



Cisco Broadband Troubleshooter Release 3.0

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1 Product Overview

Cisco Broadband Troubleshooter Release 3.0 (CBT 3.0) is a troubleshooting tool designed for the network administrator and radio frequency (RF) technician at a multiple system operator (MSO) site. An MSO provides a variety of cable services such as TV, data, or voice telephony. The network administrator and the RF technician use Cisco Broadband Troubleshooter to resolve RF problems in the MSO's cable plant.

Cisco Broadband Troubleshooter provides the following functionality:

- Provides summary statistics for each upstream port attached to a cable modem termination system (CMTS)
- Analyzes data captured from a Cisco CMTS and sorts problem modems into the following categories:
 - Provisioning problems
 - Reverse path noise problems
 - Reverse path attenuation problems
 - Packet corruption problems, showing the cyclic redundancy check (CRC) error value
- Shows the number of flapping modems and provides summary statistics on each one
- Provides the following spectrum management tools so you can analyze data without using a spectrum analyzer:
 - Trace window
 - Spectrogram
 - Carrier-to-noise ratio (CNR) analysis
- Locates a subscriber's cable modem with wildcard searches for any of the following identifiers:
 - MAC address
 - Phone number
 - Account ID
 - Name
 - Street address
 - Zip code
- Shows detailed information for a cable modem in a real-time status report, with information from the following sources:
 - The CMTS
 - The cable modem itself
 - The MSO's subscriber database
- Provides several, flexible external interface options to integrate provisioning and subscriber information

This release supports Cisco Broadband Troubleshooter installed on a server that is running the Solaris, Windows, or Linux operating system.

2 System Requirements

This section lists the system requirements for:

- Each supported operating system (OS)
 - Server
 - Client
- Cisco uBR7100 series, Cisco uBR7200 series, and Cisco uBR10012 series universal broadband routers

Solaris System Requirements

You can install Cisco Broadband Troubleshooter on a server that is running the Solaris OS.

Minimum Cisco Broadband Troubleshooter Server Requirements

- Ultra-5 Solaris workstation
- Solaris 2.8 OS installed
- 400 megabytes (MB) of available disk space
- 128 MB of memory
- CD-ROM drive
- Simple Network Management Protocol (SNMP) or Telnet connectivity between server and managed routers

Minimum Client Requirements

- Ultra-5 Solaris workstation
- 128 MB of memory
- IP connection to the CBT server
- Netscape 4.7 or a later release

Windows and Linux System Requirements

You can install Cisco Broadband Troubleshooter on a server that is running the Windows or Linux OS.

Minimum Cisco Broadband Troubleshooter Server Requirements for Windows

- Windows 2000, Windows XP, or Windows NT workstation
- Service Pack 1 for Windows XP
- Pentium II 200 megahertz (MHz) processor or higher
- 128 MB of memory
- 250 MB of disk space
- CD-ROM drive
- SNMP or Telnet connectivity between server and managed routers

Minimum Client Requirements

- Windows 98, Windows 2000, Windows XP, or Windows NT workstation
- Pentium I or II 200 MHz processor or higher
- 64 MB of memory
- IP connection to the CBT server
- Netscape 4.7 or a later release
or
Internet Explorer 5.5 or a later release

Minimum Cisco Broadband Troubleshooter Server Requirements for Linux

- Linux RedHat 7.3 workstation
- Pentium II 200 megahertz (MHz) processor or higher
- 128 MB of memory
- 600 MB of disk space
- CD-ROM drive
- SNMP or Telnet connectivity between server and managed routers

Minimum Client Requirements

- Linux RedHat 7.3 workstation
- Pentium I or II 200 MHz processor or higher
- 64 MB of memory
- IP connection to the CBT server
- Netscape 4.7 or a later release

Supported Browser and Java Runtime Environment Combinations

The Sun Java Runtime Environment (JRE) is a plug-in that must be installed in the client browser. Table 1 shows a matrix of supported browser and JRE combinations for each operating system.

For more information on using JRE with your browser, see “Configuring the Java Runtime Environment” on page 10.

Table 1 Supported Browser and JRE Combinations for Each Operating System

	Netscape 4.7 with Default JRE 1.1.5	Netscape 7.0 with JRE 1.4.1_01	Netscape 7.0 with JRE 1.3.1_07	Internet Explorer 5.5 with JRE 1.3.1_07	Internet Explorer 6.0 with JRE 1.3.1_07
Solaris 2.8	Supported	Supported	Not Available	Not Available	Not Available
Windows 2000	Supported	Supported	Supported	Supported	Supported
Windows XP	Not Available	Supported	Supported	Not Available	Supported
Windows 98	Supported	Supported	Supported	Supported	Supported
Linux 7.3	Supported	Supported	Not Supported	Not Available	Not Available

Minimum Cisco Universal Broadband Router and Cisco IOS Requirements

You can use Cisco Broadband Troubleshooter with the following universal broadband routers (uBRs):

- Cisco uBR7100 series universal broadband router
- Cisco uBR7200 series universal broadband router
- Cisco uBR10012 series universal broadband router

On these routers, CBT 3.0 supports the following Cisco IOS releases:

- Cisco IOS Release 12.1(11)EC and later releases
- Cisco IOS Release 12.2(8)BC and later releases
- Cisco IOS Release 12.2(15)BC1

Minimum uBR and Cisco IOS Requirements to Use Spectrum Management Features in CBT

To use the spectrum management features that Cisco Broadband Troubleshooter provides, you must have:

- Cisco uBR7200 series universal broadband router
or
Cisco uBR10012 universal broadband router
- Cisco IOS Release 12.2(15)BC1

For more information, see “Configuring the CMTS to Use CBT’s Spectrum Management Tools” on page 10.

Enabling SNMP on Routers

You must enable SNMP on the routers by entering the following commands:

```
Router# config t  
Router(config)# snmp-server community public RO  
Router(config)# snmp-server community private RW
```



Note CBT retrieves the Cisco IOS release number, router name, and router type by using SNMP.

3 Installing Cisco Broadband Troubleshooter

The following procedures detail how to install Cisco Broadband Troubleshooter 3.0 on each supported platform. There are three different installation CD-ROMs; you must use the CD-ROM version for your operating system.

Installing and Starting CBT on Solaris

Step 1 Log in as `root`.

Step 2 Insert the CBT 3.0 CD-ROM for Solaris into the CD-ROM drive. Use the CD-ROM version for your environment.

Step 3 (Optional) If you are not running Solaris Volume Manager as root, you have to mount the CD manually:

- If a mount point does not exist, create one by making a new `/cdrom` directory.
- Enter the following command, where *CD-ROM device* is the name of your CD-ROM:

```
mount CD-ROM device /cdrom
```



Note If you are running Solaris Volume Manager, the CD-ROM automatically mounts on the `/cdrom/cdrom0` directory.

Step 4 To change to the CBT Solaris directory and install CBT, enter:

```
cd /cdrom/cdrom0/solaris/cbt
./install
```

The CBT server is now running.

Step 5 (Optional) If you are not running Solaris Volume Manager, make sure that no other application is using `/cdrom` as the current directory so that you can unmount the CD by entering:

```
umount /cdrom
```



Note If you are running Solaris Volume Manager, the CD-ROM automatically unmounts.

Step 6 To eject the CD, enter:

```
eject
```

Step 7 To start CBT by using a command line, enter:

```
cd /opt/CSCObt/bin
./start_app
```

or

To access CBT by using a browser, open the browser and enter:

```
http://CBT server IP address:9080/
```



Note In the URL, *CBT server IP address* is the server on which you installed CBT.

Step 8 In the Log In window (see Figure 1), enter your username and password.

Step 9 (Optional) To stop CBT manually, enter:

```
cd /opt/CSCObt/bin
./stop_app
```

Figure 1 CBT Log In Window



Installing and Starting CiscoView on Solaris

Step 1 Log in as root.

Step 2 Insert the CiscoView for Solaris CD-ROM into the CD-ROM drive.

Step 3 (Optional) If you are not running Solaris Volume Manager as root, you have to mount the CD manually:

- If a mount point does not exist, create one by making a new /cdrom directory.
- Enter the following command, where *CD-ROM device* is the name of your CD-ROM:

```
mount CD-ROM device /cdrom
```



Note If you are running Solaris Volume Manager, the CD-ROM automatically mounts on the /cdrom/cdrom0 directory.

Step 4 To change to the CiscoView Solaris directory and install CiscoView, enter:

```
cd /cdrom/cdrom0/solaris/cv  
./setup.sh
```

The CBT server is now running.

Step 5 (Optional) If you are not running Solaris Volume Manager, make sure that no other application is using /cdrom as the current directory so that you can unmount the CD by entering:

```
umount /cdrom
```



Note If you are running Solaris Volume Manager, the CD-ROM automatically unmounts.

Step 6 To eject the CD, enter:

```
eject
```

Installing and Starting CBT on Windows

- Step 1** Insert the Cisco Broadband Troubleshooter Release 3.0 CD-ROM into the CD-ROM drive. Use the CD-ROM version for your operating system.
- Step 2** From Windows Explorer, double-click **CBT30-Win.exe** in CDRM-DRIVE\win.
- Step 3** Select the default answers to the installation questions.
The CBT server is now running.
- Step 4** To start CBT by using the menus, choose:
Start > Programs > Cisco Broadband Troubleshooter > Start Troubleshooter
or
To access CBT by using a browser, open the browser and enter:
`http://CBT server IP address:9080/`



Note In the URL, *CBT server IP address* is the server on which you installed CBT.

- Step 5** In the Log In window (see Figure 1), enter your username and password.
- Step 6** (Optional) To stop CBT manually, choose:
Start > Programs > Cisco Broadband Troubleshooter > Stop Troubleshooter
-

Installing and Starting CBT on Linux

Step 1 Log in as root.

Step 2 Insert the Cisco Broadband Troubleshooter Release 3.0 CD-ROM into the CD-ROM drive. Use the CD-ROM version for your operating system.

Step 3 To mount the CD, enter:

```
/bin/mount /mnt/cdrom
```

Step 4 To change to the CBT Linux directory, enter:

```
cd /mnt/cdrom/linux
```

Step 5 To start the installation program, enter:

```
./install
```

The CBT server is now running.

Step 6 To unmount and eject the CD, enter:

```
umount /mnt/cdrom  
eject
```

Step 7 To start CBT by using a command line, enter:

```
cd /opt/CSCObt/bin  
./start_app
```

or

To access CBT by using a browser, open the browser and enter:

```
http://CBT server IP address:9080/
```



Note In the URL, *CBT server IP address* is the server on which you installed CBT.

Step 8 In the Log In window (see Figure 1), enter your username and password.

Step 9 (Optional) To stop CBT manually, enter:

```
cd /opt/CSCObt/bin  
./stop_app
```

4 Configuring Cisco Broadband Troubleshooter

The following configuration requirements are prerequisites for using Cisco Broadband Troubleshooter 3.0:

- Configuring the cable modem termination system to use CBT's spectrum management tools
- Configuring the Sun Java Runtime Environment (JRE) 1.31
- (Optional) Configuring CiscoView
- (Optional) Configuring ESRI RouteMap files

Configuring the CMTS to Use CBT's Spectrum Management Tools

Cisco Broadband Troubleshooter 3.0 provides spectrum management functionality, which is generated by Digital Signal Processing (DSP) in the Cisco uBR-MC16S Spectrum Management Line Card on the CMTS. CBT's spectrum management tools require Cisco IOS Release 12.2(15)BC1. For more information, see "Minimum Cisco Universal Broadband Router and Cisco IOS Requirements" on page 5.

