Setup and Installation

Overview

This chapter provides information on how to configure the Cisco Media Gateway Controller (MGC) for using the Billing and Measurements Server (BAMS), how to uninstall previous BAMS software versions, and how to install and configure new versions of BAMS.

Caution Before upgrading to a new BAMS release, ensure that you have backed up the latest configuration and data files. For more information, see the "System Backup and Recovery" section on page 1-3.

Upgrading to BAMS Release 3.20

If this is a first-time BAMS installation, follow the installation procedure in this chapter. If you are currently operating a version of BAMS prior to Release 3.20, you need to follow a migration procedure. Proceed to Appendix B, "Upgrading to BAMS Release 3.20."

Configuring the Cisco MGC for Using BAMS

You must edit your dmprSink.dat file to set the interval to dump the call detail records (CDRs) to the spool directory every 4 minutes. To do so, use this procedure:

Step 1 `cd /opt/CiscoMGC/var`

Step 2 `mkdir bam`

Step 3 `chmod 777 bam`

Step 4 Open a vi session:
`vi /opt/CiscoMGC/etc/dmprSink.dat`

Step 5 Edit it as follows:
`1 "callDetail" bin "cdr" "../var/log" "../var/bam" 8000 0 4`

Caution The last entry in the field in the preceding line (that is, "4") is the MGC CDR dump interval (in minutes). This value must be lower than and not equal to the BAMS measurements file interval (interval-minutes parameter) set in the Node Parameters table (see "Updating the Node Parameters Table" section on

page 5-10 for details). If the Cisco MGC file interval is greater than or equal to the BAMS measurement interval, more than one measurement interval could be crossed in a single input file. If this happens, a COR206 major alarm occurs. The end result is the loss of measurement data. This loss of data causes the ACC task to generate an ACC222 minor alarm.

Caution When upgrading the Cisco MGC software from release 7.4(11) or 7.4(12) to release 9.3(2) or 9.4(1) in a configuration that includes Cisco BAMS, you must edit your dmprSink.dat file as described in the preceding Steps 4 and 5. You must edit the dmprSink.dat file before you restart the PGW.

Step 6 Open another vi session on the XECfgParm.dat:

```
vi /opt/CiscoMGC/etc/XECfgParm.dat
```

Step 7 Verify the correct CDB settings:

a. `engine.CDRtimeStamp = M`

b. `engine.CDRmessageTypes = "1010,1020,1030,1040,1050,1060,1070,1071,1080"`

Note The time stamp must be in milliseconds (M) and the message types must be from 1010 through 1080, except 1110 is not supported when you are using BAMS in its normal configuration. However, BAMS can be configured to output Cisco MGC End of Call records (see Chapter 6, "Configuring BAMS for BAF Output," for details).

Step 8 Edit the diskmonitor parameter in XECfgParm.dat to indicate whether the CDR files are to be kept after collection. You can use the same parameter to indicate how long the files are to be kept. If the value is 0, the .finished files are removed immediately. A value of 1 means that the .finished files are deleted after 1 day, 2 for 2 days, and so on. In the following example, the files are removed after 1 day, as reflected in diskmonitor.CdrRmFinished = 1.

```
#----------------------------------
# Disk Monitor Parameters
#----------------------------------
diskmonitor.Limit = 7# MIGRATED
diskmonitor.Threshold = 80# MIGRATED
diskmonitor.SoftLimit = false# MIGRATED
diskmonitor.CdrRmFinished = 1# (remove "finished" cdrs after X days (0 = immediate))
diskmonitor.OptFileSys =# (list of optional file systems to monitor (no trimming))
```

Step 9 Open another vi session:

```
vi /opt/CiscoMGC/etc/CONFIG_LIB/new/XECfgParm.dat
```

Step 10 Repeat Step 4 through Step 8 in the active_link directory, the prov_link directory, and in the new directory.

Step 11 Stop the Cisco MGC:

```
/etc/init.d/CiscoMGC stop
```

Step 12 Start the Cisco MGC for the file changes to take effect:

```
/etc/init.d/CiscoMGC start
```

Step 13 Synchronize the operation of the Cisco PGW 2200 and Cisco BAMS systems by issuing the following MML command:

```
sta-aud-cic
```

Note The MML command sta-aud-cic starts a process that audits the CIC state. The command generates the SS7 CIC Audit CDB 1071 for every configured ISUP TrunkGroup in Call C.

Uninstalling BAMS

If a previous BAMS release is already installed, you must uninstall it to start a new system. This procedure removes all BAMS software; however, you can save the data and archive directories during the uninstall procedure. The uninstall procedure also asks you if you want to save the current active BAMS configuration to a restorable provisioning batch file.

Note The uninstallation process removes the contents of the /opt/CiscoBAMS directory except the /opt/CiscoBAMS/CDR and /opt/CiscoBAMS/data folders.

Caution Do not remove the /opt/CiscoBAMS/CDR and /opt/CiscoBAMS/data directories manually. They are disk partition mount points.

