

Setup and Installation

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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](#).

**Note**

Before you can run the Cisco BAMS, you must obtain a software license. See the [“Cisco BAMS Software License” section on page 1-10](#).

Upgrading to BAMS Release 3.30

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 3.30, you need to follow a migration procedure. Proceed to [Appendix B, “Upgrading to BAMS Release 3.30.”](#)

Configuring the Cisco MGC for Using BAMS

You must edit your `dmpSink.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 | <code>cd /opt/CiscoMGC/var</code> |
| Step 2 | <code>mkdir bam</code> |
| Step 3 | <code>chmod 777 bam</code> |
| Step 4 | Open a vi session:
<code>vi /opt/CiscoMGC/etc/dmpSink.dat</code> |

Step 5 Edit it as follows:

```
1 "callDetail" bin "cdr" "../var/log" "../var/bam" 10000 0 5
```



Caution

The last field in the above line (that is, “5”) 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 5-11 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.

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 = "1010,1020,1030,1040,1050,1060,1070,1080"`



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).

The 1110 CDB (Summary CDB) is generated at the completion of a call or after a call fails to attain the setup status. The 1110 CBD includes basic billing information.

The 1071 CDB reports SS7-side circuit information in two CDE tags: CDE 4234, which presents the total circuit count; CDE 4235, which presents the number of unavailable circuits. For a PGW 2200 in call control mode, the 1071 CDB is generated for trunk groups. For a PGW 2200 in signaling mode, the 1071 CDB is generated for a signaling path.

- 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 # Minimum number of days to preserve (Trimming occurs only when the
threshold is exceeded.)

diskmonitor.Threshold = 80 # The percentage that the threshold is filled (80% full in this
case).

diskmonitor.SoftLimit = false # Set to true to allow override of preserve limit. Setting this
parameter to false does not affect log file removal. See also the PreserveLogs setting.

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
```

**Note**

If you are operating two Cisco PGW 2200 systems in a redundant Active/Standby configuration, you must perform the 12 steps of this procedure for both PGW 2200s.

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
$ mm1
mm1:sys> stp-softw::confirm
mm1: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 3.30 requires the Sun Solaris 10 operating system. (Previous releases of BAMS required the 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 3.30 software, you must ensure that Sun Solaris 10 is installed and that the Cisco BAMS server disks are properly partitioned. For information on installing Solaris 10 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/re19/swinstl/index.htm>

If you choose to install the Sun Solaris 10 operating system on a Sun Netra T2000 platform, see [Appendix D, “Installing Solaris 10 Version 0708-V01 on Sun Netra T2000.”](#)

**Caution**

When you install Cisco BAMS 3.30, you must also install the most recent patch of the software. If you fail to install the patch, the software might experience a COR failure.

- Step 1** Insert the CD labeled “Cisco Billing and Measurements Server (BAMS)” (Release 3.30) 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.

- 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 the 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 3.30:
0) New installation
1) BAMS 3.20
2) BAMS 3.30

Enter ( 0 | 1 | 2 )?
```

If you select options 1 or 2, 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 3.30.**Step 11** Install the patch.

Installing a Cisco BAMS Software Patch

Complete the following steps to install a patch to the Cisco BAMS software.

Step 1 Log in as the BAMS user.**Step 2** Stop the Cisco BAMS software by entering the following commands.

```
$ mm1
mm1:sys> stp-softw::confirm
```



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

Step 3 Identify whether Cisco BAMS is running in simplex or redundant mode by entering the following command.

```
mm1:sys>rtrv-ne
mm1:sys> quit
```

Step 4 If you must install the patch on redundant BAMS units, change the operating mode of the standby unit to simplex mode by entering the following command. (See Step 5 in the [“Configuring BAMS” section on page 2-10.](#))


```
change_mode
```



Caution For a redundant Cisco BAMS system, Send File Transfer (SXF) task alarms will be visible on the active unit. Ignore such alarms generated at this time. These alarms will disappear when both BAMS units are restored in redundant mode after patch installation.

Step 5 Log in as the root user by entering the following command.