Before using the spectrum management features in Cisco Broadband Troubleshooter, you must complete spectrum management configuration tasks on the CMTS. These configurations are outside the scope of Broadband Troubleshooter.

For more information, refer to "Advanced Spectrum Management Configuration Tasks" at:

http://www.cisco.com/en/US/products/hw/cable/ps2217/products_configuration_guide_chapter09186a0080150964.html#86373

Configuring the Java Runtime Environment

The Sun JRE 1.31 is a plug-in that must be installed in the client browser. Cisco Broadband Troubleshooter detects if JRE 1.31 is installed in the browser. This section provides directions to install JRE 1.3.1 in the browsers supported by each platform.

Installing JRE 1.3.1 in Microsoft Internet Explorer on the Windows Platform

If JRE 1.3.1 is not installed in Internet Explorer on the Windows platform, the installation is automatic.

Installing JRE 1.3.1 in Netscape Navigator on the Windows Platform

If JRE 1.3.1 is not installed in Navigator on the Windows platform, you are directed to JREDownload.html.

To install JRE 1.3.1 in Netscape Navigator on the Windows platform:

Step 1 From JREDownload.html, save j2re-1_3_1_07-windows-i586-i.exe to a local directory.



Note In these directions, *JRE1.3.1_07InstallationDirectory* represents the local directory you choose.

Step 2 To install JRE 1.3.1, choose:

Start > Run > *JRE1.3.1_07InstallationDirectory* \j2re-1_3_1_07-windows-i586-i.exe

Step 3 Close Navigator.

Step 4 Reopen Navigator.

Installing JRE 1.4.1 in Netscape Navigator on the Solaris Platform

If JRE 1.4.1 is not installed in Navigator on the Solaris platform, you are directed to JREDownload.html.

To install JRE 1.4.1 on the Solaris platform:

Step 1 From JREDownload.html, save `j2re-1_4_1_01-solaris.sparc.sh` to a local directory.



Note In these directions, *JRE1.4.1_07InstallationDirectory* represents the local directory you choose and *Netscape7.0InstallationDirectory* represents directory where Netscape 7.0 is installed.

Step 2 To install JRE 1.4.1, enter:

```
j2re-1_4_1_01-solaris.sparc.sh
```

Step 3 Point to the Java plug-in by typing the command for the version of Netscape you are using:

Netscape 4.7—Set the environment variable `NPX_PLUGIN_PATH` to point to the Java plug-in by entering:

```
setenv NPX_PLUGIN_PATH JRE1.4.1_01InstallationDirectory/plugin/sparc/ns4
```

Netscape 7.0—Create a softlink to point to the Java plug-in by entering:

```
ln -s JRE1.4.1_01InstallationDirectory/plugin/sparc/ns610/libjavaplugin_oji.so  
Netscape7.0InstallationDirectory/plugins/libjavaplugin_oji.so
```

Step 4 Close Navigator.

Step 5 Reopen Navigator.

Installing JRE 1.4.1 in Netscape Navigator on the Linux Platform

If JRE 1.4.1 is not installed in Navigator on the Linux platform, you are directed to JREDownload.html.

To install JRE 1.4.1 on the Linux platform:

Step 1 Save `j2re-1_4_1_01-linux-i586.bin` to a local directory.



Note In these directions, *JRE1.4.1_07InstallationDirectory* represents the local directory you choose and *Netscape7.0InstallationDirectory* represents directory where Netscape 7.0 is installed.

Step 2 To install JRE 1.4.1, enter:

```
j2re-1_4_1_01-linux-i586.bin
```

Step 3 Point to the Java plug-in by typing the command for the version of Netscape you are using:

Netscape 4.7—Set the environment variable `NPX_PLUGIN_PATH` to point to the Java plug-in by entering:

```
setenv NPX_PLUGIN_PATH JRE1.4.1_07InstallationDirectory/plugin/i386/ns4
```

Netscape 7.0—Create a softlink to point to the Java plug-in by entering:

```
ln -s JRE1.4.1_07InstallationDirectory/plugin/i386/ns610/libjavaplugin_oji.so  
Netscape7.0InstallationDirectory/plugins/libjavaplugin_oji.so
```

Step 4 Close Navigator.

Step 5 Reopen Navigator.

(Optional) Configuring CiscoView

CiscoView is a web-based device management application that provides dynamic status, monitoring, and configuration information for a range of Cisco internetworking products. CiscoView displays a physical view of a device chassis, with color-coding of modules and ports for at-a-glance status and has two levels of capabilities:

- **Monitoring capabilities**—Displays performance and other statistics
- **Configuration capabilities**—Allows comprehensive changes to devices, if you have security privileges

For product information, refer to:

<http://www.cisco.com/en/US/products/sw/cscowork/ps4565/index.html>

You can launch CiscoView 5.x from CBT to monitor a device and get real-time information on it.

To configure and launch CiscoView from CBT:

-
- Step 1** To identify the CiscoView server so that CBT can launch the application, from the **Configuration** menu, choose **CiscoView Server**.
 - Step 2** To identify the device that you want to monitor with CiscoView, from the **Utilities** menu, choose **CiscoView**.
 - Step 3** For a complete description of each field in the CiscoView dialog boxes, click **Help**.
-



Note The Solaris installation package for CBT 3.0 includes the CiscoView installation package.

(Optional) Configuring ESRI RouteMap Files

ESRI RouteMAP is a third-party product that is an Internet-based site locator and mapping application. It enables network engineering professionals to view their entire network of cable modems down to the street level.

For product information, refer to:

<http://www.esri.com/software/routemapims/index.html>

If you have RouteMap installed, follow the directions in this section to install and start updated map-related files.



Note The map server PC may be different from the machine on which Cisco Broadband Troubleshooter is installed. To install and start the map-related files, you must use the map server PC.

To install and start map-related files from the map server PC:

Step 1 To start the map server application, choose:

Start > Program > Esri > RouteMap... > Server Manager > Map Service

Step 2 To stop the map server, from the Map Server menu, choose:

Tools > Stop Server

The ESRI map server stops.

Step 3 To start Windows Explorer, choose:

Start > Programs > Accessories > Windows Explorer

Step 4 Insert the Cisco Broadband Troubleshooter Release 3.0 CD-ROM into the CD-ROM drive. Select the CD-ROM drive and double-click **maps.zip** to extract the files in maps.zip to a local directory.



Note In these directions, *MapFileDirectory* represents the local directory you choose.

Step 5 To install the map files on the map server, double-click *MapFileDirectory*\disk1\setup.exe and click **Next**.

Step 6 Enter the CBT Installation CD-ROM drive or the *MapFileDirectory* and click **Next**.

Step 7 Enter the path to the Internet Information Server (IIS) root directory and click **Next**.

Step 8 Enter the path to the ESRI RouteMap root directory.

Step 9 To start the map server application, choose:

Start > Program > Esri > RouteMap... > Server Manager > Map Service

Step 10 To start the map server, from Map Server menu, choose:

Tools > Start Server

5 Reviewing the CBT Task Menu

After you log on to CBT, you see the following menu:

Figure 2 CBT Task Menu



Above the menu, your user type is displayed. For more information on user types, see “User Types in CBT” on page 17.

All tasks in CBT are divided into the following menus:

- User Guide
- Configuration
- Diagnostics
- Hotline Tools
- Spectrum Tools
- Utilities
- User Log Out

The next sections describe the tasks within each menu.

User Guide

The User Guide menu contains one task:

- **User Guide**—To link to the *Cisco Broadband Troubleshooter User Guide*

Configuration

The Configuration menu contains the following tasks:

- **User List**—To specify who can access the application and with what level of access permissions
- **CMTS List**—To specify the routers you want to manage, by entering the information manually
- **CMTS Group**—To organize CMTSs into groups, so that you can manage several CMTSs as one unit
- **Flap List Scheduler**—To schedule a time to capture data from one or more CMTSs
- **Flap List Parameters**—To specify configuration parameters for the flap list
- **CiscoView Server**—To identify the CiscoView server so that you can launch CiscoView from CBT
- **Message Log**—To filter which error and informational messages are logged by the server
- **System**—To modify system-level parameters that are saved to the CONFIGS.INI file
- **External Interface**—To specify how and where to access subscriber and provisioning information
- **Poller**—To schedule how often the Poller gets provisioning information from CMTSs

Diagnostics

The Diagnostics menu contains the following tasks:

- **Flap List Analysis**—To analyze the results of data captured for the selected CMTSs
- **Cable Monitor Tool**—To get summary information for Cisco cable modems

Hotline Tools

The Hotline Tools menu contains the following tasks:

- **Locate Modem**—To get summary information on one or more cable modems
- **Modem Status**—To generate a real-time status report for a cable modem
- **CMTS Dashboard**—To get detailed information on one or more CMTSs
- **Ping Test**—To see if a device has connectivity
- **CiscoView**—To identify the device that you want to monitor with CiscoView

Spectrum Tools

The Spectrum Tools menu contains the following tasks:

- **Trace Window**—To monitor the power and noise levels for a selected cable modem or upstream port
- **Spectrogram**—To monitor the power and noise levels over time for a selected cable modem or upstream port
- **CNR Analysis**—To retrieve carrier-to-noise ratio for selected modems or upstream ports
- **Data Playback**
 - **Trace Window**—To play back a saved Trace Window
 - **CNR Analysis**—To play back a saved CNR Analysis
- **Clients**—To get a list of each spectrum analysis in process on a client machine

Utilities

The Utilities menu contains the following tasks:

- **Import**
 - **CMTS List**—To import an ASCII text file of subscriber data, such as name and phone number
 - **Subscriber Data**—To import an ASCII text file of all the managed CMTSs, so that you don't have to enter each CMTS manually
- **Map Calculation**—To convert customer addresses into X/Y coordinates if you are using the optional third-party application, ESRI RouteMAP
- **Purge Saved Data**
 - **Flap List**—To remove a saved Flap List Analysis from the database
 - **Spectrum Data**—To remove a saved Trace Window or CNR Analysis from the database
- **Message Log**—To view error and information messages logged by the server, by using filters to show the level of detail you want

User Log Out

The User Log Out menu contains one task:

- **User Log Out**—To log out of Cisco Broadband Troubleshooter

User Types in CBT

The number of tasks you see in the CBT menu varies according to the type of user you are. There are two user types in CBT, each with access to different tasks:

- **ADMIN**—The administrator has access to all tasks in each menu.
- **RFTECH**—The RF technician has access to a subset of tasks in the following menus:
 - **Configuration menu**—Can access the Flap List Scheduler task only. Figure 3 shows the Configuration menu for each user type.
 - **Utilities menu**—Can access the Purge Saved Data and Message Log tasks only. Figure 4 shows the Utilities menu for each user type.

In each other menu, the RFTECH user has access to all tasks.

Figure 3 Configuration Menus for ADMIN and RFTECH Users



Figure 4 Utilities Menus for ADMIN and RFTECH Users



Workflow of Administrator and RF Technician Tasks

Figure 5 Administrator and RF Technician Tasks in CBT

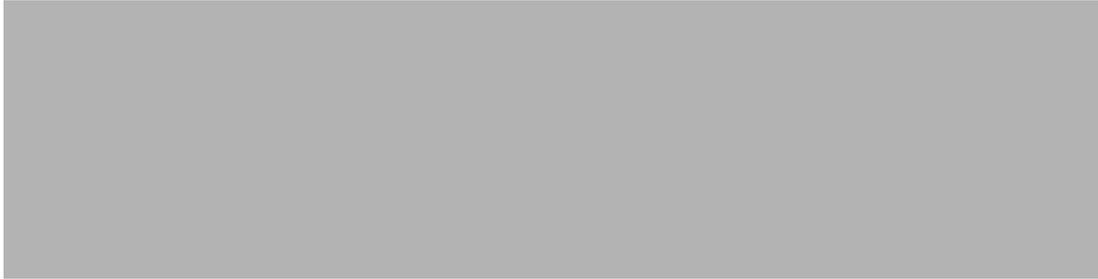


Figure 5 illustrates a high-level workflow of tasks that each type of user, the administrator and the RF technician, performs in CBT.