To uninstall BAMS, use this procedure:

Step 1 Log in as the BAMS user.

Step 2 Stop the application by entering the following commands:

```
$ cd /opt/CiscoBAMS/bin
$ mml
mml:sys> stp-softw::confirm
mml:sys> quit
```

Note The default UNIX prompt ($ or #) might vary with the shell program being used.

Step 3 Log out. Make sure that all BAMS logins have exited. This account is removed during the uninstallation.

Step 4 Log in as the root user by entering the following command:

```
:root
:<password>
```

Step 5 Uninstall the application software:

```
$ cd /opt/install
```

Step 6 Run the uninstall script:

```
$ bams uninstall
```

Step 7 Follow the prompts from the uninstallation script. (The uninstall script automatically copies the BAMS configuration files from /opt/CiscoBAMS/files to /usr/tmp/bamsconfig.)

Step 8 Uninstall the application software:

```
$ cd /opt
$ pkgrm CSCOcaBAM
```

This completes the uninstallation procedure.

Installing Cisco BAMS

Note Cisco BAMS Release 3.x requires the Sun Solaris 8 operating system. In addition, Cisco BAMS requires that you follow specific guidelines in the partitioning of the BAMS hard disks.

Before you install Cisco BAMS Release 3.x software, you must make sure that Sun Solaris 8 is installed and that the Cisco BAMS server disks are properly partitioned. For information on installing Solaris 8 installation and disk partitioning, see the *Cisco Media Gateway Controller Software Release 9 Installation and Configuration Guide* located at:

http://www.cisco.com/univercd/cc/td/doc/product/access/sc/rel9/swinstl/index.htm

Step 1 Insert the CD labeled "Cisco Billing and Measurements Server (BAMS)" (Release 3.20 or higher) in a CD-ROM drive.

Step 2 For each machine on which BAMS is to be installed, obtain the following information from your system administrator:

a. Platform host name.

b. Platform IP address.

c. Platform user name.

d. Platform user password.

e. Home directory for the BAMS account (default: /opt/CiscoBAMS/local).

f. Where to put the /opt/CiscoBAMS/data directory for all data files created by the application. This is usually a separate disk or file system (default: /opt/CiscoBAMS).

Note The system prompts are displayed in the UNIX Korn shell. Refer to user documentation such as *UNIX Complete* by SYBEX for more information on the Korn shell. You must be familiar with the Korn shell and use of the UNIX vi text editor in order to properly set up and configure BAMS.

Step 3 Log in as the root user by entering the following command:

```
:root
:<password>
```

Step 4 Install the CSCOcaBAM package (from the solaris_patches directory) by entering the following commands:

```
$ cd /cdrom/cdrom0
$ pkgadd -d CSCOcaBAM.pkg
```

Step 5 Follow the prompts.

Caution Do not install the following Solaris 8 patch:

CSCOh005: It creates two unnecessary file systems on BAMS.

Step 6 Run the BAMS install script by entering the following commands:

```
$ cd /opt/install
$ ./bams install
```

Step 7 Follow the prompts.

Note **For upgrade installations:** An option to restore the BAMS configuration files is given during the installation:

Do you wish to restore BAMS configuration files from the previous installation? [y,n]

Answering "y" to this prompt restores the provisioning tables from the previous installation, provided that you saved the previous configurations when prompted to during the uninstallation procedure. This restore function also retains the simplex/redundant state configured by the **change_mode** command, the polling **seqno** for each node, and the **setbamunit** information.

Step 8 You are prompted for the following:

Enter the version of BAMS that was uninstalled prior to this installation of BAMS 3.20:

0) New installation
1) BAMS 2.68
2) BAMS 3.10
3) BAMS 3.12
4) BAMS 3.13
5) BAMS 3.14
6) BAMS 3.20

Enter (0 | 1 | 2 | 3 | 4 | 5 | 6)?

If you select any option from 1 to 5, the installation program converts any in-progress call records to the latest data format so that these records can be processed by the latest version of the software.

When the installation is complete, the system displays the following message: `Installation of <CiscoBAMS> was successful.`

Step 9 After the installation has successfully completed, reboot the system.

Step 10 Go to the Cisco website and download the latest patch for BAMS Release 3.x.

Step 11 Install the patch.

Configuring BAMS to Forward SNMP Traps

To configure BAMS to forward SNMP traps to a management application, perform the following steps:

Step 1 Log in as the root user by entering the following command:

```
:root
:password
```

Step 2 Open a vi session:

```
vi /etc/srconf/agt/snmpd.cnf
```

Step 3 Make sure the following lines exist under the snmpNotifyEntry section (if they are not there, add them):

```
snmpNotifyEntry 31 Console trap nonVolatile
snmpNotifyEntry 32 TrapSink trap nonVolatile
```

Note Number 31 must be unique in that section. Each entry number must be unique.

