BLKSIZE parameters. The DSN will be filled in from the input supplied by the user when requesting a listing.

- @repository@ is the input data set that is the repository for the listings.
- @extract@ is the output of the utility and used as input to source program mapping.
- @parms@ contains any input parms required.
- @sysprint@ contains messages and control statement output from the utility, normally the SYSPRINT data set.

Starting the CAZO started task

The CAZO started task must be started for it to become operational. If you have not re-IPLed after making changes to parmlib as described in step 6 on page 10 of the task for making CAZO available, you can start CAZO by entering the command 'S CAZO' on the system console. When you re-IPL your system, the started task CAZO is automatically started.

Starting the IBM Application Performance Analyzer user interface

To start IBM Application Performance Analyzer, do the following steps:

1. Enter 'EX 'hlq.SCAZEXEC(CAZ@SPF)'' at the TSO/E command prompt.

```
----- TSO COMMAND PROCESSOR -----
ENTER TSO COMMAND, CLIST, OR REXX EXEC BELOW:
====> EX 'hlq.SCAZEXEC(CAZ@SPF)'
```

Alternatively, you can select APA from your ISPF Primary Option menu, as shown below:

```
Menu Utilities Compilers Options Status Help
-----
                          ISPF Primary Option Menu

Option ==>

0      Settings           Terminal and user parameters
1      View               Display source data or listings
2      Edit               Create or change source data
3      Utilities          Perform utility functions
4      Foreground         Interactive language processing
5      Batch              Submit job for language processing
6      Command            Enter TSO or Workstation commands
7      Dialog Test        Perform dialog testing
8      LM Facility        Library administrator functions
9      IBM Products       IBM program development products
10     SCLM               SW Configuration Library Manager
11     Workplace         ISPF Object/Action Workplace
APA    AppPerfAnalyzer    Application Performance Analyzer for z/OS
```

You will see the IBM Application Performance Analyzer Primary Options menu.

2. To begin an analysis session, choose one of the options from the menu and press Enter.

File View Navigate Help

R02: IBM APA for z/OS Observation Session List (CAZ0) Row 00001 of 00245
Command ==> _____ Scroll ==> CSR

| <u>Reqnum</u> | <u>Owned By</u> | <u>Description</u> | <u>Job Name</u> | <u>Date/Time</u> | <u>Samples</u> | <u>Status</u> |
|---------------|-----------------|--------------------|-----------------|------------------|----------------|---------------|
| 0882 | USER1 | id | MACHIND | Jan-3 18:12 | 50,000 | Ended |
| 0880 + | USER1 | ims | DONDRVRN | Jan-3 18:11 | 50,000 | STEPS |
| 0873 + | USER2 | | MQGET | Jan-3 18:11 | 60,000 | STEPS |
| 0872 + | USER2 | | MQPUT | Jan-3 18:10 | 60,000 | STEPS |
| 0871 + | USER2 | | CICSC22F | Jan-3 18:07 | 60,000 | REPEAT |
| 0868 + | USER2 | | VSAMJOB | Jan-3 18:08 | 60,000 | STEPS |
| 0867 | USER2 | | CICSC22F | Jan-3 17:55 | 60,000 | Ended |
| 0866 | USER2 | | DBJOB8 | Jan-3 17:56 | 100,001 | Cancel |
| 0865 | USER2 | | AMENT1 | Jan-3 17:54 | 4,567 | Ended |
| 0864 | USER2 | | AMENT1 | Jan-3 17:54 | 1 | Failed |
| 0863 | USER2 | | AMENTPL1 | Jan-3 17:52 | 1 | Failed |

Welcome to IBM APA for z/OS ISPF Version 1.100D. You are currently
connected to measurement task id CAZ0. Enter CONNECT for and alternate
connection, VERSION for version information, NEW to start a measurement.

Chapter 3. Verifying the installation

In this section, you activate the Application Performance Analyzer started task. You then perform a measurement using the supplied IVP program CAZIVP01. This job is designed to run for exactly 30 seconds. CAZIVP01 loops to consume CPU time, and it incrementally obtains blocks of memory as its execution progresses.