Administrator Tasks

The first four tasks shown in Figure 5 are ones that only an administrator can perform.

- **Install CBT**—The administrator installs CBT on one of the supported platforms: Linux, Solaris, or Windows.
- **Change administrator’s password**—The administrator changes the default ADMIN password to ensure proper security.
- **Set up CBT**—The administrator performs the following setup tasks to configure CBT according to the site’s needs:
 - Add users, routers, and subscriber information
 - Configure parameters in .INI files: CONFIGS.INI, POLLER.INI, and SPECTRUM.INI
 - Set message log options to see errors logged by the server
- **Set up an external interface (optional)**—If CBT will not retrieve subscriber or provisioning data from its local database, which is the system default, the administrator sets up an external interface to retrieve the data by using one of the following methods:
 - **Subscriber information**—Can be accessed by script, HTTP, or Lightweight Directory Access Protocol (LDAP)
 - **Provisioning information**—Can be accessed by script, HTTP, LDAP, Cisco Broadband Provisioning Registrar (BPR), or Cisco Network Registrar (CNR)



Note BPR and CNR have recently been renamed. BPR will be called Cisco Broadband Access Center for Cable (BACC). CNR will be called Cisco CNS Network Registrar (CNS-NR). You will see the new names on cisco.com and in future releases. The CBT 3.0 GUI and documentation use the former names and acronyms.

The remainder of this guide explains these tasks in greater detail.

RF Tech Tasks

The last task shown in Figure 5 is one that the RF technician performs:

- **Use CBT to diagnose RF Problems**—The RF technician can diagnose a frequency problem in the cable plant by using any or all of CBT’s troubleshooting capabilities:
 - **CMTS dashboard**—To view summary information on a CMTS and the cable modems attached to it
 - **Flap list analysis**—To analyze data from a CMTS and categorize problems into four groups: provisioning, reverse path noise, reverse path attenuation, and packet corruption
 - **Spectrum management tools**—To view performance data for an upstream port or cable modem
 - **Cable modem tools**—To ping, monitor, or query a cable modem to assess its status

6 Setting Up CBT with a Password, Users, and Data for Routers and Subscribers

This section describes the following important setup tasks that only a CBT administrator can perform:

- Changing the administrative password
- Adding users
- Adding router information
- Adding subscriber information

Changing the Admin Password

For security reasons, we recommend that you change the default password for the administrator.

To change the administrator password:

Step 1 Open the browser and enter the URL for your CBT server:

`http://CBT server IP address:9080/`



Note In the URL, *CBT server IP address* is the server on which you installed CBT.

The Login dialog box appears, as shown in Figure 1.

Step 2 Log in as **admin** with the default password **changeme**.

Step 3 To change the password, from the **Configuration** menu, choose **User List**.

About Adding Users

You add users in CBT by specifying the following information for a user:

- User Name—Specifies the name the user enters in the Login dialog box.
- Password—Specifies the password the user enters in the Login dialog box.
- User Type—Determines the level of privileges the user has. The two choices are ADMIN and RFTECH.

Adding Users

To add users in CBT:

Step 1 Log in as **admin**.

Step 2 From the **Configuration** menu, choose **User List**. (See Figure 6.)

Figure 6 *Manage Users Dialog Box*



About Adding Router Information

You can add router information in CBT by using either of the following methods:

- Enter information for a router by manually filling in fields for each router.
- Import an ASCII file that contains a list of managed CMTSs. A sample file is in the following locations:
 - **Linux and Solaris**—`/opt/CSCOCBT/samples/showmap/cmts.txt`
 - **Windows**—`%CSCOCBT_ROOT%\samples\showmap\cmts.txt`

If you import an ASCII file, the file must contain 13 fields for each CMTS:

- Fields 1 to 4—IP address, Community String (Read), Community String (Write), and CM Community String (Read).
- Fields 5 to 9—User Name, User Password, Line Password, Enable Password, and Telnet Enable.
- Field 10—Telnet port the router uses (the default is 23).
- Fields 11 and 12—AAA Username Prompt and AAA Password Prompt.
- Field 13—Setting to Ping CMTS. The options are *yes* or *no*, and the default is *yes*.

Each field must be separated by a comma (,). If you leave a field blank, use a comma as a placeholder for it.

Example 1 *ASCII File Format for One CMTS*

The following example shows the data for a CMTS in this format:

```
172.21.73.10,public,private,public,jdoe,nAda,nAda,nAda,yes,23,UserName>Password,yes
```

Adding Router Information

To add information about the Cisco uBR7100 series, Cisco uBR7200 series, and Cisco uBR10012 series universal broadband router in CBT:

Step 1 Log in as **admin**.

Step 2 Choose a method to import router information:

- To add information for a router manually, from the **Configuration** menu, choose **CMTS List**.
- To add information by importing an ASCII file of router information, from the **Utilities** menu, choose **Import, CMTS List**. (See Figure 7.)

Step 3 For a complete description of each field in the CMTS List dialog boxes, click **Help**.



Tip To successfully manage routers, make sure that you enable SNMP on these routers. Verify that access lists, if configured in the router, allow for SNMP read access from your workstation.



Note The CMTS name cannot contain a question mark (?).

Figure 7 *Import a List of CMTSs Dialog Box*



About Adding Subscriber Information

To add subscriber information in CBT, you import an ASCII text file that contains the subscriber information. A sample file is in the following locations:

- **Linux and Solaris**—/opt/CSCOCBT/samples/showmap/subscriberinfo.txt
- **Windows**—%CSCOCBT_ROOT%\samples\showmap\subscriberinfo.txt

For each subscriber, the ASCII text file must contain 12 fields. The following fields are typical, although only the first one is required:

1. Cable Modem MAC Address
2. Account ID
3. Customer Name
4. Phone Number
5. Address
6. City
7. State
8. Zip
9. Country
10. Class of Service
11. Fiber Node
12. User-Defined Field

Each field, including blank ones, must be separated with | (the pipe symbol).

Example 2 *ASCII File Format for One Subscriber*

The following example shows the data for a subscriber in this format:

```
000216d5a0cf|ID987654|JohnDoe|4085551212|175 West Tasman|San Jose|CA|95134|USA|Gold|FiberNode_SanJose|Paid
```

Adding Subscriber Information

To add subscriber information to CBT:

-
- Step 1** Log in as **admin**.
 - Step 2** From the **Utilities** menu, choose **Import, Subscriber Data**. (See Figure 8.)
 - Step 3** For a complete description of each field, click **Help**.
-

Figure 8 *Import Subscriber Data Dialog Box*



7 Setting Parameters in .INI Files

This section describes the parameters you set in three .INI files in CBT:

- CONFIGS.INI—Where you set certain system-level parameters
- POLLER.INI—Where you set parameters for the Poller, the separate Java application that polls CMTSs for provisioning data
- SPECTRUM.INI—Where you set parameters for the spectrum management tools



Note Cisco Broadband Troubleshooter and Cisco Cable Diagnostic Manager (CCDM) are companion network management software applications that share some functionality. CCDM is for the MSO customer service representative. In some instances, a parameter in an .INI file applies to one product but not to the other. Those parameters are identified in this section.

Parameters in the CONFIGS.INI File

In addition to specifying system-level parameters in the CONFIGS.INI file, you can also specify some of the parameters in the GUI.



Tip To specify configuration parameters in the GUI, from the **Configuration** menu, choose **System**.

This section describes parameters that you configure in the CONFIGS.INI file, which is in the following locations:

- **Linux**—/opt/CSCOcbt/jakarta-tomcat-4.0.3/webapps/ROOT/WEB-INF/classes
- **Solaris**—/opt/CSCOcbt/httpServer/servlets
- **Windows**—%CSCOCBT_ROOT%\httpServer\jserv1.1.2\servlets



Note When you configure parameters in CONFIGS.INI, you must restart the CBT server for the new settings to take effect.

Phone Number Format

The phoneLength parameter applies to Cisco Cable Diagnostic Manager only.

Modem Status Thresholds

When you view a status report for cable modem, color-coding indicates the modem's status:

- **Green**—Indicates a normal condition. The modem is online and is within the thresholds that have been specified to indicate proper performance.
- **Red**—Indicates that an error condition exists. The modem is under or over thresholds that have been specified to indicate proper performance.

The following parameters set the thresholds that determine the boundaries for color-coding and must be configured in the CONFIGS.INI file:

- upstreamXmitPowerFloor
- upstreamXmitPowerCeiling
- downstreamSnrFloor
- downstreamReceivePowerFloor
- downstreamReceivePowerCeiling

upstreamXmitPowerFloor—This parameter determines the minimum upstream transmit power for a cable modem to show a functioning status. This measurement is expressed in decibels millivolt (dBmV). The default setting is 34, as shown below:

```
upstreamXmitPowerFloor=34
```

upstreamXmitPowerCeiling—This parameter determines the maximum upstream transmit power for a cable modem to show a functioning status. This measurement is expressed in decibels millivolt (dBmV). The default setting is 52, as shown below:

```
upstreamXmitPowerCeiling=52
```

downstreamSnrFloor—This parameter determines the minimum signal-to-noise (SNR) for a cable modem to show a functioning status. SNR is a measure of transmission quality, which is expressed by the ratio of good data (signal) to interference (noise) that is heard on a line. This ratio is measured in decibels (dB). A higher ratio indicates a better transmission quality. For example, 30 dB is better than 24 dB. The default setting is 30, as shown below:

```
downstreamSnrFloor=30
```

downstreamReceivePowerFloor—This parameter determines the minimum downstream receive power for a cable modem to show a functioning status. This measurement is expressed in decibels millivolt (dBmV). The default setting is 15, as shown below:

```
downstreamReceivePowerFloor=15
```

downstreamReceivePowerCeiling—This parameter determines the maximum downstream receive power for a cable modem to show a functioning status. This measurement is expressed in decibels millivolt (dBmV). The default setting is 5, as shown below:

```
downstreamReceivePowerCeiling=5
```

Southbound Interface Settings

These parameters apply to Cisco Cable Diagnostic Manager only:

SouthBoundExtIntf

SouthBoundExtIntfTimeout

Modem State Settings

These parameters apply to Cisco Cable Diagnostic Manager only:

ModemStateMaxLife

ModemStateMaxHash

Query Timeout

The administrator specifies external interface parameters to access subscriber and provisioning information. Most of these parameters are in the Set External Interfaces dialog box. However, you must configure the following external interface parameters in the CONFIGS.INI file.

SubscriberExtIntfTimeout—This parameter determines the maximum wait time before CBT times out during a query for subscriber information. This measurement is expressed in milliseconds (msecs). The default setting is 5000, which is equal to 5 seconds, as shown below:

```
SubscriberExtIntfTimeout=5000
```

ProvisionExtIntfTimeout—This parameter determines the maximum wait time before CBT times out during a query for provisioning information. This measurement is expressed in milliseconds (msecs). The default setting is 5000, which is equal to 5 seconds, as shown below:

```
ProvisionExtIntfTimeout=5000
```

Parameters in the POLLER.INI File

When it starts, the Poller accesses the POLLER.INI file, which is in the following locations:

- **Linux and Solaris**—/opt/CSCOcbt/bin
- **Windows**—%CSCOCBT_ROOT%\bin



Note For a detailed description of the Poller, see “About the Poller” on page 37.