Step 4 Make sure the following lines exist under the snmpTargetAddrEntry section (if they are not there, add them):

```
snmpTargetAddrEntry 33 snmpUDPDomain 127.0.0.1:0 100 3 Console \
v1ExampleParams nonVolatile 255.255.255.255:0 2048
snmpTargetAddrEntry 34 snmpUDPDomain 127.0.0.1:0 100 3 Console \
v2cExampleParams nonVolatile 255.255.255.255:0 2048
```

Note Number 33 must be unique in that section. Each entry number must be unique.

Step 5 To forward a V1 trap to the IP address of the network management platform (A.B.C.D in the lines below), add the following line:

```
snmpTargetAddrEntry 35 snmpUDPDomain A.B.C.D:0 100 3 TrapSink \
v1cExampleParams nonVolatile 255.255.255.255:0 2048
```

Step 6 To forward a V2c trap to destination A.B.C.D, add the following line:

```
snmpTargetAddrEntry 36 snmpUDPDomain A.B.C.D:0 100 3 TrapSink \
v2cExampleParams nonVolatile 255.255.255.255:0 2048
```

Step 7 Restart the snmpdm process:

kill -9 *pid*

Note The value of pid is the process ID for snmpdm, and snmpdm restarts itself after termination.

Configuring BAMS

To configure BAMS, perform the following steps:

Step 1 Log in as the root user by entering the following command:

```
:root
:password
```

Step 2 Define the network node names and IP addresses of the Cisco MGC and the BAMS units in the file /etc/hosts. You must edit and save the host file with the information obtained from your system administrator, using the UNIX vi text editor to enter the following commands:

```
$ cd /etc/inet
$ chmod 744 hosts
$ vi hosts
```

Step 3 Log out as the root user.

Caution All of the dual Ethernet connections and host names should be set up and defined for each BAMS and Cisco MGC unit. The redundant Ethernet connection should have a suffix of _b; for example: MGC1 hostname=ciscomgc1, MGC1 redundant connection hostname=ciscomgc1_b.

Step 4 Log in as the BAMS user.

Step 5 (Skip this step if you are upgrading your BAMS version and you chose to restore the previous configuration files during the installation procedure.)

Set up the basic BAMS configuration: simplex or redundant.

a. To change the system settings for simplex versus redundant mode, run **change_mode** and follow the instructions. The following change_mode example shows user input for setting up BAMS in redundant mode:

```
$ cd /opt/CiscoBAMS/bin
$ change_mode

The change_mode program sets the BAMS configuration to simplex or redundant.
Do you want to continue (y/n)? y

Enter mode of operation:
1. Simplex BAMs mode
2. Redundant BAMs mode

Enter mode [1-2]: 2

To finish configuration for a redundant system:

1. On unit 1, set UNITNO to 1 in file /opt/CiscoBAMS/bin/sym_defs
2. Run /opt/CiscoBAMS/bin/setbamunit and enter all parameters

User should execute the following to set up current environment:
$ ./opt/CiscoBAMS/bin/sym_defs

As an alternative, the user can log out and log in again to re-set the shell environment.
```

To set up the BAMS unit for SC2200 applications and check the measurements reporting interval, start an MML provisioning session, modify the configuration of the Node Parameters table using the NODEPARMS tag ID, and deploy any changes you make.

Refer to the "Configuring Node Parameters" section on page 2-12.

Step 6 (Skip this step if you are upgrading your BAMS version and you chose to restore the previous configuration files during the installation procedure.)

Complete the instructions given at the end of the **change_mode** program:

a. Set the unit designation.

Note For a redundant configuration, Step 6 must be performed on both units.

b. Modify the UNITNO environment variable definitions to define the unit number in the file /opt/CiscoBAMS/bin/sym_defs. (The primary BAMS unit should be 0, and the secondary BAMS unit should be 1.)

Note You can designate the Cisco MGC units 1 and 2. You must confirm the unit designations with your system administrator. Do not modify the BAMS 0 and 1 unit numbers to match the Cisco MGC numbers 1 and 2, or the system will not work as intended.

c. After unit designation is complete, reset the system environment variables by entering the following commands:

```
$ cd /opt/CiscoBAMS/bin
$ . sym_defs
```

Note Only valid users with appropriate permissions can access the Cisco MGC. They must be set up with permissions in the Cisco MGC group for Cisco MGC software Release 7.4 and later releases, and in the TransPath group for releases before software Release 7.4.

d. From within the /opt/CiscoBAMS/bin directory, enter the **setbamunit** command to configure the host name, login ID, and password parameters for both BAMS units.