Beginning the started task

After you complete all of the customization tasks described in previous chapters, you can initiate the Application Performance Analyzer started task. Stop any Application Performance Analyzer started task currently running, then issue a START command on the system console specifying the name of the procedure you created.

For example:

```
S CAZ0
```

The Application Performance Analyzer started task initializes quickly. It should only be a few seconds before it is up and ready to accept measurement requests. Various messages are written to the JES message log during initialization. One of the first should appear as shown here:

```
CAZ0001I CAZ0-MAIN IBM APA for z/OS Version 1.100C starting.
```

The above message indicates execution has begun. The message in the following format is the one you need to see:

```
CAZ0100I CAZ0-MAIN (PLXF067) IBM APA for z/OS operating.
```

This indicates the Application Performance Analyzer started task has initialized successfully.

Logged messages

The Application Performance Analyzer started task logs informational messages to various destinations managed by JES. The following SDSF panel illustrates these output files:

| NP | DDNAME | StepName | ProcStep | DSID |
|----|-----------|----------|----------|------|
| | JESMSG LG | JES2 | | 2 |
| | JESJCL | JESYSMSG | | 3 |
| | JESYSMSG | JES4 | | 4 |
| | COMMANDS | SCAZ0 | | 102 |
| | LOGR | CAZ0 | | 103 |
| | MAIN | CAZ0 | | 104 |
| | LOAD | CAZ0 | | 105 |
| | CMDP | CAZ0 | | 106 |
| | URSS | CAZ0 | | 107 |

All critical messages will appear in JESMSG LG. If the started task fails to start successfully, look in JESMSG LG for messages reporting the failure. Messages written to other destinations are described here:

COMMANDS

Any commands processed by the started task (external or internal) are logged to this file.

LOGR, MAIN, LOAD, CMDP, URSS

Each of these represents a subtask attached by the Application Performance Analyzer started task and contains messages logged by that task. These are primarily informational messages and during normal operations you need not be concerned with the contents of these files. They can be useful during problem diagnosis.

Starting the ISPF dialog

The next step is to start the ISPF user interface. Start Application Performance Analyzer by selecting APA from the ISPF Primary Option menu, or by typing 'TSO CAZ@SPF' at the TSO/E command prompt.

You should see a panel like the one shown below.

```
File View Navigate Help
-----
R02: IBM APA for z/OS Observation Session List   (CAZ0) Row 00001 of 00002
Command ==>                                     Scroll ==> CSR
ReqNum  Owned By  Description  Job Name  Date/Time  Samples  Status
-----
+-----+
| Welcome to Application Performance Analyzer/ISPF Version 1.1. You are |
| currently connected to measurement task id CAZ0.                     |
| Enter CONNECT for an alternate connection, VERSION                  |
| for additional version information.                                   |
+-----+
```

The screen should have displayed a message indicating that you are connected to the measurement task. If this has not appeared, enter a CONNECT command specifying your Application Performance Analyzer instance identifier. For example:

```
==> CONNECT CAZ0
```

Entering a measurement request

Assuming this worked, you have finished the installation. Application Performance Analyzer is ready to accept measurement requests. The panel illustrated above shows a list of Application Performance Analyzer observation sessions and is the dialog from which you access all other Application Performance Analyzer dialogs and reports. Since no measurement requests have been made yet, the list is empty. The next step is to perform the first measurement. From this screen, enter the NEW command.

```
==> NEW
```

Application Performance Analyzer will open a dialog screen into which you specify the measurement parameters. This is shown here:


```

File View Navigate Help
-----
R03: Schedule New Measurement          Row 00001 of 00019
Command ==>                          Scroll ==> CSR
  1. Job Information      3. Multi Steps      5. CICS Txns      7. Schedule
  2. Options              4. Active Jobs      6. Sysplex        8. Sched Options

Panel 1. Job Information

Job Name/Pattern . . _____

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 . . ____ Retain file for (days) . 20

```

Now enter the following input to this panel. This will create a measurement request for a supplied installation verification job named CAZIVP01.