The Poller accesses POLLER.INI to gather the following configurable parameters:

- maximumThread
- maximumDBConnection
- SnmpTimeout
- SnmpRetry
- Debug
- maximumAge
- PollerServerPort

maximumDBConnection—This parameter determines the maximum number of CBT Sybase database connections the Poller uses to perform the polling operation. The valid range is 1 to 7. The default setting is 7, as shown below:

```
maximumDBConnection=7
```

SnmpTimeout—This parameter determines the number of seconds before the attempt to create the SNMP connection will reach a timeout or fail. The valid range is 1 to 3. The default setting is 2, as shown below:

```
SnmpTimeout=2
```

SnmpRetry—This parameter determines the number of times you want to try to create the SNMP connection. The valid range is 1 to 5. The default setting is 3, as shown below:

```
SnmpRetry=3
```

Debug—This parameter determines if debug messages are sent to the log file, which is in the following location:

```
/opt/CSCOcbt/logs/Poller.log
```

Valid values are true and false. The default setting is false, as shown below:

```
Debug=false
```

maximumAge—This parameter tells the Poller which outdated records to purge, based on the number of polling intervals that have occurred during which those records have not been updated. This measurement is expressed in polling intervals. A valid range is 1 to 7. The default setting is 2, as shown below:

```
maximumAge=2
```

PollerServerPort—This parameter sets the HTTP server port number where the Poll Manager listens to polling requests. The default setting is 8040:

```
PollerServerPort=8040
```



Note If a parameter in POLLER.INI is set out of the valid range, CBT resets the parameter to its default value.

Parameters in the SPECTRUM.INI File

The parameters you specify in the SPECTRUM.INI file affect the following spectrum management tools:

- Trace Window
- Spectrogram
- CNR Analysis
- Data Playback

This section describes parameters that you configure in the SPECTRUM.INI file, which is in the following locations:

- **Linux**—`/opt/CSCOcbt/jakarta-tomcat-4.0.3/webapps/ROOT/WEB-INF/classes`
- **Solaris**—`/opt/CSCOcbt/httpServer/servlets`
- **Windows**—`%CSCOCBT_ROOT%\httpServer\jserv1.1.2\servlets`



Note When you configure parameters in SPECTRUM.INI, you must restart the CBT server for the new settings to take effect.

The spectrum management tools access SPECTRUM.INI to gather the following configurable parameters:

- CNRFloor
- CNRCeiling
- CNRFloorColor
- CNRCeilingColor
- SpecDataMaxRequests
- SpecDataQueryInterval
- SpecDataMaxCPU
- CableModemCacheAge

CNRFloor—This parameter determines the lower threshold for the carrier-to-noise ratio that you see in the spectrum tools. CNR is a measure of transmission quality, which is expressed by the ratio of good data from the carrier to interference or noise that is heard on a line. A higher ratio indicates a better transmission quality. If the CNR is below this lower threshold, the value is highlighted in the color you specify in the CNRFloorColor parameter. This measurement is expressed in decibels (dB). Acceptable values range from -20 to 60 dB. If an unacceptable value is entered, the system default is used. The default setting is 20, as shown below:

```
CNRFloor=20
```

CNRCeiling—This parameter determines the upper threshold for the carrier-to-noise ratio that you see in the spectrum tools. CNR is a measure of transmission quality, which is expressed by the ratio of good data from the carrier to interference or noise that is heard on a line. A higher ratio indicates a better transmission quality. If the CNR is below this upper threshold, the value is highlighted in the color you specify in the CNRCeilingColor parameter. This measurement is expressed in decibels (dB). Acceptable values range from -20 to 60 dB. If an unacceptable value is entered, the system default is used. The default setting is 30, as shown below:

```
CNRCeiling=30
```

CNRFloorColor—This parameter determines the color that is used to highlight a carrier-to-noise ratio that is below the lower threshold, which you specify in the CNRFloor parameter. Accepted colors are red, yellow, blue, cyan, green, magenta, orange, and pink. If an unacceptable color is entered, the system default is used. The default setting is red, as shown below:

```
CNRFloorColor=Red
```

CNRCeilingColor—This parameter determines the color that is used to highlight a carrier-to-noise ratio that is below the upper threshold, which you specify in the CNRCeiling parameter. Accepted colors are red, yellow, blue, cyan, green, magenta, orange, and pink. If an unacceptable color is entered, the system default is used. The default setting is yellow, as shown below:

```
CNRCeilingColor=Yellow
```

SpecDataMaxRequests—This parameter determines the maximum number of active rows of `ccsSpectrumRequestTable` in the CMTS SNMP agent. This setting is necessary to avoid overloading the CMTS, and CBT checks to ensure that the number is not exceeded. If the number of active rows in the associated CMTS has reached the specified value, new spectrum requests cannot be launched. The default setting is 10, as shown below:

```
SpecDataMaxRequests=10
```

SpecDataQueryInterval—This parameter determines the time required after a spectrum data response and before the next spectrum data query. This measurement is expressed in milliseconds and should not be edited. The default setting is 5000, as shown below:

```
SpecDataQueryInterval=5000
```

SpecDataMaxCPU—This parameter determines the CPU utilization in the CMTS SNMP agent. This setting is necessary to avoid overloading the CMTS, and CBT checks to ensure that the percentage is not exceeded. If the CPU utilization in the associated CMTS has reached the specified value, new spectrum requests cannot be launched. This measurement is expressed in percentage. The default setting is 80, as shown below:

```
SpecDataMaxCPU=80
```

CableModemCacheAge—This parameter determines the cable modem caching time for the spectrum management tools. If the value is set to 0, the CBT server generates an SNMP request and bypasses the cache, which slows down performance if there are many modems associated with the selected CMTS. This measurement is expressed in seconds. If a negative number is entered, the system default is used. The default setting is 3600, as shown below:

```
CableModemCacheAge=3600
```



Note You can update the cache for a selected CMTS manually by using the GUI. From the Spectrum Tools menu, choose **Trace Window, Spectrogram, or CNR Analysis**. Then click **Update CM Info**.

8 Retrieving Subscriber or Provisioning Data by Using an External Interface

With CBT you can set up an external interface to retrieve subscriber or provisioning data:

- **Subscriber information**—Data such as a customer’s name and account number
- **Provisioning information**—Data such as the IP address for a customer’s cable modem and the IP address for the CMTS on which the modem is located

You can use the following methods to set up an external interface:

- **Script**—Can be used for subscriber or provisioning information or both
- **Application on an HTTP server**—Can be used for subscriber or provisioning information or both
- **LDAP**—Can be used for subscriber or provisioning information or both
- **BPR**—Can be used for provisioning information only
- **CNR**—Can be used for provisioning information only
- **Local Database**—(Default) Can be used for subscriber or provisioning information or both



Note If you set an external interface and CBT does not find subscriber or provisioning data there, CBT reverts to the local database.

Figure 9 shows the dialog box where you specify the method. The remainder of this section describes how to set up an external interface with each method.

Figure 9 Set External Interfaces Dialog Box



About Retrieving Data with a Script

You can implement an external data retrieval application by using a scripting language. To see a sample script that you can modify according to your needs, see “Shell Script for Retrieving Subscriber or Provisioning Information” on page 68.



Note You can also implement an external data retrieval application in programming languages such as PL/SQL, C/C++, and Java, as long as it is embedded in a shell script.

Script Parameters for MAC Address Information

The script must support the ability to search for a cable modem’s MAC address by entering the customer’s phone number or IP address. The input parameters for the script are:

- *subscriber-info-script-name* GET_MAC PHONE *phone-number*
- *provision-info-script-name* GET_MAC IP *ip-address*

For example, the following script invokes a search for the modem’s MAC address by using the phone number 408-123-4567:

```
/opt/tools/subscriber-query.sh GET_MAC PHONE 4081234567
```

The next script invokes a search for the modem's MAC address by using the IP address 172.2.3.1:

```
/opt/tools/provision-query.sh GET_MAC IP 172.2.3.1
```

 **Note** A MAC address query by phone number invokes the subscriber information script. A MAC address query by IP address invokes the provisioning information script.

The output of the script must be in the following format:

```
OUT_DATA=MAC followed by one or more MAC addresses (non-dotted format) separated by ^
```

The following examples show the output for one and two MAC addresses:

```
OUT_DATA=MAC^001c64ff23ef^
OUT_DATA=MAC^001c64ff23ef^013e45ed1245^
```

Script Parameters for Subscriber Information

If you use a script to query subscriber information, it needs to support the ability to search for subscriber data, such as name and account number, by entering the MAC address of the subscriber's cable modem. The input parameters for the script are:

```
script-name GET_SUBSCRIBER MAC non-dotted-modem-mac-address
```

For example, the following script invokes a search for subscriber data by using the MAC address 001c.ab23.45fe in a non-dotted format:

```
/opt/tools/subscriber-query.sh GET_ SUBSCRIBER MAC 001cab2345fe
```

The output of the script must be in the following format, separated by ^:

```
OUT_DATA=SUBSCRIBER^Field1=value1^Field2=value2^Field3=value3^Field4=value4^Field5=value5^
```

The following example shows the output for a subscriber's data:

```
OUT_DATA=SUBSCRIBER^Account Number=123456^Name=Doe_John^Address=123 Tasman, San Jose, CA
93443^Phone=4081234567^Class of Service=N/A^FiberNode=FIBER_1^Customer Since=1999^Account
Status=Paid
```

 **Note** In the Real-Time Modem Status Report, CBT displays subscriber information in the order in which the fields are returned from the script.

Script Parameters for Provisioning Information

If you use a script to query provisioning information, it needs to support the ability to search for provisioning data, such as CMTS and cable modem IP addresses, by entering the MAC address of a cable modem. The input parameters for the script are:

```
script-name GET_PROVISION MAC non-dotted-modem-mac-address
```

For example, the following script invokes a search for provisioning data by using the MAC address 001c.ab23.45fe:

```
/opt/tools/subscriber-query.sh GET_PROVISION MAC 001cab2345fe
```

The output of the script must be in the following format:

```
OUT_DATA=PROVISION^cmts-ip-address^cm-ip-address^
```

The following example shows the output for provisioning data:

```
OUT_DATA=PROVISION^127.23.45.1^127.23.127.5^
```

Error Handling for Script

If an error occurs within the script or the embedded application called by the script, the script should return the output in the following format:

```
OUT_DATA=ERROR^error-message^
```

The following example shows output for an error:

```
OUT_DATA=ERROR^Unable to query the subscriber database.^
```

In the graphical user interface (GUI), CBT displays the error message to the user in a message box.

Retrieving Data with a Script

To retrieve subscriber or provisioning information by using a script:

-
- Step 1** Review the sample script and modify it according to your needs. See “Sample Script Code” on page 71.
 - Step 2** From the **Configuration** menu, choose **External Interface** to specify one or both of the following:
 - In the **Subscriber Information** section, click **Script** and enter the **Script Location** of the file.
 - In the **Provisioning Information** section, click **Script** and enter the **Script Location** of the file.
 - Step 3** For a complete description of each field in the External Interface dialog box, click **Help**.
-

Troubleshooting Script Problems

See “Directions for Troubleshooting the Script” on page 69.

About Retrieving Data with an Application on an HTTP Server

You can implement an external data retrieval application by using an application running on an HTTP server. CBT sends the request to the HTTP server by using the POST method. To see a sample application file that you can modify according to your needs, see “Java Code for Retrieving Subscriber or Provisioning Information” on page 72.