All parameters should be defined. The parameters bam_name0 and bam_name1 should correspond to the node names of the BAMS units defined in the file /etc/hosts. See the following example:

```
$ cd /opt/CiscoBAMS/bin
$ setbamunit
New value for 'bam-name0' [ ]: bams0
New value for 'login0' [bams]: bams
Enter new password for 'passwod0': xxxxxxxx
Re-enter password: xxxxxxxx
New value for 'bam-name1' [ ] : bams1
New value for 'login1' [bams] : bams
Enter new password for 'passwd1': yyyyyyyy
Re-enter password: yyyyyyyy
$
```

Step 7 Configure the Cisco MGC polling parameters for the first node by using the Man-Machine Language (MML) program to set the first node. This creates the initial polling control file for node 1 (opt/CiscoBAMS/files/s01/poll.CTL).

```
$ cd /opt/CiscoBAMS/bin
$ mml
```

You can also change the MML environment by just entering the node identifier:

```
mml:sys> set-node:1:
```

To start an MML editing session, enter the following command:

```
mml:1> prov-sta::srcver=active,dstver=test1
Billing and Measurements Server - BAMS-00 2004-10-09 15:20:30
B  COMPLD
;
```

To set the node name "boston" for the first node, enter the following command:

```
mml:sys> set-nodename:1:name="boston"
```

To display the polling record for this node, enter the following command:

```
mml:1> prov-rtrv:poll:
Billing and Measurements Server - BAMS-00 2004-10-09 15:30:02
B  RTRV
;
```

Initially, this file is empty.
To display the configuration parameters, enter the following command:

```
mml:1> prov-rtrv:poll:?
Billing and Measurements Server - BAMS-00 2004-10-09 15:21:49
B  COMPLD
host-name1 (string)
rem-dir1 (string)
file-prefix1 (string)
file-suffix1 (string)
host-name2 (string)
rem-dir2 (string)
file-prefix2 (string)
file-suffix2 (string)
action (string)
interval (numeric)
maxtries (numeric)
;
```

When you add a polling record to the Poll table, you must specify the file prefix (for example, "cdr*") and suffix (for example, ".bin") for the CDR files on each host. The CDR files produced on the Cisco MGC switch use the following naming convention:

<prefix>_yyyymmddhhMMss_nnnnnn.bin

where:

<*prefix*> is defined in the Cisco MGC switch configuration (for example, "cdr")

yyyymmddhhMMss is the timestamp. BAMS ignores the timestamp when polling; it uses the file sequence number instead.)

nnnnnn is the file sequence number. You specify this number with the **chgno** command in Step 9.

.*bin* is the suffix

To add a polling record (all required fields and values must be specified), enter the following command:

```
mml:1> prov-add:poll:host-name1="MGCtest1",rem-dir1="/opt/CiscoMGC/var/bam",
file-prefix1="cdr*",file-suffix1=".bin",host-name1="MGCtest2",file-prefix2="cdr*",file-suf
fix2=".bin",action="R",interval=5,timeout=2,maxtries=2
Billing and Measurements Server - BAMS-00 2004-10-09 16:28:02
B  COMPLD
"POLL"
;
```

In the example above, the file-prefix1 and file-suffix1 parameters must correspond to the file generated on the Cisco MGC switch 1 (host-name1 parameter), and the file-prefix2 and file-suffix2 parameters must correspond to the file generated on the Cisco MGC switch 2 (host-name2 parameter).

To edit the polling configuration information for this node, use the following command:

```
mml:1> prov-ed:poll:maxtries=3
```

Refer to the "POLL Tag ID" section on page 5-17 for details on the Poll table's required fields and values.

Step 8 To deploy the changes, use the following command:

```
mml:1> prov-dply::
```

If the remote unit is online, the files are synchronized and messages such as the following display on the screen:

```
/* Synchronizing remote BAMS ... */
/* Transferring file /opt/CiscoBAMS/files/s01/zoneinfo.CTL ... */
/* Transferring file /opt/CiscoBAMS/files/s01/TrunkGroup.CTL ... */
/* Transferring file /opt/CiscoBAMS/files/s01/alm_parms.CTL ... */
/* Transferring file /opt/CiscoBAMS/files/s01/country.CTL ... */
/* Transferring file /opt/CiscoBAMS/files/s01/maptype.CTL ... */
/* Transferring file /opt/CiscoBAMS/files/s01/nodeParm.CTL ... */
/* Transferring file /opt/CiscoBAMS/files/s01/NpaNxx.CTL ... */
/* Transferring file /opt/CiscoBAMS/files/s01/poll.CTL ... */
/* Transferring file /opt/CiscoBAMS/files/s01/RatingType.CTL ... */
/* Transferring file /opt/CiscoBAMS/files/s01/RatingException.CTL ... */
/* Transferring file /opt/CiscoBAMS/files/s01/NailedConn.CTL ... */
/* Transferring file /opt/CiscoBAMS/files/s01/skipcdb.CTL ... */
/* Transferring file /opt/CiscoBAMS/files/s01/skipcde.CTL ... */
/* Transferring file /opt/CiscoBAMS/files/s01/thresholds.CTL ... */
/* Transferring file /opt/CiscoBAMS/files/s01/tollfree.CTL ... */
;
```

Note You must be in an active provisioning session (**prov-sta** command) to edit any parameters; use the **prov-dply** command to implement the changes.

Step 9 (Skip this step if you are upgrading your BAMS version and you chose to restore the previous configuration files during the installation procedure.)