- Job Name/Pattern, enter: CAZIVP01
- Step No, enter: 1
- Description, enter: IVP 01 (or any description you want)
- Number of Samples, enter: 6000
- Duration of session, enter: 30

Now press the ENTER key. Assuming you did not make any errors in the input, you will see the following message:

Input more data or ENTER to submit

Press the ENTER key again and your request will be accepted. You will be returned to the observation session list screen. The list will now contain the request you just made.

```

File View Navigate Help
-----
R02: IBM APA for z/OS Observation Session List          (CAZ0) Request submitted OK
Command ==>                                          Scroll ==> CSR
ReqNum  Owned By  Description  Job Name  Date/Time  Samples  Status
0001    USER1    IVP 01     CAZIVP01  Jul-20 9:35  6,000   Sched

```

This shows that the request is scheduled. The Application Performance Analyzer started task will automatically begin the measurement when it detects execution of the job named CAZIVP01. Now we will submit the job. The JCL for CAZIVP01 is in *hlq.SCAZSAMP* in the member CAZIVPJ. Submit this JCL (after making any necessary modifications).

When the job begins execution, the status shown in the observation session list screen will show *Active*, and the value under the *Samples* heading will display the actual number of samples completed. This will refresh dynamically each time you press the ENTER key.

```

File View Navigate Help
-----
R02: IBM APA for z/OS Observation Session List (CAZ0)          Row 00001 of 00246
Command ==>>> _____ Scroll ==>>> CSR

Regnum  Owned By  Description      Job Name  Date/Time      Samples  Status
-----
0001    USER1    my userid       MACHIND   Jun-11  6:51         43  Active
-----

```

Upon completion of the job, the status will change to *Ended*.

```

File View Navigate Help
-----
R02: IBM APA for z/OS Observation Session List (CAZ0)          Row 00001 of 00246
Command ==>>> _____ Scroll ==>>> CSR

Regnum  Owned By  Description      Job Name  Date/Time      Samples  Status
-----
0001    USER1 id      MACHIND   Jun-10  19:03         6,000  Ended
-----

```

Displaying performance analysis reports

With completion of a measurement, you are now ready to display performance analysis reports. The subject of performance analysis reports and their interpretation is beyond the scope of this manual, but we will demonstrate this here just to complete the installation verification.

To enter the reporting facility, enter the R line command on the measurement request you would like to report on. You will then see a report selection screen like the one shown here.

```

File View Navigate Help
-----
R01: IBM APA for z/OS Performance Reports (0001)          Row 00001 of 00007
Command ==>>> _____ Scroll ==>>> CSR

Select a category from  __A Admin/Miscellaneous      __I IMS Measurement
the list to the right  __S Statistics/Storage       __E CICS Measurement
to view the available  __C CPU Usage Analysis       __F DB2 Measurement
reports in the selection __D DASD I/O Analysis        __Q MQ Measurement
list below.            __W CPU WAIT Analysis        __G Coupling Facility

-----

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

__S01 Session Statistics          __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

```

From this panel, you can select from an array of performance analysis reports. As an example, select report S05 (Memory Usage Timeline). You can position the cursor on the S05 item and press enter, or you can type S05 directly on the command line. You should see a screen like the one shown here:

```

File View Navigate Help
-----
S05: Memory Usage Timeline (0001)          Row 00001 of 00015
Command ==>                               Scroll ==> CSR
SEQN  Seconds  Storage  <---2650K-----5830K-->
      *...+. ...+. ...+. ...+. ...+. ...+. ...+. ...+. ...*
0001  1.857  2924K  ****
0002  1.935  3124K  *****
0003  1.935  3324K  *****
0004  1.944  3524K  *****
0005  1.927  3724K  *****
0006  1.935  3928K  *****
0007  1.934  4128K  *****
0008  1.942  4328K  *****
0009  1.929  4528K  *****
0010  1.936  4728K  *****
0011  1.935  4932K  *****
0012  1.934  5132K  *****
0013  1.934  5332K  *****
0014  1.934  5532K  *****
0015  1.905  5732K  *****

```

Ending the Application Performance Analyzer started task

During normal operation of Application Performance Analyzer, you will typically initiate the started task(s) after an IPL and it will remain active. Stopping (and restarting) the started task is necessary, however, to apply any configuration setting changes. Stop the task simply by entering the STOP command on the operator console:

```
P CAZ0
```