HTTP Parameters for MAC Address Information

The application running on an HTTP server must support the ability to search for a cable modem’s MAC address by entering the customer’s phone number or IP address. CBT sends the following parameters to the appropriate server:

- REQUEST=GET_MAC
- SEARCH_TYPE=PHONE or IP
- IN_PARAM=phone or ip

For example, the following parameters search for the modem’s MAC address by using the phone number 408-123-4567:

```
REQUEST=GET_MAC  
SEARCH_TYPE=PHONE  
IN_PARAM=4081234567
```

The response from the server must be in the following format:

```
OUT_DATA=MAC followed by one or more MAC addresses separated by ^
```

The following examples show the output for one and two MAC addresses:

```
OUT_DATA=MAC^001c64ff23ef^  
OUT_DATA=MAC^001c64ff23ef^013e45ed1245^
```



Note When the SEARCH_TYPE is PHONE, the subscriber information URL is used. When the SEARCH_TYPE is IP, the provisioning information URL is used.

HTTP Parameters for Subscriber Information

If you use an application running on an HTTP server to query subscriber information, it needs to support the ability to search for subscriber data, such as name and account number, by entering the MAC address of the subscriber's cable modem. CBT sends the following parameters to the server:

- REQUEST=GET_SUBSCRIBER
- SEARCH_TYPE=MAC
- IN_PARAM=*non-dotted-modem-mac-address*

For example, the following parameters search for subscriber data by using the MAC address 001cab2345fe:

```
REQUEST=GET_SUBSCRIBER
SEARCH_TYPE=MAC
IN_PARAM=001cab2345fe
```

The output of the script must be in the following format, separated by ^:

```
OUT_DATA=SUBSCRIBER^Field1=value1^Field2=value2^Field3=value3^Field4=value4^Field5=value5^
```

The following example shows the output for a subscriber's data:

```
OUT_DATA=SUBSCRIBER^Account Number=123456^Name=Doe_John^Address=123 Tasman, San Jose, CA
93443^Phone=4081234567^Class of Service=N/A^FiberNode=FIBER_1^Customer Since=1999^Account
Status=Paid
```



Note In the Real-Time Modem Status Report, CBT displays subscriber information in the order in which the fields are returned from the script.

HTTP Parameters for Provisioning Information

If you use an application running on an HTTP server to query provisioning information, it needs to support the ability to search for provisioning data, such as CMTS and cable modem IP addresses, by entering the MAC address of the cable modem. CBT sends the following parameters to the server:

- REQUEST=GET_PROVISION
- SEARCH_TYPE=MAC
- IN_PARAM=*non-dotted-modem-mac-address*

For example, the following parameters search for provisioning data by using the MAC address 001cab2345fe:

```
REQUEST=GET_PROVISION
SEARCH_TYPE=MAC
IN_PARAM=001cab2345fe
```

The response from the server must be in the following format:

```
OUT_DATA=PROVISION^cmts-ip-address^cm-ip-address^
```

The following example shows the output for provisioning data:

```
OUT_DATA=PROVISION^127.23.45.1^127.23.127.5^
```

Error Handling for HTTP

If an error occurs within the application running on an HTTP server, the script should return the output in the following format:

```
OUT_DATA=ERROR^error-message^
```

The following example shows output for an error:

```
OUT_DATA=ERROR^Unable to query the subscriber database.^
```

In the GUI, CBT displays the error message to the user in a message box.

Retrieving Data with an HTTP Application

To retrieve subscriber or provisioning information with an application on an HTTP server:

-
- Step 1** Review the sample application file and modify it according to your needs. See “Sample Java Code” on page 76.
- Step 2** From the **Configuration** menu, choose **External Interface** to specify one or both of the following:
- In the **Subscriber Information** section, click **HTTP** and enter the **URL Location** of the file.
 - In the **Provisioning Information** section, click **HTTP** and enter the **URL Location** of the file.
- Step 3** For a complete description of each field in the External Interface dialog box, click **Help**.
-

Troubleshooting HTTP Problems

See “Directions for Troubleshooting the Sample HTTP Application” on page 74.

About Retrieving Data with LDAP

You can use Lightweight Directory Access Protocol (LDAP) to retrieve external subscriber or provisioning information. LDAP is a nonproprietary, standards-based protocol. If you use the LDAP method, see your LDAP server administrator to obtain the information about the LDAP server that CBT requires.

CBT 3.0 supports LDAP Version 2.0, which was tested with Netscape LDAP Server Version 4.0 and iPlanet Version 5.1.

Retrieving Data with LDAP

To retrieve external subscriber or provisioning information by using LDAP:

-
- Step 1** From the Configuration menu, choose **External Interface**.
- Step 2** Depending on the type of information you want to retrieve, do one or both of the following:
- To retrieve subscriber information, in the Subscriber Information section select **LDAP** and click **LDAP Access Parameters** to open the LDAP Access Parameters dialog box.
 - To retrieve provisioning information, in the Provisioning Information section select **LDAP** and click **LDAP Access Parameters** to open the LDAP Access Parameters dialog box.
- Step 3** To fill in the LDAP Access Parameters dialog box, see your LDAP server administrator to obtain the required information and click **Help** for directions on how to fill in each of the LDAP fields that CBT requires.
-

About Retrieving Data with BPR

You can retrieve provisioning information only by using BPR, which stands for Cisco Broadband Provisioning Registrar. BPR automates provisioning and configuration tasks. CBT supports BPR 2.0. For product information, refer to:

<http://www.cisco.com/en/US/products/sw/netmgtsw/ps529/index.html>



Note BPR has recently been renamed as Cisco Broadband Access Center for Cable (BACC). You will see the new name on cisco.com and in future releases. The CBT 3.0 GUI and documentation use the former name and acronym.

Retrieving Data with BPR

To retrieve provisioning information by using BPR:

Step 1 From the **Configuration** menu, choose **External Interface**.

Step 2 In the **Provisioning Information** section, click **BPR**. To interact with BPR, CBT requires the following information:

- RDU Server IP Address
- RDU Server Port Number
- Admin Password

Step 3 For information on each field, click **Help**.

About Retrieving Data with CNR

You can retrieve provisioning information only by using CNR, which stands for Cisco Network Registrar. CNR is an application that provides scalable Domain Name System (DNS), Trivial File Transfer Protocol (TFTP), and Dynamic Host Configuration Protocol (DHCP) services. For product information, refer to:

<http://www.cisco.com/en/US/products/sw/netmgtsw/ps1982/index.html>

If you use CNR, the following caveats apply to the setup:

- Either the CNR GUI or server component must be installed on the CBT server.
- The CNR server component can be installed on the same server as CBT or on a different server. If it is installed on a separate server, the CBT server must know the location of that server.
- CBT currently works with one CNR at a time.
- CBT supports CNR 5.0.3 and 5.5.4.



Note CNR has recently been renamed to Cisco CNS Network Registrar (CNS-NR). You will see the new name on cisco.com and in future releases. The CBT 3.0 GUI and documentation use the former name and acronym.

Retrieving Data with CNR

To retrieve provisioning information by using CNR:

-
- Step 1** From the **Configuration** menu, choose **External Interface**.
- Step 2** In the **Provisioning Information** section, click **CNR**. To interact with CNR, CBT requires the following information:
- Cluster Name/IP Address
 - Admin User Name
 - Admin Password
 - Client Path
- Step 3** For information on each field, click **Help**.
-

About Retrieving Subscriber Data from the Local Database

CBT can retrieve subscriber data from its own local Sybase database after the data has been added in CBT. After installation, Local Database is the default method for retrieving subscriber data.

Retrieving Subscriber Data from the Local Database

To retrieve subscriber information from the local database:

-
- Step 1** Add subscriber information by following the directions in “Adding Subscriber Information” on page 22.
- Step 2** From the **Configuration** menu, choose **External Interface**.
- Step 3** In the **Subscriber Information** section, click **Local Database**.
- Step 4** (Optional) To update or replace the existing subscriber information, click **Import Subscriber** to open the Import Subscriber Data dialog box, as shown in Figure 10. In it, click **Help** for directions on how to import subscriber data.
-

Figure 10 *Import Subscriber Data Dialog Box*



About Retrieving Provisioning Data from the Local Database

CBT can retrieve provisioning data from its own local Sybase database after the data has been added to it. After installation, Local Database is the default method for retrieving provisioning data. To store provisioning information in its local database, CBT polls CMTSs using SNMP. CBT provides two ways to do this:

- **The Poller Scheduler dialog box**—Use this method if you prefer to work in the CBT GUI.
- **A separate Java poller application**—Use this method, referred to as the Poller, if you prefer to work with a command-line interface.



Tip If you are using CBT on the Windows OS, it is recommended that you use the CBT GUI method.

About the Poller

When you install CBT, the default method for retrieving provisioning information is the local database. Because the Poller is part of the process for this method, it is on by default after installation. The default schedule for the Poller is to run at or about midnight and to repeat every 24 hours. You can change these settings according to your own needs.

To query CMTSs using the Poller, you specify two parameters:

- ***delta-start-time***—When the Poller should start to poll the CMTSs. Expressed in hours, the delta is the difference between when you schedule the polling and when the polling begins.
- ***poll-interval***—The interval, expressed in hours, between polling sessions.

The syntax to start the Poller on Linux or Solaris is:

```
/opt/CSCOcbt/bin/start_poller delta-start-time poll-interval
```

Example 3 Starting the Poller

The following example shows a polling session that starts 8 hours after you schedule it and repeats every 24 hours:

```
/opt/CSCOcbt/bin/start_poller 8 24
```

Example 4 Stopping the Poller

The following example shows how to stop the Java poller application on Linux or Solaris:

```
/opt/CSCOcbt/bin/stop_poller
```



Note There is no impact to CBT if you turn the Poller off.

At each polling interval, the Poller accesses the CBT routers list file and performs SNMP queries to each CMTS using its SNMP read-only community string. The CBT routers list file is in the following locations:

- **Linux**—/opt/CSCOcbt/jakarta-tomcat-4.0.3/webapps/ROOT/WEB-INF/classes/config
- **Solaris**—/opt/CSCOcbt/httpServer/servlets/config
- **Windows**—%CSCOCBT_ROOT%\httpServer\jserv1.1.2\servlets\config

In addition to the on-demand polling that you schedule, CBT submits a polling request when it detects that a change has been made to the list of routers that CBT manages. For example, CBT submits a polling request when it detects that a new chassis has been added to a router.



Note The more frequent the polling interval, the more SNMP traffic that is generated to the CMTSs. This means that CPU utilization on the CMTS increases when polling is in progress. The impact on the CBT server side is minimal.

Retrieving Provisioning Data from the Local Database

To retrieve provisioning information from the local database:

Step 1 Add provisioning data by following the directions in “Adding Router Information” on page 21.

Step 2 From the **Configuration** menu, choose **External Interface**.

Step 3 In the Provisioning Information section, click **Local Database**.

Scheduling the Poller

To schedule when and how often the Poller populates the local database with provisioning information that it gathers from CMTSs, you can use the GUI or type a command.