Identify the sequence number of the first file to be polled from each Cisco MGC switch. You modify the polling file sequence number by using the MML **chgno** command. This file sequence number must correspond to the sequence number of the files generated by the Cisco MGC switches. Refer to Step 7 for the filename format. You can change one or both file sequence numbers with this command.

```
mml:1> chgno::[seqno1=#,][seqno2=#]
```

seqno1 is the file sequence number of the first polled unit, and seqno2 is the file sequence number of the second polled unit. For example:

```
chgno::seqno1=0001,seqno2=0002
```

The system should be stopped when you execute the **chgno** command. If the system is running, be sure it is not polling, or else a "Load record failed error" message could be generated. If **chgno** fails, you receive the message "Polling control record #1 in use by POL program — try again later."

Step 10 Quit the MML session by entering the following command:

```
mml:1> quit
```

Step 11 For security reasons, the login information for the Cisco MGCs is not entered through the MML interface. The BAMS user must execute the program /opt/CiscoBAMS/bin/setpollpwd to define the login IDs and passwords for the redundant Cisco MGC units.

```
$ cd /opt/CiscoBAMS/bin
$ setpollpwd -sx (Where x represents the node identifier: 1 to 8)
New value for 'userid1' [ ]: mgcuser1
Enter new password for 'password1': xxxxxxxx
Re-enter password: xxxxxxxx
New value for 'userid2' [ ]: mgcuser2
Enter new password for 'password2': yyyyyyyy
Re-enter password: yyyyyyyy
$
```

Step 12 Repeat Step 7 through Step 11 to set up each additional node (2 through 8).

Step 13 Configure the MSC Thresholds table and the MSC Parameters table to monitor the disk usage levels.

Note The MSC threshold levels have been set at default values, but you can modify them by entering the following commands:

```
$ cd /opt/CiscoBAMS/bin
$ mml
mml:sys> sta-softw
```

To display threshold values, enter the following command:

```
mml:sys> prov-rtrv:msc-thres:
```

To display file parameters, enter the following command:

```
mml:sys> prov-rtrv:msc-parms:
```

Note If BAMS Release 1.x has been uninstalled and is being replaced by BAMS Release 3.x, log in as a user and enter the following commands:

```
$ cd /opt/CiscoBAMS/data/output
$ mv /tmp/incomplete_cdr.cor.out incomplete_cdr.cor
```

Reconfigure the provisioning tables using the MML command.

Step 14 Start the system by entering the following commands:

```
$ cd /opt/CiscoBAMS/bin
$ mml
mml:sys> sta-softw
```

This completes the installation process.

Note You can also start or stop the system from the UNIX prompt by using **start_system** or **stop_system**.

Configuring Node Parameters

Use the NODEPARMS tag ID to set node parameters such as record-type outputs (for example, ASCII, BAF, NICS, P01) and measurements.

To display the node parameters, you need to first set a node. Enter the following commands:

```
$ cd/opt/CiscoBAMS/bin
$ mml
mml:sys> set-node:1:
Billing and Measurements Server - BAMS-00 2004-10-12 10:36:39
mml:1:boston> prov-rtrv:NODEPARMS:
Billing and Measurements Server - BAMS-00 2004-10-12 10:36:58
B  RTRV

"NODEPARMS:activate=1,statoutput=1,bafoutput=0,asciibafoutput=0,asciioutput=2,lookupinfo=1
,bafinfo=0,dynamicaccumes=0,sup-zero-counts=0,interval-minutes=15,nailed-cfg=1,p01output=0
,p01prefix="p01_",enable-h323=0,extasciioutput=0,nicsoutput=0,bin1110output=0"
   ;
```

Caution The Cisco MGC dump CDR interval (set in the dmprSink.dat file) must be set to a value less than and not equal to the BAMS measurements interval (interval-minutes parameter). For example, if the measurements interval is set to 5 minutes, the dump CDR interval must be set to 4 minutes or less. If the Cisco MGC dump CDR interval is greater than or equal to the BAMS measurements interval, the possibility exists that more than one measurements interval can be crossed in a single input file. If this happens, a COR206 major alarm occurs. The end result is the loss of measurement data. This loss of data

causes the ACC task to generate an ACC222 minor alarm. For details about modifying the Cisco MGC dump CDR interval value in the dmprSink.dat file, see "Configuring the Cisco MGC for Using BAMS" section on page 2-1.

Note Refer to the "NODEPARMS Tag ID" section on page 5-10 for details on the available node parameters and acceptable values.

Host Configuration Setup for Downstream Polling

You can collect files in the opt/CiscoBAMS/data directories (ASCII, BAF, measurements, NICS, and so forth) through an appropriate FTP session. This is referred to as FTP polling of BAMS by the downstream billing system. In an automated FTP session, data collected from BAMS is stored in appropriate directories on the downstream billing system. After a successful poll of a data file, the data file in the BAMS /data subdirectory should be renamed with a *.finished suffix. In a redundant configuration, the duplicate file on the redundant BAMS unit should also be renamed. This allows the BAMS MSC task to delete these polled files, freeing up disk space. Refer to "Updating the Poll Table" section on page 5-17 for information about specifying a *.finished suffix for polled files.