At termination, you will see the following messages.

```

CAZ0490I CAZO-MAIN Application Performance Analyzer is shutting down.
CAZ1190I CAZO-CMDP Command processor stopping.
CAZ1199I CAZO-CMDP Command processor terminated.
CAZ0499I CAZO-MAIN Application Performance Analyzer is terminating.
CAZ1090I CAZO-LOGR Logger stopping.
CAZ1099I CAZO-LOGR Logger terminated.
IEF404I CAZO - ENDED - TIME=14.11.45
IEF352I ADDRESS SPACE UNAVAILABLE
$HASP395 CAZO ENDED

```

The IEF352I message is reported because MVS marks the address space as unavailable. This is because Application Performance Analyzer creates a global linkage entry. This is normal for any program that creates a global linkage entry.

Chapter 4. Customizing Application Performance Analyzer for use with DB2 Universal Database

This chapter describes the tasks for configuring the optional DB2 Universal Database component. These tasks are only required if you want Application Performance Analyzer to gather the necessary data to report plan and package BIND timestamps.

We recommend that you work closely with a DB2 UDB administrator to complete the following tasks:

1. "Deciding which authorization ID to use"
2. "Binding a DB2 package and plan"
3. "Enabling DB2 EXPLAIN – Creating a PLAN_TABLE" on page 44
4. "Providing DB2 authorization" on page 45
5. "Updating the Application Performance Analyzer started task" on page 45
6. "Updating the started task configuration settings" on page 45

Deciding which authorization ID to use

Before running the tasks described in the following sections, you must choose a unique *authid*. The *authid* is the same *authid* that you defined for the Application Performance Analyzer RACF STARTED class. You must use the same *authid* to bind a DB2 plan (see "Binding a DB2 package and plan") and authorize the plan name (see "Providing DB2 authorization" on page 45).

Binding a DB2 package and plan

To bind a DB2 UDB package and plan, do the following steps:

1. Edit member CAZBIND in your *hlq.SCAZSAMP* library. This sample job requires you to have knowledge of the DB2 UDB subsystem. See the instructions in the sample job for more information.
2. The default package name used in the first BIND statement above is CAZPACK1. You can change this name to match your site requirements. If you do so then you must also change this value in the BIND PLAN statement.

The default plan name used in the statement is CAZPLAN1. You can change this name to match your site's requirements. If you do so then you must also change the plan name specified in the keyword DB2PlanName, in member CAZCNFG0 in the *hlq.SCAZSAMP* library.

Repeat these BIND operations if you are binding this plan to multiple DB2 subsystems.

Note: You must use the same plan name on all DB2 subsystems.

3. Submit the sample job. You will get a return code of 0 if the job runs correctly.

Enabling DB2 EXPLAIN – Creating a PLAN_TABLE

To use dynamic EXPLAIN with the Application Performance Analyzer UDB component, Application Performance Analyzer started tasks must have access to a PLAN_TABLE. Bypass this section if you do not use the EXPLAIN feature.

1. Edit and submit job CAZPLANT in *hlq.SCAZSAMP* to create a PLAN_TABLE.
2. The qualifier for this PLAN_TABLE defaults to the authorization ID of the started task. You can override this default by changing the DB2Qualifier setting in the configuration file. See *DB2Qualifier* under “CONFIG SAMPLE statement” on page 19.

The CREATE statement in job CAZPLANT is in the 49-column format compatible with DB2, Version 6. The 51-column format (for DB2, Version 7) and the 58-column format for (DB2, Version 8) can be used instead, but the EXPLAIN feature will only make use of the first 49 columns when reporting the results of an EXPLAIN.

You can specify the database and tablespace name in which the PLAN_TABLE will be created by adding the appropriate lines to the CREATE statement.

The CREATE statement applies if the escape character the DB2 subsystem is the quote character ("). However, if the DB2 subsystem has been installed with the quote character as the SQL string delimiter, then the escape character is the apostrophe ('). In this case, the quotes in the CREATE statement must be changed to apostrophes.