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

- Step 6** To identify patches currently installed on Cisco BAMS, enter the following command.
- ```
$ pkginfo -1 | grep CSCO*
```
- Step 7** Before you install a new patch, you must remove the old patch. To remove the old patch, enter the following command.
- ```
$ pkgrm <patch_name>
```
- Step 8** To verify that the patch you wished to remove was deleted, enter the following command.
- ```
$ pkginfo -1 | grep CSCO*
```
- Step 9** To install a new patch on Cisco BAMS, enter the following command.
- ```
$ pkgadd -d <patch_name>
```
- If the patch is installed, the system generates a message to confirm successful installation
-  **Caution** If the initial attempt to install the patch failed, you must remove the patch by issuing the **pkgrm** command before you attempt to install the patch again.
- Step 10** To verify that the new patch is successfully installed, enter the following command.
- ```
$ pkginfo -1 | grep CSCO*
```
- Step 11** Repeat steps 1 through 9 for the redundant Cisco BAMS system.
- 

## Enabling SFTP on Cisco BAMS and the Cisco PGW 2200

This section provides the procedures you must perform to enable the use of the SFTP on the Cisco BAMS and the Cisco PGW 2200.

### Generate Public and Private Keys on the Cisco PGW 2200

To generate public and private keys for the Cisco PGW 2200, complete the following steps:

- 
- Step 1** Login to the active PGW 2200 with a valid user name.
- Step 2** Issue the command:
- ```
cd /usr/bin
```
- Step 3** Issue the command:
- ```
ssh-keygen -t rsa
```
- Step 4** Press Enter to accept the default file name for the key (`/.ssh/id_rsa`).
- Step 5** If you are prompted to choose whether to overwrite the existing file, enter yes.
- Step 6** When you are prompted to enter a pass phrase, press Enter.
-

## Generate Public and Private Keys on the Cisco BAMS

To generate public and private keys for the Cisco BAMS, complete the following steps:

- 
- Step 1** Login to the active Cisco BAMS as a valid BAMS user.
  - Step 2** Issue the command:  
`cd /usr/bin`
  - Step 3** Issue the command:  
`ssh-keygen -t rsa`
  - Step 4** Press Enter to accept the default file name for the key (`/.ssh/id_rsa`).
  - Step 5** If you are prompted to choose whether to overwrite the existing file, enter yes.
  - Step 6** When you are prompted to enter a pass phrase, press Enter.
- 



### Note

To generate public and private keys for a redundant Cisco BAMS and Cisco PGW 2200 system, repeat the steps provided in the preceding two procedures on the standby PGW 2200 and redundant Cisco BAMS, respectively.

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## Enabling Automatic SFTP Login

In interoperating with the Cisco PGW 2200, Cisco BAMS uses the SSH Secure File Transfer Protocol (SFTP). Consequently, one must provide a password to run SFTP to transfer files from one system to another. To avoid the requirement to provide a password to use SFTP, you must enable automatic login.

To enable automatic login on Cisco BAMS, complete the following steps:

- 
- Step 1** Ensure that the directory `~/.ssh` includes the two files `id_rsa` and `id_rsa.pub`. If these files are not present, create them by running the program `ssh-keygen -t rsa`.
  - Step 2** Append your local `id_rsa.pub` file to the remote host's file `~/.ssh/authorized_keys`.



### Note

If the file `authorized_keys` does not exist, create it with `vi` text editor.

---

To append your public key to the file `~/.ssh/authorized_keys`, copy and paste the contents of your public key into the file `authorized_keys` on the remote machine. Alternatively, use the UNIX `cat` command as follows:

```
cat id_rsa.pub >>authorized_keys
```



- Step 3** The file permission of the file `~/.ssh/authorized_keys` must be 644. Use the following command to set the required file permission:

```
chmod 644 ~/.ssh/authorized_keys
```



- Note** To set the required permission, you might have to modify the file `/etc/ssh/sshd_config` by adding the following line if it is already configured:

```
* RSAAuthentication yes
```

- Step 4** To ensure that the SFTP automatic login works correctly (with no password prompt), from the active BAMS issue the following command:

```
sftp (PGW_username)@(PGW_IP_address | hostname)
```



- Note** Repeat this procedure to enable automatic login on a redundant BAMS unit.