The billing system host must be set up to support such polling. Data files should be collected through FTP in binary transfer mode so that data file corruption is avoided. For automated storage, report creation and generation, and analysis, a number of solutions are available.

Setting Up Disk Monitoring Thresholds

The Mass Storage Control (MSC) task maintains disk space on the BAMS units according to percentage-based disk-space usage thresholds. Use the MSC-THRES tag ID at the system level to configure the MSC thresholds. Refer to Chapter 4, "Using MML Commands," for the MSC-THRES field names and values.

In the following example, the MSC task is set up to run at 15-minute intervals:

```
prov-ed:msc-thres:interval=15,iut=50000,put=60,plt=40,uut=80,mil=75
```

Note the following in this example:

- The inode upper threshold has been set at 50,000 inodes.
- The polling upper threshold is set at 60 percent of the available disk space, and the lower threshold is set at 40 percent of the disk space.
- The unpolled upper threshold has been set at 80 percent of the available disk space.
- A minor alarm level has been set at 75 percent.

The MSC task uses the directory name and a user-defined file pattern to distinguish polled files from unpolled files. The actual values depend on disk usage and fill factors that vary between BAMS locations. The system administrator must determine the appropriate values for a given location.

Calculating Disk Space Usage

When you establish the MSC task interval, you must make disk space usage estimates. The following examples are provided to help you estimate data processing and archive partitioning based on average calls per second (CPS). You can use the estimates listed to:

- Calculate how long data files will remain in the data directories before deletion by the MSC task
- Determine a backup procedure if the BAMS data is not being forwarded to another device
- Customize the MSC disk usage parameters

The estimates listed in Table 2-1 are based on an 18-GB disk partition and an output configuration for BAF, measurements, and ASCII. The estimates in Table 2-2 are based on an 18-GB disk partition and an output configuration for BAF and measurements. The estimates in Table 2-3 are based on a 12-GB disk partition.

Table 2-1 Data Disk Partitioning (Output Configuration for BAF, Measurements, and ASCII)

CPS	Disk Usage MB per Hour	Disk Usage (Percent) per Day	Disk Usage (Percent) per Week
20	32	4.2	29.4
40	64	8.4	58.8
60	96	12.6	88.2
80	128	16.8	100 (in 0.86 of a week)

Table 2-2 Data Disk Partitioning (Output Configuration for BAF and Measurements)

CPS	Disk Usage (MB) per Hour	Disk Usage (Percent) per Day	Disk Usage (Percent) per Week
20	7	0.9	6.5
40	14	1.9	13.0
60	21	2.8	19.6
80	28	3.7	26.1

Table 2-3 Archive Disk Partitioning

CPS	Disk Usage (MB) per Hour	Disk Usage (Percent) per Day	Disk Usage (Percent) per Week
20	36	7.2	50.4
40	72	14.4	100
60	108	21.6	100 (in 0.71 of a week)
80	144	28.8	100 (in 0.57 of a week)

Defining Conditions for MSC Alarms

Use the MSC-PARMS tag ID to define conditions that generate alarms or events, based on parameters such as file size, file type, and file age. Refer to Chapter 4, "Using MML Commands," for a detailed description of the tag ID field names and values.

In the following example, the MSC task looks for polled files with a baf* prefix to determine whether or not to set off a minor alarm:

```
prov-ed:msc-parms:type=baf*,polled=1
```

Setting a File-Age Condition

You can set a file-age condition by setting an age value (in days) in the MSC-PARMS tag ID's agealarm field. In the following example, an alarm will occur once BAF files are 40 days old:

```
prov-ed:msc-parms:type="baf*",agealarm=40
```

Setting a File-Type Condition

You can add file-type conditions for files that the MSC task should monitor. To do so, use the **prov-add** command. Configure the MSC task to clean up unneeded files and to conserve disk space. A file already polled by the downstream billing system is an example of an unneeded file. A BAMS file-naming convention is used to indicate the file processing state and whether files have been polled or not. Thus file naming serves to indicate to the control task which files must be saved and which files are unneeded.

In the following example, the MSC task looks for files with a *.polled suffix.

```
prov-add:msc-parms:type="*.polled"
```

Setting Disk Usage Thresholds

You can add disk usage thresholds to be monitored by the MSC task. To do so, use the **prov-add** command. In the example below, the MSC task looks for unpolled files with the baf* prefix and generates a minor alarm if a file is older than 10 days. After 30 days, the MSC task deletes that file and sets a critical alarm.

```
prov-add:msc-parms:type="baf*",polled=2,agealarm=10,agelevel=2,delage=30,delalarm=0
```

Setting the Initial PGW CDR Sequence Number

To set the initial PGW CDR sequence number, perform the following steps:

Step 1 On each PGW host, change directory to /opt/CiscoMGC/var.

This directory contains the file .cdr.seq, which contains a number that identifies the last CDR sequence number written to the file.