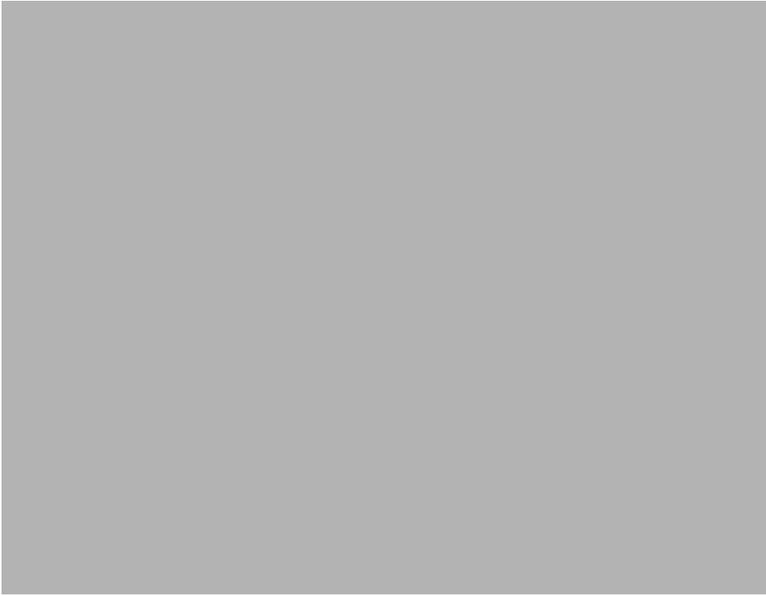
To use the GUI, from the Configuration menu, choose **Poller**. The Schedule CMTS Polling dialog box appears, as shown in Figure 11. In it, click **Help** for directions on how to schedule the Poller.

or

To use a command, type the following command and specify the parameters in hours, as explained in the previous section:

```
/opt/CSCOcbt/bin/start_poller delta-start-time poll-interval
```

Figure 11 *Schedule CMTS Polling Dialog Box*



9 Getting Summary Information and a Detailed Real-Time Status Report for a Modem

To get summary information on a cable modem, you can locate the modem by entering the MAC address. If you retrieve subscriber or provisioning data from the local database, you can also locate the modem by using any of the following advanced search criteria:

- Phone number
- Account ID
- Name
- Street address
- Zip code

CBT's advanced search feature also allows you to use the asterisk (*) for wildcard searches. For example, if you enter 1234* for the account ID, you get a list of all cable modems for subscribers who have account numbers that begin with 1234.



Note CBT's advanced search criteria applies to the local database only. If you set up an external interface for subscriber or provisioning data, you must locate a modem by entering its MAC address.

To get detailed information on a cable modem, you can get a Real-Time Modem Status Report, as shown in Figure 12. The information for a cable modem comes from three sources:

- The CMTS, which is the router that directs network traffic.
- The cable modem itself.
- The provider's subscriber database, where each provider can specify the information that appears. Typical information would be the customer's name, phone number, and account number. However, the information is not limited to that.

Within the status report, the following colors are used in certain fields to indicate performance:

- **Green**—Indicates a value is within the allowed threshold.
- **Red**—Indicates a value is above or below the allowed threshold.

For more information on setting thresholds, see “Modem Status Thresholds” on page 24.

Figure 12 *Real-Time Modem Status Report*



Getting Summary Information on a Modem

To get summary information on a modem:

-
- Step 1** From the **Hotline Tools** menu, choose **Locate Modem**. The Locate Broadband Modems dialog box appears, as shown in Figure 13.
- Step 2** Use one of the following methods to locate a modem:
- If you know the complete MAC address, enter one or more MAC addresses and click **Start**.
 - If you are using the local database for subscriber or provisioning data and want to search by using other criteria, such as phone number or wildcard strings, click **Advanced Search**. The Locate a Broadband Modem dialog box appears, as shown in Figure 14.
- Step 3** For a complete description of each field in these dialog boxes, click **Help**.
-

Figure 13 *Locate Broadband Modems Dialog Box*



Figure 14 *Locate a Broadband Modem Dialog Box*



Getting a Detailed Real-Time Status Report for a Modem

To get a detailed status report for a cable modem:

-
- Step 1** From the **Hotline Tools** menu, choose **Modem Status**. The **Real Time Status of a Broadband Modem** dialog box appears, as shown in Figure 15.
 - Step 2** Enter the MAC address for the cable modem for which you want to see a status report and click **Real Time Status**. The **Real-Time Status Report** for that modem appears, as shown in Figure 12.
 - Step 3** For a complete description of each field in the dialog box and the **Real-Time Status Report**, click **Help**.
-

Figure 15 *Real Time Status of a Broadband Modem Dialog Box*



10 Reviewing the CMTS Dashboard

To get summary information on a CMTS, review the CMTS Dashboard. Figure 16 shows the CMTS Dashboard.

Figure 16 CMTS Dashboard Dialog Box



For the CMTS that you select, the CMTS Dashboard provides the following information:

- IP address
- Interface/Upstream
- Counter reset time
- Signal-to-noise ratio (SNR)
- Minimum receive power level of all modems associated with that CMTS
- Maximum receive power level of all modems associated with that CMTS
- Percentage of time that the modem stays online
- Number of modems that are online
- Total number of modems that connect to the interface
- Router name

For printing or collaborative troubleshooting, you can generate an HTML version of the information.

To access the CMTS Dashboard:

Step 1 From the **Hotline Tools** menu, choose **CMTS Dashboard**.

Step 2 For a complete description of each field in the CMTS Dashboard dialog box, click **Help**.

11 Showing and Configuring the Flap List Analysis

To analyze the results of data captured from one or more Cisco CMTSs, review the Flap List Analysis. The analysis shows the number of modems with the following problems:

- Provisioning—The issue could be at one of the provisioning servers.
- Reverse path noise—The issue could be from trouble in the cable plant.
- Reverse path attenuation—The issue could be from a power adjustment that the subscriber makes.
- Packet corruption—The issue could be from degradation on the network.



Note You can not get a flap list analysis for a CMTS that is not from Cisco.

Figure 17 shows the Flap List Analysis dialog box, which you can sort according to your needs by clicking a column heading. For example, to sort the provisioning problems by MAC address, click the MAC Address column heading.

Figure 17 *Flap List Analysis Dialog Box*



From the Flap List Analysis dialog box, you can see a lower level of detail that contains the following information:

- General status of each interface
- Total number of modems reported by the router and output for each one
- Number of flapping modems that are reported and output for each one

The detailed level of the Flap List Analysis dialog box is shown in Figure 18.

Figure 18 *Flap List Analysis Details Dialog Box*



Showing the Flap List Analysis

To show a flap list for one or more CMTSs:

-
- Step 1** From the **Diagnostics** menu, choose **Flap List Analysis**.
 - Step 2** Select one or more Cisco CMTSs to analyze and click **Analyze**.
 - Step 3** (Optional) To see a lower level of detail, click **Details**.



Note To sort data in the analysis, click the column heading by which you want to arrange the information.

- Step 4** For a complete description of each field in the Flap List Analysis dialog boxes, click **Help**.
-

Scheduling the Flap List Analysis

To schedule a time to capture raw data from one or more Cisco CMTSs, use the Scheduler Configuration dialog box, which is shown in Figure 19.

Figure 19 Scheduler Configuration Dialog Box



To schedule a time to capture raw data from one or more Cisco CMTSs:

-
- Step 1** From the **Configuration** menu, choose **Flap List Scheduler**.
 - Step 2** Select one or more Cisco CMTSs from which you want to capture data and click **Schedule**.
 - Step 3** For a complete description of each field in the Scheduler Configuration dialog box, click **Help**.
-

Setting Parameters for the Flap List

The administrator can set parameters for the flap list in the Flap List Configuration dialog box shown in Figure 20.



Note The RFTECH user type does not have access to the Flap List Configuration dialog box.

Figure 20 *Flap List Configuration Dialog Box*



For a CMTS, the administrator can specify the following criteria for a flap list:

- Maximum number of rows that the flap list can have. Increase the default of 100 if you think you have more than 100 flapping modems.
- Insertion time, in seconds, at which a cable modem should be included in the flap list because it has not completed registration within that time.
- Miss threshold, which is the number of consecutive times a cable modem can fail to respond to a keepalive poll from the CMTS, before it should be included in the flap list.
- Aging threshold, which is the number of minutes a cable modem is allowed between flaps, before it should be included in the flap list.
- Power adjust threshold, in decibels, that a cable modem cannot exceed without being included in the flap list.

To set parameters for the flap list:

-
- Step 1** From the **Configuration** menu, choose **Flap List Parameters**.
- Step 2** Select the Cisco CMTS for which you want to set parameters and click **Load**.
- Step 3** For a complete description of each field in the Flap List Configuration dialog box, click **Help**.
-

Purging the Flap List

When you want to delete a saved flap list file, use the Purge Flap List Data, which is shown in Figure 21. Before you purge a flap list file, you can generate an HTML version of it.

Figure 21 *Purge Flap List Data File Dialog Box*



To purge a flap list file:

-
- Step 1** From the **Utilities** menu, choose **Purge Saved Data, Flap List**.
 - Step 2** Select one or more Cisco CMTSs for which you want to show saved flap list files and click **Show**.
 - Step 3** For a complete description of each field in the Purge Flap List Data File dialog box, click **Help**.
-

12 Using the Spectrum Management Tools

CBT 3.0 interfaces with the Cisco CMTS to provide return path spectrum analysis, which is provided in the following tasks:

- **Trace Window**—To monitor power and noise levels for a selected modem or upstream port
- **Spectrogram**—To monitor power and noise levels over time for a selected modem or upstream port
- **CNR Analysis**—To retrieve the carrier-to-noise ratio (CNR) for selected modems or upstream ports
- **Data Playback**—To review a saved Trace Window or CNR Analysis
- **Clients**—To get a list of each spectrum analysis in process on a client machine so you can:
 - View summary information for the analysis
 - Launch a Trace Window or Spectrogram for the analysis

Each task is covered separately in the following sections.

Using Trace Window

To monitor power and noise levels for a selected modem or upstream port, use the Trace Window. As shown in Figure 22, the Trace Window shows the output that you would see in a spectrum analyzer. This output displays in the plot line of the Trace Window.

Figure 22 Trace Window



About the Trace Window

In the Trace Window, you can:

- Monitor the power and noise levels two ways:
 - **Single sweep**—Provides a snapshot view of levels at one point in time, as shown in Figure 22
 - **Continuous sweep**—Provides a real-time view of data as it changes
- Check two types of power levels and display the data in the results block, which is in the lower right corner as shown in Figure 22:
 - **Burst power analysis**—Acquires the upstream channel power
 - **Band power analysis**—Acquires the band power measurement for a start and stop frequency that you select
- Indicate a variety of lines and points in the plot line and display the data in the annotations block, which is in the upper right corner as shown in Figure 22
 - **Reference marker**—Is a unique marker in the plot line and is indicated by r, as shown in Figure 22
 - **Point markers**—Is a way to indicate one or more points in the plot line; each point marker is numbered consecutively beginning with p1, as shown in Figure 22
 - **Amplitude and frequency lines**—Display a line marker in the plot line, as shown by the horizontal amplitude line at 0 dBmV and the vertical frequency line just before 14000 kilohertz (kHz) in Figure 22
- Show additional plot lines:
 - **Minimum hold**—Display the plot line that shows the minimum power level
 - **Maximum hold**—Display the plot line that shows the maximum power level
- Move a marker that you created to peaks in the plot line:
 - **Peak**
 - **Next peak**
 - **Left peak**
 - **Right peak**
- Customize the placement and position of point markers:
 - **Text**—You can customize a point marker’s label by entering a name in the Text box. For example, you could change p1 to Test Point 1 and p2 to Test Point 2, as shown in Figure 22.
 - **Frequency (kHz)**—You can specify a frequency in kilohertz for the point marker by entering a number in the Frequency text box. For example, you could enter 20200 instead of clicking on the plot line near 20000.
- Show the delta between the reference marker’s power level and that of each point marker.
- Zoom in on a selected frequency range to enlarge the view.
- Save a single sweep of the plot line and play it back.

Working with the Trace Window

Table 2 shows several ways to work with data in the Trace Window.