Considerations in using DB2 EXPLAIN

1. You must select DB2+ in order for Application Performance Analyzer to capture the required qualification information. It must be done after the SQL call has completed, when the DB2 control blocks are stable. If DB2+ is not selected, then EXPLAIN will not be available.
2. There is a limit of 15000 bytes on the target SQL statement size. The sample file LRECL dictates this limit.
3. A DB2 restriction prevents some SQL statements from being the subject of dynamic EXPLAIN. UPDATE or DELETE statements with a WHERE CURRENT OF clause are some of the prevented SQL statements.
4. Application Performance Analyzer needs to access catalog information for the target SQL statement. If any of the information changed since the sample file was created, then the EXPLAIN might not be correct. In the case of a static SQL statement of 4000 bytes or greater, the statement itself might have changed and might no longer match the statement in the sample file.
5. When you enable the automatic PLAN_TABLE creation option, the started task will automatically create a PLAN_TABLE if none exists for the qualifier of a particular target SQL statement. Depending on the usage of the EXPLAIN feature, the result could be that many tables are created.

Note: This option only applies to DB2 versions 6 and 7.

To avoid creating a large number of tables, you can explicitly create the plan tables for those qualifiers for which you want EXPLAIN support enabled, and specify NO, in the automatic PLAN_TABLE creation option of the DB2EXPLAIN entry for the DB2 subsystem.

Providing DB2 authorization

The authorization ID of the started task must have SYSADM authority if you want to use the DB2 EXPLAIN feature. Having SYSADM authority allows the started task to perform functions such as setting the CURRENT SQLID (or SCHEMA) to the qualifier for a target SQL statement. You can use the following SQL statement to grant SYSADM privilege:

```
GRANT SYSADM TO authid
```

Otherwise, grant EXECUTE authority on the plan CAZPLAN1 to the authorization ID of the Application Performance Analyzer started task. You can use the following SQL statement to grant this privilege:

```
GRANT EXECUTE ON PLAN CAZPLAN1 TO authid
```

Note: CAZPLAN1 is the default plan name. If you have chosen to use a different plan name, then replace CAZPLAN1 with the plan name that was used to BIND the Application Performance Analyzer DB2 Plan.

Updating the Application Performance Analyzer started task

Add a DSN for the DB2 load library (for example, *db2hlq.SDSNLOAD*) to the STEPLIB in the Application Performance Analyzer started task JCL (member CAZ0 in *hlq.SCAZSAMP*). This load library can be at either version 7 or version 8, but must contain the following load modules: DSNALI, DSNTIAR, and alias DSNHLI2.

Updating the started task configuration settings

1. Edit member CAZCNFG0 in library *hlq.SCAZSAMP*.
2. Find the CONFIG SAMPLE statement, then specify the DB2 plan name in the DB2PlanName parameter.
3. Restart your Application Performance Analyzer started task CAZ0 to make the change effective.

Appendix A. Stopping the IBM Application Performance Analyzer started tasks

To stop the Application Performance Analyzer started tasks, do the following steps:

1. Enter the command P CAZ0 from the system console.
2. If P CAZ0 fails to stop the started task, retry the command.

Appendix B. Sysplex External Security Conversion Aid

In order to use the sysplex security enhancements, you must select the Application Performance Analyzer External Security option. As part of these enhancements, the naming convention for the RACF (or equivalent) security profiles has changed.

Note: The changes apply to all External Security option users in both sysplex and non-sysplex environments.

Currently, the RACF general resource profiles use the Application Performance Analyzer started task identifier (STCID) for a prefix. The sysplex enhancements require that the profile names use the sysplex system names of the target or servicing systems as the prefix.

A REXX utility program, CAZRACON in library *hlq.SCAZEXEC*, is provided to aid in the conversion of the external security profiles. This utility supports RACF environments only. CAZRACON is a REXX program and can be run in TSO foreground or in a TSO batch job. Sample JCL is provided below. Using the existing RACF profiles as a base, CAZRACON generates the JCL and RACF commands needed to create new RACF profiles using the sysplex naming conventions. CAZRACON must be run once for each Application Performance Analyzer instance or STCID.