Step 2 Issue the MML **chgno** command to set the sequence number you want BAMS to collect initially.

Example

```
mml:3>chgno::seqno1=2,seqno2=2
```

Note Within the **chgno** command expression, **seqno1** represents host1 in the POLL table; **seqno2** represents host2 in the POLL table.

For a description of the **chgno** command, see chgno—Change Number, page 4-7.

Note If you wish to collect older records, you can obtain the sequence numbers by issuing the command **ls -lt |cdr*** from the /opt/CiscoMGC/var/bam directory on each PGW host.

Setting the PGW Dynamic Update Mode

Based on a feature on PGW Release 9.4(1) and later, two call detail elements (CDEs), 4234 and 4235, are produced in the 1071 CDB. These two CDEs take a "snapshot" of the trunk group or sigpath on the PGW for the number of circuits in the trunk group (sigpath in nailed mode) and the number of unavailable circuits for the trunk group (sigpath in nailed mode). The 1071 CDB is triggered whenever a trunk group (sigpath) is added or updated, or when a manual MML **audit** command is issued on the PGW.

For a detailed description of the feature, CIC Availability Measurement CDB, refer to the feature module document of the same name, *CIC Availability Measurement CDB* under Cisco Media Gateway Controller Software Release 9 Feature Modules (Release 9.4(1) Feature Modules).

Note To start an audit of the Cisco PGW 2200, issue the following MML command:
sta-audit-cic

For a description of the **sta-audit-cic** MML command, see the document *CIC Availability Measurement CDB* under Cisco Media Gateway Controller Software Release 9 Feature Modules (Release 9.4(1) Feature Modules).

With these two CDEs produced on PGW 9.4(1), it is now possible for BAMS—when running in PGW Dynamic Update mode—to update the trunk groups and the number of circuits in a trunk group dynamically without end-user intervention. BAMS can:

- Update the number of circuits for each update on the PGW
- Report accurately the number of circuits out of service for a trunk group

The set-pgw-mode utility allows you to configure BAMS to process data from PGWRelease 9.4.1 and later (by default, BAMS does not run in PGW Dynamic Update mode).

Note The PGW Dynamic Update mode status can be determined with the **rtrv-ne** command. Refer to "rtrv-ne—Retrieve Network" section on page 4-21 for information about this command.

Processing Pre-9.4.1 Data

By default, the PGW_DYNAMIC_UPDATE value is FALSE; therefore, BAMS uses the number of available circuits in the Trunk Group table as the total number of circuits. Since the number of unavailable circuits is unreliable in this mode, BAMS does not attempt to track them.

Processing 9.4.1 (and Newer) Data

To process PGW 9.4.1 (and newer) data, you set PGW_DYNAMIC_UPDATE to TRUE. The following changes are enabled on BAMS:

- A backup of all current BAMS configuration tables is made.
- The structure of the Trunk Group table is modified by elimination of the circuits field, because BAMS will know the exact number of configured circuits and the number of unavailable circuits.
- A dynamic table of circuits is maintained.
- The BAMS algorithm for counting the number of circuits per trunk group is changed, thereby affecting measurements (see the "Suppressed Measurements" section on page 2-18).

- The **rtrv-circuits** MML command is enabled.

To configure BAMS to run in PGW Dynamic Update mode, perform the following steps:

Step 1 Log in as the BAMS user.

Step 2 Stop the application by entering the following commands:

```
$ cd /opt/CiscoBAMS/bin
$ mml
mml:sys> stp-softw::confirm
mml:sys> quit
```

Note The default UNIX prompt ($ or #) might vary with the shell program being used.

Step 3 Execute the set-pgw-mode utility. The following example shows user input for changing the default PGW_DYNAMIC_UPDATE value:

```
$ set-pgw-mode
The set-pgw-mode program sets the BAMS PGW_DYNAMIC_UPDATE
configuration to TRUE (1) or FALSE (0).

Do you want to continue (y/n)? y

Current value for PGW-DYNAMIC-FLAG is FALSE (*):

0) FALSE *
1) TRUE
q) Quit

New value (0, 1, or q(uit)): 1
You will be setting the BAMS PGW_DYNAMIC_UPDATE configuration to
TRUE (1).
A BAMS configuration rollback file will be created in case
set-pgw-mode is run once again and the value of PGW_DYNAMIC_UPDATE
is set back to FALSE.

This rollback file will reset the BAMS configuration back to the
date when the configuration was changed from FALSE to TRUE.
The rollback file being created at this time is named
/opt/CiscoBAMS/files/set-pgw-mode.200410071121.tar.
** This file should not be deleted **.

The BAMS PGW_DYNAMIC_UPDATE mode requires that the PGW is
running version 9.4.1 or later.

Is PGW version 9.4.1 or later (y/n)? y
Archiving current configuration tables ...
a /opt/CiscoBAMS/files/s01/DynTrunkGroup.CFDT 1K
a /opt/CiscoBAMS/files/s01/NailedConn.CFDT 1K
.
.
.
converting TrunkGroup.CFDT file
moving TrunkGroup.CTL to TrunkGroup.CTL_20041007112133.old
converting TrunkGroup.CTL file
********************************************************************************

User should execute the following to set up current environment:
$ . /opt/CiscoBAMS/bin/sym_defs
```

```
As an alternative, the user can log out and log in again to re-set
the shell environment.

*********************************************************************************

Conversion of BAMS PGW_DYNAMIC_UPDATE mode complete

PGW_DYNAMIC_UPDATE has been set to TRUE (1)

The rollback file /opt/CiscoBAMS/files/set-pgw-mode.200410071121.tar
has been created in case PGW_DYNAMIC_UPDATE is set back to FALSE
```

Step 4 Restart BAMS.