Table 2 Keyboard Actions for Working with the Trace Window

Task	Keyboard Sequence
To move a line marker	Press Shift , click and drag the line to the desired location.
To zoom in on a selected frequency	Move your cursor to the area you want to enlarge and press Ctrl , left-click . or Press Ctrl , left-click and drag your cursor to create a box that indicates the area you want to enlarge.
To return to a full view from a zoom view	Press r .

Starting the Trace Window

To use the Trace Window to monitor power and noise levels for a selected modem or upstream port:

Step 1 From the **Spectrum Tools** menu, choose **Trace Window**. The Trace Window Criteria dialog box appears, as shown in Figure 23.

Step 2 Select an upstream or cable modem for which you want to monitor power and noise levels.



Note To update the cable modem information on the selected CMTS instead of getting data from the cache, click **Update CM Info**. This real-time update varies according to how many modems are attached to the CMTS. If thousands of modems are attached to a CMTS, the update takes longer than if hundreds of modems are attached to the CMTS.



Tip When you select the resolution bandwidth (RBW), keep in mind that the smaller the RBW, the less variance and the more accurate the frequency is in the Trace Window is. Specifically, when a single-tone signal that resembles a noise burst appears in the Trace Window, the frequency of the signal gets shifted. This causes the frequency in the Trace Window to be different from the spectrum analyzer output. The variance in frequency increases as the resolution bandwidth increases.

Step 3 Click **Start**. The Trace Window appears, as shown in Figure 22.

Step 4 To view the return path data and activate all options in the Trace Window, click one of the following buttons:

- **Single Sweep**—Provides a single snapshot of power and noise levels
- **Continuous Sweep Start**— Starts to monitor for real-time measurements of power and noise levels

Step 5 For a complete description of each field in these dialog boxes, click **Help**.

Figure 23 *Trace Window Criteria Dialog Box*



Using the Spectrogram

To monitor power and noise levels, as you do in the Trace Window, while viewing the added dimension of time, use the Spectrogram. As shown in Figure 24, the Spectrogram shows the output that you would see in a spectrum analyzer.

Figure 24 Spectrogram



About the Spectrogram

In the Spectrogram, you see the following variables in one easy, 3-D view:

- **Power level**—Measured in decibels millivolt (dBmV) and depicted according to the color key at the bottom. As shown in Figure 24, the power level is cyan, which the color key indicates is in the -30 to -10 dBmV range.
- **Frequency**—Measured in kilohertz and shown on the X axis. In Figure 24, the power level is between 30867 and 34563 kHz.
- **Time**—Measured in hours, minutes, and seconds (HH:MM:SS) and shown on the Y axis. Figure 24 shows the latest time that data was captured is 15:18:39.

When you move your cursor over the spectrogram, the status bar at the bottom of the window displays the time, frequency, and power level for the current location. In the spectrogram, you can click **Pause** or **Print** at anytime.

Starting the Spectrogram

To use the Spectrogram to monitor power and noise levels for a selected modem or upstream port over time:

Step 1 From the **Spectrum Tools** menu, choose **Spectrogram**. The Spectrogram Criteria dialog box appears, as shown in Figure 25.

Step 2 Select an upstream or cable modem for which you want to monitor power and noise levels over time.



Note To update the cable modem information on the selected CMTS instead of getting data from the cache, click **Update CM Info**. This real-time update varies according to how many modems are attached to the CMTS. If thousands of modems are attached to a CMTS, the update takes longer than if hundreds of modems are attached to the CMTS.

Step 3 Click **Start**. The Spectrogram appears, as shown in Figure 24.

Step 4 For a complete description of each field in these dialog boxes, click **Help**.

Figure 25 *Spectrogram Criteria Dialog Box*



Analyzing the Carrier-to-Noise Ratio

To show the carrier-to-noise ratio for selected cable modems or upstream ports, use the CNR Analysis task. As shown in Figure 26, this information displays in the CNR Analysis dialog box, which lets you:

- View the following information:
 - CMTS and interface/upstream
 - CM MAC address
 - Carrier-to-noise ratio
 - Collected time
- Save the results to play back later

Figure 26 *CNR Analysis Dialog Box*



About the CNR Analysis

In the SPECTRUM.INI file, you:

- Set thresholds for acceptable carrier-to-noise ratios
- Specify colors for CNRs that are below two thresholds, floor and ceiling

In Figure 26, the CNRs for the selected modems fall into three categories:

- **Yellow**—The CNR is below the ceiling threshold.
- **Red**—The CNR is below the floor threshold.
- **White**—The CNR is above the ceiling threshold.

For more information on the SPECTRUM.INI file, see “Parameters in the SPECTRUM.INI File” on page 27.

Getting the CNR Analysis

To show the carrier-to-noise ratio for selected cable modems or upstream ports:

Step 1 From the **Spectrum Tools** menu, choose **CNR Analysis**. The CNR Analysis Criteria dialog box appears, as shown in Figure 27.

Step 2 Select one or more upstreams or cable modems for which you want to see the carrier-to-noise ratio.



Note To update the cable modem information on the selected CMTS instead of getting data from the cache, click **Update CM Info**. This real-time update varies according to how many modems are attached to the CMTS. If thousands of modems are attached to a CMTS, the update takes longer than if hundreds of modems are attached to the CMTS.



Tip You specify an upper and lower threshold for carrier-to-noise ratios in the **CNR Ceiling** and **CNR Floor** parameters of the SPECTRUM.INI file. If you want to specify different thresholds on an analysis-by-analysis basis, you can do that in the **Upper Threshold** and **Lower Threshold** text boxes. For more information on thresholds, see “Parameters in the SPECTRUM.INI File” on page 27.

Step 3 Click **Start**. The CNR Analysis dialog box appears, as shown in Figure 26.

Step 4 For a complete description of each field in these dialog boxes, click **Help**.

Figure 27 *CNR Analysis Criteria Dialog Box*



Playing Back Data

You can play back a saved Trace Window or CNR Analysis. This allows you to capture and preserve troubleshooting information and use it later.

Playing Back a Trace Window

To play back a Trace Window:

-
- Step 1** From the **Spectrum Tools** menu, choose **Data Playback, Trace Window**. The Trace Window Playback Criteria dialog box appears, as shown in Figure 28.
 - Step 2** Select one or more MAC addresses for which you want to see a list of saved traces and click **Start**. The Trace Window Playback List dialog box appears, as shown in Figure 29.
 - Step 3** From the list of saved traces, select the one you want to play back and click **Show**. The Trace Window for the saved trace, as shown in Figure 22, appears.



Note To remove a saved Trace Window from the database, from the Utilities menu, choose **Purge Saved Data, Spectrum Data**.

- Step 4** For a complete description of each field in these dialog boxes, click **Help**.
-

Figure 28 Trace Window Playback Criteria Dialog Box



Figure 29 *Trace Window Playback List Dialog Box*



Playing Back a CNR Analysis

To play back a CNR Analysis:

Step 1 From the **Spectrum Tools** menu, choose **Data Playback, CNR Analysis**. The CNR Analysis Playback Criteria dialog box appears, as shown in Figure 30.

Step 2 To select one or more MAC addresses for which you want to see a saved CNR Analysis, click **Start**. The CNR Analysis Playback dialog box appears, as shown in Figure 31.



Note To remove a saved CNR Analysis from the database, from the Utilities menu, choose **Purge Saved Data, Spectrum Data**.

Step 3 For a complete description of each field in these dialog boxes, click **Help**.

Figure 30 *CNR Analysis Playback Criteria Dialog Box*



Figure 31 *CNR Analysis Playback Result Dialog Box*



Working with Spectrum Management Clients

To see a list of clients that are currently using CBT's spectrum management tools, use the Clients task. The Clients feature is an effective tool that optimizes CBT's diagnostic capabilities by listing all in-process spectrum analyses in one place. By using the Clients task, technicians can troubleshoot collaboratively because multiple technicians can simultaneously:

- View the same summary information for all spectrum analyses that are in process
- Launch a Trace Window or Spectrogram to monitor a spectrum analysis from that tool

When you choose the Clients task, the Spectrum Data Clients dialog box (Figure 32) appears.

Figure 32 *Spectrum Data Clients Dialog Box*



About the Clients Task

In the Spectrum Data Clients dialog box, each row represents a spectrum analysis in process on a client machine. For each spectrum analysis in the list, you can:

- See the following summary information:
 - CMTS
 - Interface/Upstream
 - Cable modem MAC address
 - Resolution bandwidth
 - Start frequency
 - Stop frequency
 - Client
 - Port
 - Query interval
 - Start time
- Launch a Trace Window or Spectrogram

As you work in the Spectrum Data Clients dialog box, you can click **Refresh** to update the information or **Generate HTML** to capture the information in a format that can be distributed easily outside of Cisco Broadband Troubleshooter. For example, you could send it as an attachment in a trouble-ticket system or email application.

Using the Clients Task

To see a list of spectrum analyses in process on client machines:

Step 1 From the **Spectrum Tools** menu, choose **Clients**. The Spectrum Data Clients dialog box, as shown in Figure 32, appears.



Tip There can be limits on how many clients can use the spectrum management tools at one time. If you cannot access a spectrum management tool, such as the Trace Window, you can use the Clients task see how many spectrum analyses are in process.

Step 2 For a complete description of each field in the Spectrum Data Clients dialog box, click **Help**.

13 Troubleshooting the Poller

This section provides directions to troubleshoot error messages for the following CBT components:

- **Script**—Retrieves subscriber or provisioning information from an external source
- **Application on an HTTP server**—Retrieves subscriber or provisioning information from an external source
- **Poller**—Queries CMTSs by using SNMP and stores provisioning information in CBT’s local Sybase database

Troubleshooting Poller Problems

You can use the Poller, a separate Java application, to store provisioning information in CBT’s local Sybase database. This database poller queries the CMTSs by using SNMP. If the Debug parameter in POLLER.INI is set to true, the Poller sends information to the Poller.log file in the following location:

- **Linux and Solaris**—/opt/CSCOCbt/logs
- **Windows**—%CSCOCBT_ROOT%\logs



Note See “Parameters in the POLLER.INI File” on page 26 for an explanation of each parameter in POLLER.INI.

This section:

- Shows output from Poller.log that indicates there is a problem
- Describes the cause of the problem
- Provides a resolution for the problem

Error Message: No Router

Problem

The following output from Poller.log indicates that no router was found:

```
Thu Jun 27 15:47:35 EDT 2002: INFO: Start polling...
Thu Jun 27 15:47:37 EDT 2002: INFO: No router found in routers list file:
/opt/CSCOCbt/jakarta-tomcat-4.0.3/webapps/ROOT/WEB-INF/classes/config/myrouters
Thu Jun 27 15:47:37 EDT 2002: INFO: Finished polling... elapsed time: 2371 milliseconds
Thu Jun 27 15:47:37 EDT 2002: INFO: Poller exited.
```

Cause

No router was found in the routers list file, myrouters, because of one of the following conditions:

- The routers list file does not exist. This is the case when you first install CBT.
- The CMTS routers list is empty; it does not contain any routers.

Resolution

To add routers in CBT, see “Adding Router Information” on page 21.

Error Message: Database Login Failed

Problem

The following output from Poller.log indicates that the login to the database failed:

```
Wed Jun 26 11:14:12 PDT 2002: INFO: Start polling...
Wed Jun 26 11:14:13 PDT 2002: FATAL: SQL Exception in setupDB makeDBConnection: 1
JZ00L: Login failed. Examine the SQLWarnings chained to this exception for the reason(s).
Software aborted.
```

Cause

The database login failure occurs because the database ran out of connections. That is, it tried to use more connections than it can support.

Resolution

If the database ran out of connections, restart CBT to clear all existing database connections and start the database.



Note For directions on restarting CBT, see “Installing Cisco Broadband Troubleshooter” on page 6.