Sample JCL

```
//jobname JOB <job parameters>
//*
//* Run CAZRACON to convert Application Performance
//* Analyzer RACF profiles for the sysplex
//* security enhancements.
//*
//TSO      EXEC PGM=IKJEFT01,DYNAMNBR=20
//SYSEXEC DD DISP=SHR,DSN=hlq.SCAZEXEC
//SYSTSPRT DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSTSIN DD *
           CAZRACON STCID=CAZ0 SYSNAMES=(SYSA,SYSB) CLASS=CAZCLASS
/*
//
```

CAZRACON syntax

```
CAZRACON STCID=stcid
          SYSNAMES=system_name | SYSNAMES=(system_name,system_name,....)
          DSN=output_dataset_name
          CLASS=RACF_class
```

Parameters

STCID=*stcid*

- Required.
- Specifies the Application Performance Analyzer started task identifier to be converted.

SYSNAMES=*system_name* | **SYSNAMES**=(*system_name,system_name,....*)

- Required.
- Specifies the target sysplex system name, or list of system names, for this Application Performance Analyzer instance. Up to 32 system names can be specified.
- In a non-sysplex environment, the system name is the same as the name of the system where the observation request was made.

DSN=*output_dataset_name*

- Optional.
- Default: *tsoprefix*.CAZRACF.COMMANDS
- Fully qualified data set names must be in quotes.
- If not specified, the default data set will be created.
- If specified and the specified data set does not exist, the data set will be created.
- If the specified data set is a PDS, it must exist and the member name must be included. The member can be an existing or a new member.

CLASS=*RACF_class*

- Optional.
- Default: FACILITY
- Specifies a RACF class for the new profiles. Application Performance Analyzer now provides the option for a user-specified class for the external security profiles (see the `SecurityClassName` parameter in the “CONFIG BASIC statement” on page 16). This parameter allows the user to migrate the new profiles from the FACILITY class to the user-specified class in the CONFIG settings.

The CAZRACON utility will extract all the RACF profiles that contain the specified STCID prefix. From the extracted information, RACF RDEFINE commands are generated for defining the corresponding sysplex profiles. More specifically, for each extracted profile, new profiles are created with the system names replacing the STCID as the first qualifier. A profile is created for each sysname specified.

The FROM parameter is used on the RDEF command to copy the attributes of the old profile, including the authorization list.

Note: Be aware that the RDEF command with the FROM parameter does not guarantee that the new profile is identical to the old profile, minor differences can occur. See the *IBM z/OS Security Server RACF Command Language Reference*, (SA22-7687), for details.

RACF RDELETE commands are also generated to delete the old profiles. The RDEL commands are written as comments. Remove the comment characters `/*` before you submit the job.

Depending on the sysplex installation, duplicate RDEF commands can be generated for a specific system name. This can happen when the utility is run for multiple Application Performance Analyzer instances in the sysplex, and two or more of the instances have common target systems. In this case, you must decide which RDEF commands best suit your sysplex environment. Additionally, you might need to alter the authorization lists.

Examples

Suppose the sysplex consists of two systems, SYSA and SYSB, with an Application Performance Analyzer instance on each system, CAZA and CAZB, respectively. Both systems are valid targets for both CAZA and CAZB.

The existing RACF profiles in the FACILITY class are:

```
CAZA.VIEW.USER123
CAZA.MEASURE.JOB.JOB123
```

```
CAZB.VIEW.USER123
CAZB.MEASURE.JOB.JOB123
```

When the CAZRACON utility is run for CAZA with the following command,

```
CAZRACON STCID=CAZA
          SYSNAMES=(SYSA,SYSB)
          CLASS=CAZCLASS
          DSN=CAZA.COMMANDS
```