Note If you run the set-pgw-mode utility to return BAMS to its default setting, a warning is issued because the configuration will be rolled back to the date when the default setting was changed.

Suppressed Measurements

The following table illustrates which measurements are suppressed or not pegged based on the PGW_DYNAMIC_UPDATE value (that is, TRUE or FALSE).

Table 2-4 Suppressed Measurements

	PGW Dynamic Update = False			PGW Dynamic Update = True			
Measurement Name	**Pre-defined**	**Dynamic**	**MGCP**	**Pre-defined without 1071**	**Pre-defined with 1071**	**Dynamic**	**MGCP**
Call Attempts Incoming							
Call Attempts Outgoing			No Peg				No Peg
Outgoing Attempts Blocked			No Peg				No Peg
Failed Calls-Congestion							
Successful Calls Incoming							
Successful Calls Outgoing			No Peg				No Peg
Percent Trunk Group Usage Incoming		Suppress		Suppress		Suppress	
Percent Trunk Group Usage Outgoing		Suppress	No Peg	Suppress		Suppress	No Peg
Maintenance Duration per Trunk Group	Suppress	Suppress		Suppress		Suppress	
Total Traffic in Erlangs							

Table 2-4 Suppressed Measurements (continued)

	PGW Dynamic Update = False			PGW Dynamic Update = True			
Measurement Name	**Pre-defined**	**Dynamic**	**MGCP**	**Pre-defined without 1071**	**Pre-defined with 1071**	**Dynamic**	**MGCP**
Total Calls Terminated Normally							
Calls Terminated Abnormally							
Calls Terminated, Failed MGW or NAS							
Calls Rejected							
Calls Rejected, Unknown Dialed Number							
Calls Rejected, Other Reasons							
Overflow, Outgoing Attempts Blocked			No Peg				No Peg
Total Sum of Usage Pegs per Trunk Group							
Tandem Routing Attempts, Outgoing		Suppress	No Peg			Suppress	No Peg
Tandem Completions, Outgoing		Suppress	No Peg			Suppress	No Peg
Tandem Routing Attempts, Incoming		Suppress				Suppress	
Tandem Completions, Incoming		Suppress				Suppress	
Tandem Duration, Outgoing		Suppress				Suppress	
Tandem Duration, Incoming		Suppress				Suppress	
IC Destined Calls							
IC Destined Calls, No Circuit							
IC Usage							
Conversation Duration Ingress							
Conversation Duration Egress			No Peg				No Peg
Setup Duration Ingress							
Setup Duration Egress			No Peg				No Peg

Table 2-4 Suppressed Measurements (continued)

	PGW Dynamic Update = False			PGW Dynamic Update = True			
Measurement Name	**Pre-defined**	**Dynamic**	**MGCP**	**Pre-defined without 1071**	**Pre-defined with 1071**	**Dynamic**	**MGCP**
Teardown Duration Ingress							
Teardown Duration Egress			No Peg				No Peg
Call Routing I Peg							
Call Routing II Peg							
Call Routing III Peg							
Carrier Select No Indication		Suppress				Suppress	
Carrier Select PreSubscribed Not Input		Suppress				Suppress	
CarrierSelect PreSubscribed and Input		Suppress				Suppress	
CarrierSelect PreSubscribed with No Indication		Suppress				Suppress	
Carrier Id Code Not PreSubscribed but Input by Customer		Suppress				Suppress	
Successful H.323 Terminating Pegs							
Successful H.323 Originating Pegs							
Unsuccessful H.323 Terminating Pegs							
Unsuccessful H.323 Originating Pegs							
Successful ISUP Terminating Pegs							
Successful ISUP Originating Pegs							
Unsuccessful ISUP Terminating Pegs							
Unsuccessful ISUP Originating Pegs							

Table 2-4 Suppressed Measurements (continued)

Measurement Name	PGW Dynamic Update = False			PGW Dynamic Update = True			
	Pre-defined	Dynamic	MGCP	Pre-defined without 1071	Pre-defined with 1071	Dynamic	MGCP
ISDN Terminating Setup Message Delay Pegs							
ISDN Originating Setup Message Delay Pegs							
Number of Defined CICs during the Measurement Period		Suppress		Suppress		Suppress	
Average Number of Available CICs during the Measurement Period	Suppress	Suppress		Suppress		Suppress	