## 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 \
v2cExampleParams 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
```

The following text represents a sample /etc/hosts file. In the sample file, sh-v210-primrose and sh-v210-medusa are the BAMS hostnames. The active and standby PGW 2200 hostnames are sh-gox and sh-hox respectively.

```
127.0.0.1 localhost
10.74.50.187 sh-v210-primrose loghost
10.0.50.187 sh-v210-primrose_b
10.0.50.184 sh-v210-medusa
10.74.50.184 sh-v210-medusa_b
10.74.57.53 sh-gox_b
10.0.33.53 sh-gox
10.0.33.54 sh-hox
10.74.57.54 sh-hox_b
```

- 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
```

```
Specify the transfer protocol between the BAMS units:
1. FTP
2. SFTP
```

```
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.

Installation complete

```
hostname : sh-v210-medusa
date of change_mode : Fri Feb 9 15:56:22 EST 2007
system mode : Redundant BAMS mode
BAMS protocol : SFTP
$
```

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 2-17](#).

**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, this step 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 'passwd0': 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:
```

**Note**

The node identifier represents the first PGW 2200 pair connected to the BAMS system.

**Note**

In representations of MML sessions, the prompt `mml:sys>` indicates that what you configure will be applied to all nodes.

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

```
mml:1> prov-sta::srcver="active",dstver="test1"
```

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

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

**Note**

The syntax for the **set-nodename** command is **set-nodename:node#:name=nodename**. The value of *node#* is an integer in the range 1–8.

The value of *nodename* must be a valid UNIX filename because this name is used to create a directory link in the data directory.

The nodename should be the Cisco PGW 2200 node name.

You can issue the **set-nodename** command to modify any existing node names. However, you cannot issue the command to modify the system name.

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-add:poll:host-name1="MGCTest1",rem-dir1="/opt/CiscoMGC/var/bam",
file-prefix1="cdr",file-suffix1=".bin",host-name2="MGCTest2",file-prefix2="cdr",
file-suffix2=".bin",action="R",interval=5,timeout=2,maxtries=2, protocol="ftp"
```

```
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)
protocol (string)
;
```

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 .

*.bin* is the suffix

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

```
mm1:1> prov-add:poll:host-name1="MGCTest1",rem-dir1="/opt/CiscoMGC/var/bam",
file-prefix1="cdr*",file-suffix1=".bin",host-name2="MGCTest2",file-prefix2="cdr*",
file-suffix2=".bin",action="R",interval=5,timeout=2,maxtries=2,protocol="ftp"
;
```



#### Note

The host-name should match the PGW 2200 hostname configured in the /etc/hosts file.

In the preceding example, 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:

```
mm1:1> prov-ed:poll:maxtries=3
```

Refer to the “[POLL Tag ID](#)” section on page 5-18 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,
qosoutput=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 5-11](#) 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 (or SFTP) session. This is referred to as FTP (or SFTP) polling of BAMS by the downstream billing system. In an automated FTP or SFTP 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 5-18](#) 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 (or SFTP) 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:m-sc-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 lcdr\*** from the `/opt/CiscoMGC/var/bam` directory on each PGW host.

## Setting the PGW Dynamic Update Mode

Based on a feature on PGW 9.4(1) and later, two 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.

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.

In BAMS 3.30, PGW Dynamic Update Mode is set to True.

## 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

For processing PGW 9.4.1 (and newer) data, the PGW\_DYNAMIC\_UPDATE is set to TRUE. Consequently, the following changes are enabled in Cisco BAMS 3.30:

- A backup of all current BAMS configuration tables is made.
- The structure of the Trunk Group table is modified by eliminating 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 2-21](#)).
- The MML command **rtv-circuits** is enabled.

## Suppressed Measurements

The following table illustrates which measurements are suppressed or not pegged based on the PGW\_DYNAMIC\_UPDATE value (i.e., TRUE or FALSE).

**Table 2-4 Suppressed Measurements**

| Measurement Name                      | PGW Dynamic Update = True |                       |          |        |
|---------------------------------------|---------------------------|-----------------------|----------|--------|
|                                       | Pre-defined No 1071       | Pre-defined with 1071 | Dynamic  | MGCP   |
| Call Attempts Incoming                |                           |                       |          |        |
| Call Attempts Outgoing                |                           |                       |          | No Peg |
| Outgoing Attempts Blocked             |                           |                       |          | No Peg |
| Failed Calls-Congestion               |                           |                       |          |        |
| Successful Calls Incoming             |                           |                       |          |        |
| Successful Calls Outgoing             |                           |                       |          | No Peg |
| Percent Trunk Group Usage Incoming    | Suppress                  |                       | Suppress |        |
| Percent Trunk Group Usage Outgoing    | Suppress                  |                       | Suppress | No Peg |
| Maintenance Duration per Trunk Group  | Suppress                  |                       | Suppress |        |
| Total Traffic in Erlangs              |                           |                       |          |        |
| Total Calls Terminated Normally       |                           |                       |          |        |
| Calls Terminated Abnormally           |                           |                       |          |        |
| Calls Terminated, Failed MGW or NAS   |                           |                       |          |        |
| Calls Rejected                        |                           |                       |          |        |
| Calls Rejected, Unknown Dialed Number |                           |                       |          |        |

**Table 2-4 Suppressed Measurements (continued)**

| Measurement Name                                        | PGW Dynamic Update = True |                       |          |        |
|---------------------------------------------------------|---------------------------|-----------------------|----------|--------|
|                                                         | Pre-defined No 1071       | Pre-defined with 1071 | Dynamic  | MGCP   |
| Calls Rejected, Other Reasons                           |                           |                       |          |        |
| Overflow, Outgoing Attempts Blocked                     |                           |                       |          | No Peg |
| Total Sum of Usage Pegs per Trunk Group                 |                           |                       |          |        |
| Tandem Routing Attempts, Outgoing                       |                           |                       | Suppress | No Peg |
| Tandem Completions, Outgoing                            |                           |                       | Suppress | No Peg |
| Tandem Attempts, Incoming                               |                           |                       | Suppress |        |
| Tandem Completions, Incoming                            |                           |                       | Suppress |        |
| Tandem Duration, Outgoing                               |                           |                       | Suppress |        |
| Tandem Duration, Incoming                               |                           |                       | Suppress |        |
| IC Destined Calls                                       |                           |                       |          |        |
| IC Destined Calls, No Circuit                           |                           |                       |          |        |
| IC Usage                                                |                           |                       |          |        |
| Conversation Duration Ingress                           |                           |                       |          |        |
| Conversation Duration Egress                            |                           |                       |          | No Peg |
| Setup Duration Ingress                                  |                           |                       |          |        |
| Setup Duration Egress                                   |                           |                       |          | No Peg |
| Teardown Duration Ingress                               |                           |                       |          |        |
| Teardown Duration Egress                                |                           |                       |          | No Peg |
| Call Routing I Peg                                      |                           |                       |          |        |
| Call Routing II Peg                                     |                           |                       |          |        |
| Call Routing III Peg                                    |                           |                       |          |        |
| Carrier Select No Indication                            |                           |                       | Suppress |        |
| Carrier Select PreSubscribed Not Input                  |                           |                       | Suppress |        |
| CarrierSelect PreSubscribed and Input                   |                           |                       | Suppress |        |
| CarrierSelect PreSubscribed with No Indication          |                           |                       | Suppress |        |
| Carrier Id Code Not PreSubscribed but Input by Customer |                           |                       | 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                      |                           |                       |          |        |

**Table 2-4 Suppressed Measurements (continued)**

| Measurement Name                                               | PGW Dynamic Update = True |                       |          |      |
|----------------------------------------------------------------|---------------------------|-----------------------|----------|------|
|                                                                | Pre-defined No 1071       | Pre-defined with 1071 | Dynamic  | MGCP |
| Unsuccessful ISUP Originating Pegs                             |                           |                       |          |      |
| ISDN Terminating Setup Message Delay Pegs                      |                           |                       |          |      |
| ISDN Originating Setup Message Delay Pegs                      |                           |                       |          |      |
| Number of Defined CICs during the Measurement Period           | Suppress                  |                       | Suppress |      |
| Average Number of Available CICs during the Measurement Period | Suppress                  |                       | Suppress |      |

**Note**

In representations of MML sessions, the prompt `mml:sys>` indicates that what you configure will be applied to all nodes.