the following output is written to data set *tsoprefix.CAZA.COMMANDS*:

```
(INSERT JOB CARD)
/*
/* Create RACF Profiles for Sysplex security enhancements.
/*
//TSO      EXEC PGM=IKJEFT01,DYNAMNBR=20
//SYSTSPRT DD  SYSOUT=*
//SYSPRINT DD  SYSOUT=*
//SYSUDUMP DD  SYSOUT=*
//SYSTSIN  DD  *
RDEF CAZCLASS SYSA.VIEW.USER123 FROM(CAZA.VIEW.USER123) -
      FCLASS(FACILITY)
RDEF CAZCLASS SYSB.VIEW.USER123 FROM(CAZA.VIEW.USER123) -
      FCLASS(FACILITY)

RDEF CAZCLASS SYSA.MEASURE.JOB.JOB123 FROM(CAZA.MEASURE.JOB.JOB123) -
      FCLASS(FACILITY)
RDEF CAZCLASS SYSB.MEASURE.JOB.JOB123 FROM(CAZA.MEASURE.JOB.JOB123)-
      FCLASS(FACILITY)

/* RDEL FACILITY CAZA.VIEW.USER123
/* RDEL FACILITY CAZA.MEASURE.JOB.JOB123
/*
//
```

When the utility is run for CAZB with the following command,

```
CAZRACON STCID=CAZB
          SYSNAMES=(SYSA,SYSB)
          CLASS=CAZCLASS
          DSN=CAZB.COMMANDS
```

the following output is written to data set *tsoprefix.CAZB.COMMANDS*:

```
(INSERT JOB CARD)
/*
/* Create RACF Profiles for Sysplex security enhancements.
/*
//TSO      EXEC PGM=IKJEFT01,DYNAMNBR=20
//SYSTSPRT DD  SYSOUT=*
//SYSPRINT DD  SYSOUT=*
//SYSUDUMP DD  SYSOUT=*
//SYSTSIN  DD  *
RDEF CAZCLASS SYSA.VIEW.USER123 FROM(CAZB.VIEW.USER123) -
      FCLASS(FACILITY)
```

```
RDEF CAZCLASS SYSB.VIEW.USER123 FROM(CAZB.VIEW.USER123) -
    FCLASS(FACILITY)

RDEF CAZCLASS SYSA.MEASURE.JOB.JOB123 FROM(CAZB.MEASURE.JOB.JOB123) -
    FCLASS(FACILITY)
RDEF CAZCLASS SYSB.MEASURE.JOB.JOB123 FROM(CAZB.MEASURE.JOB.JOB123)-
    FCLASS(FACILITY)

/* RDEL FACILITY CAZB.VIEW.USER123
/* RDEL FACILITY CAZB.MEASURE.JOB.JOB123
/*
//
```

Notice that there are RDEF commands in each output data set for the same profiles from two different sources. If the source profiles have the same authorization lists, then either can be used; otherwise, you need to determine which commands to use and whether any changes to the authorization lists are required.

Appendix C. Applying service APAR or PTF

This section describes how to apply updates to IBM Application Performance Analyzer. To use the maintenance procedures effectively, you must install IBM Application Performance Analyzer with SMP/E before doing the maintenance procedures below.

What you receive

If you report a problem with IBM Application Performance Analyzer to your IBM Support Center, you might receive a tape containing one or more Authorized Program Analysis Reports (APARs) or Program Temporary Fixes (PTFs) that were created to solve your problem.

You might also receive a list of prerequisite APARs or PTFs, which you must apply to your system before applying the current APAR. These prerequisite APARs or PTFs might relate to IBM Application Performance Analyzer or any other licensed product you have installed, including z/OS.

Checklist for applying an APAR or PTF

The following checklist describes the steps and associated SMP/E commands to install the APAR or PTF:

- Step 1. Prepare to install the APAR or PTF
- Step 2. Receive the APAR or PTF (SMP/E RECEIVE)
- Step 3. Review the HOLDDATA
- Step 4. Accept previously applied APARs or PTFs (optional) (SMP/E ACCEPT)
- Step 5. Apply APAR or PTF (SMP/E APPLY)
- Step 6. Test APAR or PTF
- Step 7. Accept APAR or PTF (SMP/E ACCEPT)

Step 1. Prepare to install APAR or PTF

Before you start to install an APAR or PTF, do the following steps:

1. Create a backup copy of the current IBM Application Performance Analyzer libraries. Save this copy of IBM Application Performance Analyzer until you have completed installing the APAR or PTF and you are confident that the service runs correctly.
2. Research each service tape through the IBM Support Center for any errors or additional information. Note all errors on the tape that were reported by APARs or PTFs and apply the relevant fixes. You should also review the current Preventive Service Planning (PSP) information.

Step 2. Receive the APAR or PTF

Receive the service using the SMP/E RECEIVE command from either the SMP/E dialogs in ISPF or by using a batch job similar to CAZWRECV in *hlq.SCAZSAMP*.

Step 3. Review the HOLDDATA

Review the HOLDDATA summary reports for the APAR or PTF. Follow any instructions described in the summary reports.

Step 4. Accept a previously applied APAR or PTF (optional)

If there is any APAR or PTF that you applied earlier but did not accept, and the earlier APAR or PTF is not causing problems in your installation, accept the applied service from either the SMP/E dialogs in ISPF or by using a batch job.

Accepting the earlier service allows you to use the SMP/E RESTORE command to return to your current level if you encounter a problem with the service that you are currently applying. You can do this either from the SMP/E dialogs in ISPF or by using a batch job similar to CAZWACPT in *hlq.SCAZSAMP*.

Step 5. Apply the APAR or PTF

We recommend that you first use the SMP/E APPLY command with the CHECK operand. Check the output; if it shows no conflict, rerun the APPLY command without the CHECK operand. This can be done from the SMP/E dialogs in ISPF or by using a batch job similar to CAZWAPLY in *hlq.SCAZSAMP*.

Step 6. Test the APAR or PTF

Thoroughly test your updated IBM Application Performance Analyzer. Do not accept an APAR or PTF until you are confident that it runs correctly.

Step 7. Accept the APAR or PTF

We recommend that you first use the SMP/E ACCEPT command with the CHECK operand. Check the output; if it shows no conflict, rerun the ACCEPT command without the CHECK operand. You can do this either from the SMP/E dialogs in ISPF or by using a batch job similar to CAZWACPT in *hlq.SCAZSAMP*.

Appendix D. Accessibility

Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use software products successfully. The accessibility features in z/OS provide accessibility for IBM Application Performance Analyzer.

The major accessibility features in z/OS enable users to:

- Use assistive technology products such as screen readers and screen magnifier software
- Operate specific or equivalent features by using only the keyboard
- Customize display attributes such as color, contrast, and font size

Using assistive technologies

Assistive technology products work with the user interfaces that are found in z/OS. For specific guidance information, consult the documentation for the assistive technology product that you use to access z/OS interfaces.

Keyboard navigation of the user interface

Users can access z/OS user interfaces by using TSO/E or ISPF. Refer to the following publications:

- *z/OS TSO/E Primer*
- *z/OS TSO/E User's Guide*
- *z/OS ISPF User's Guide Volume 1*

These guides describe how to use TSO/E and ISPF, including the use of keyboard shortcuts or function keys (PF keys). Each guide includes the default settings for the PF keys and explains how to modify their functions.

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Glossary

A

abend. Abnormal end of a task. The termination of a task before its completion because of an error condition that cannot be resolved by recovery facilities while the task is executing.

access plan. The set of access paths that are selected by the optimizer to evaluate a particular SQL statement.

APF. Authorized program facility. A facility that permits the identification of programs that are authorized to use restricted functions.

authorized program. A system program or user program that is allowed to use restricted functions.

B

batch. A processing mode in which a predefined series of actions are performed with little or no interaction between the user and the system.

bind. To convert the output from the SQL compiler to a usable control structure.

C

checkpoint. A place in a program at which a check is made, or at which data is recorded, to provide real-time monitoring.

checkpoint data set. A data set that contains checkpoint records.

connection authorization exit. An exit that approves or disapproves requests for a connection to another program.

D

data set. The major unit of data storage and retrieval, consisting of a collection of data in one of several prescribed arrangements and described by control information to which the system has access.

dynamic. Pertaining to events that occur at run time or during processing.

E

explain. To capture detailed information about the access plan that was chosen by the SQL compiler to resolve an SQL statement.

I

ISPF. Interactive system productivity facility. An IBM licensed program that serves as a full-screen editor and dialog manager.

J

JCL. Job control language. A control language that is used to identify a job to an operating system and to describe the job's requirements.

M

monitor. To collect data about an application from the running agents that are associated with the application.

P

panel. An area of the screen that displays formatted information and that can include entry fields.

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