Error Message: SNMP Timeout

Problem

The following output from Poller.log indicates that an SNMP timeout has occurred:

```
Thu Jun 20 13:45:08 EDT 2002: INFO: Start polling...
Thu Jun 20 13:45:18 EDT 2002: ERROR: Thread16 got SNMP exception on Router: 24.216.122.254. Exception:
Snmp Timeout... Router 24.216.122.254 is unreachable
```

Cause

The SNMP timeout occurs when the network connection to the router, or the router itself, is so busy that it cannot satisfy the request within the specified time.

Resolution

If the SNMP timeout occurs too frequently, change the SNMP settings in the POLLER.INI file:

-
- Step 1** Open the POLLER.INI file for your operating system:
- **Linux and Solaris**—/opt/CSCOcbt/bin
 - **Windows**—%CSCOCBT_ROOT%\bin
- Step 2** Increase one or both of the following settings:
- **SnmpTimeout**—You can increase the number of seconds before the attempt to create the SNMP connection reaches a timeout.
 - **SnmpRetry**—You can increase the number of times to try to create the SNMP connection.
- Step 3** To activate the new settings, restart the CBT server.
-



Tip Check for incorrect SNMP community strings, because an invalid community string for read/write will also result in an SNMP timeout.

14 Uninstalling Cisco Broadband Troubleshooter

This section provides instructions to uninstall Cisco Broadband Troubleshooter on each supported platform.

Uninstalling CBT on Solaris

- Step 1** Log in as `root`.
- Step 2** Insert the CBT 3.0 CD-ROM for Solaris into the CD-ROM drive.
- Step 3** To change to the CBT Solaris directory, enter:
- ```
cd /cdrom/cdrom0/solaris/cbt
```
- Step 4** To uninstall CBT, enter:
- ```
./uninstall
```
-

Uninstalling CBT on Windows

- Step 1** Choose:
- Start > Settings > Control Panel > Add/Remove Programs
- Step 2** Select Cisco Broadband Troubleshooter.
- Step 3** Click Remove.
-

Uninstalling CBT on Linux

- Step 1** Log in as `root`.
- Step 2** Insert the CBT 3.0 CD-ROM into the CD-ROM drive.
- Step 3** To mount the CD, enter:
- ```
/bin/mount /mnt/cdrom
```
- Step 4** To change to the CBT Linux directory, enter:
- ```
cd /mnt/cdrom/linux
```
- Step 5** To uninstall CBT, enter:
- ```
./uninstall
```
-

# 15 Sample Code for Application Program Interfaces

This section contains the README files for the following application program interfaces (APIs):

- Shell script for retrieving subscriber or provisioning information from an external source by using a script
- Java code for retrieving subscriber or provisioning information from an external source by using an HTTP application

The sections that describe scripts and code provide the following information:

- Location
- Purpose
- Requirements
- Description of components
- Directions for modifying the code
- Directions for troubleshooting the code
- Sample code that you can modify to meet your needs

## Shell Script for Retrieving Subscriber or Provisioning Information

You can use a sample script written for various databases to retrieve subscriber or provisioning information from an external source. These scripts, that you can modify according to your needs, are in the README file in the following locations:

- **Linux and Solaris**
  - /opt/CSCOcbt/samples/db\_script/oracle/
  - /opt/CSCOcbt/samples/db\_script/sybase/
- **Windows**
  - %CSCOCBT\_ROOT%\samples\db\_script\oracle\
  - %CSCOCBT\_ROOT%\samples\db\_script\sybase\

This section provides a printed copy of that README file, formatted for this user guide.

### Purpose of Shell Script

This file describes how to use scripts written against a Sybase database. The sybase directory contains sample scripts that you can modify to meet your needs. These scripts demonstrate how to:

- Receive requests from CBT
- Query data against a Sybase database
- Return data to CBT in the format specified in “Retrieving Data with a Script” on page 32.

### Sample Script Requirements

The sample scripts:

- Require Sybase running with CBT's database schema, which is created automatically during the CBT install.
- Are written for the Solaris OS. To use the scripts on a Linux machine, see “Directions for Troubleshooting the Script” on page 69.

After trying the sample scripts, you can tailor them for your database or any other external data source.

## Script and File Descriptions

The following list describes the purpose of each script or file:

- **get\_subscriber**—Queries subscriber information from the database
- **get\_provision**—Queries provisioning information from the database
- **insert\_cmts**—Invokes insert\_cmts.sql
- **insert\_cmts.sql**—Inserts CMTs and cable modems into the database and is invoked by insert\_cmts
- **subscriberinfo.txt**—Contains subscriber information in ASCII text file format
- **add\_col\_name.pl**—Adds column names to the subscriber fields (for example, Customer Last Name) queried from get\_subscriber

## Directions for Modifying the Script

1. Modify insert\_cmts.sql to insert a list of CMTs and cable modems into the database.
2. Execute insert\_cmts from the command line:  
**./insert\_cmts**
3. Modify subscriberinfo.txt to import subscriber information into CBT. For field descriptions, refer to online help for the Import Subscriber Data dialog box.
4. Start CBT. Log in as an Admin user.
5. Click **Import Subscriber Data**, enter the **Subscriber Data File Location**, and click **Start**.
6. Click **Set External Interfaces**.
7. Under Subscriber Information, select the **Script** radio button and enter the location of the get\_subscriber filename (for example, /my\_dir/get\_subscriber) in the **Script Location** text box.
8. Under Provisioning Information, select the **Script** radio button and enter the location and the get\_provision filename (for example, /my\_dir/get\_provision) in the **Script Location** text box.

## Directions for Troubleshooting the Script

- The get\_subscriber and get\_provision scripts can be run from the UNIX command line. The following examples show how to execute a script and the output the script produces:

```
./get_provision GET_PROVISION MAC 000216d5a0cf
OUT_DATA=PROVISION^172.22.85.10^172.22.127.26^
```

```
./get_provision GET_MAC IP 172.22.127.26
OUT_DATA=MAC^000216d5a0cf^
```

```
./get_subscriber GET_SUBSCRIBER MAC 000216d5a0cf
OUT_DATA=SUBSCRIBER^AccId=ID000006^Name=Name000006^Phone=6172300006^Address=175 West
Tasman^ClassOfService=Policy000006^FiberNode=User A000006^
```

```
./get_subscriber GET_MAC PHONE 5106663152
OUT_DATA=MAC^000164ffeb95^000164ffc3c7^
```

```
./get_subscriber GET_ADDRESS MAC 000164ffc3c7^000164ffeb95^
OUT_DATA=ADDRESS^000164ffc3c7=170 West Tasman Drive,95134^000164ffeb95=170 West Tasman Drive,95134^
```

- The get\_subscriber script invokes add\_col\_name.pl. Modify the scriptDir to accurately reflect where add\_col\_name.pl is located.
- All scripts use /tmp as a temporary directory for creating temp files. Create the /tmp directory with read and write privileges for all users.
- If you are running the scripts on a Linux machine, make the following changes to the get\_provision, get\_subscriber, and insert\_cmts scripts:
  - Modify commLib to /bin
  - Replace dbisql to dbisqlc
- If you get Invalid Data when using echo in Window's batch file:
  - Turn off echo:  
**@echo off**
  - If you are not using double quotes around the message, then the delimiter has to be "^" instead of "\".  
For example:  
echo OUT\_DATA=PROVISION^^172.22.85.10^^172.22.127.26^^

## Sample Script Code

The following sample code is extracted from the get\_subscriber script:

```
#!/bin/ksh
argc=$#
set -A argv $*
integer i=0
while let "i < $argc"; do
 case ${argv[$i]} in
 "GET_MAC") function=${argv[$i]};;
 esac
 let "i = i + 1"
done

#retrieving MAC based on Customer phone number
if ["$function" = "GET_MAC"] ; then

 str="SELECT MACAddress FROM SUBSCRIBERINFO where CusPhone='$in_param'";
 echo $str >> "$tmpDir/script.$filenameExt"
 str="OUTPUT TO $tmpDir/test.$filenameExt FORMAT ASCII;"
 echo $str >> "$tmpDir/script.$filenameExt"

 tmpi=`dbisqlc -q -c $dbAccess read $tmpDir/script.$filenameExt`
 rm $tmpDir/script.$filenameExt

 MAC=`$commLib/cat $tmpDir/test.$filenameExt | $commLib/sed s/\'//g`
 echo $MAC > $tmpDir/test.$filenameExt
 MAC=`$commLib/cat $tmpDir/test.$filenameExt | $commLib/sed 's/ /^/g'`

 tmp="OUT_DATA=MAC^$MAC^";
 if [$tmp = "OUT_DATA=MAC^^"] ; then
 echo "OUT_DATA=ERROR^No data found for $in_param^";
 exit;
 fi
 echo $tmp

 rm $tmpDir/test.$filenameExt
 exit;

fi
```

## Java Code for Retrieving Subscriber or Provisioning Information

You can use an application that is running on an HTTP server to retrieve subscriber or provisioning information from an external source.

A sample application that you can modify according to your needs is in the README file in the following locations:

- **Linux and Solaris**
  - /opt/CSCOcbt/samples/db\_script/oracle/
  - /opt/CSCOcbt/samples/db\_script/sybase/
- **Windows**
  - %CSCOCBT\_ROOT%\samples\db\_script\oracle\
  - %CSCOCBT\_ROOT%\samples\db\_script\sybase\

This section provides a printed copy of that README file, formatted for this user guide.

### Purpose of Java Code

This file describes how to use Data Manager, a sample HTTP application. The HTTP directory contains this sample application that you can modify to meet your needs. Data Manager demonstrates how to:

- Receive requests from CBT
- Query data against an Oracle database
- Return the data to CBT in the format specified in “Retrieving Data with an HTTP Application” on page 34.

### Sample HTTP Application Requirements

The sample HTTP application:

- Requires the Oracle database running with the schema described in create\_tbls.sql.
- Is written to use Oracle OCI, instead of the pure Java JDBC, to communicate with the database. To use the sample HTTP application on a Solaris machine, see “Directions for Troubleshooting the Sample HTTP Application” on page 74.

### Module and File Descriptions

This section lists the modules and files used in Data Manager, the sample HTTP application. For a description, refer to a specific module or file. To modify Data Manager to suit your needs, refer to the next section, “Modifiable Components in the Data Manager Application.”

- Java Modules:
  - DataManager.java
  - Db.java
  - DbProps.java
  - DbQuery.java
  - GetResponse.java
  - HttpManager.java
  - HttpObj.java
  - HttpRequest.java
  - HttpResponse.java
  - HttpServer.java
  - LoadOracleJDBCdriver.java
  - Logger.java
  - PostResponse.java
  - ShutDown.java

- System and Configuration Files:

- Makefile
- Db-Vital.properties
- Db-Sigma.properties
- install
- start\_dm
- stop\_dm

- SQL Files:

- create\_tbls.sql
- insert\_cmts.sql
- insert\_subscriber.sql

## Modifiable Components in the Sample HTTP Application

- **create\_tbls.sql, insert\_cmts.sql, insert\_subscriber.sql**—Scripts that create database tables and insert data into the database.
- **DbQuery.java**—Module that queries the data from the database. The following functions were written based on the schema described in the create\_tbls.sql:
  - getMacByIP
  - getMacByPhone
  - getProvInfo
  - getProvInfoExt
  - getFiberNode
  - getSubscriberInfo

If create\_tbls.sql is changed, the code for these functions must be changed accordingly.

- **Db-Sigma.properties**—Contains attributes of the subscriber database.
- **Db-Vital.properties**—Contains attributes of the provisioning database.

If the provisioning and subscriber data tables reside in the same database, these two files must have identical information. In Data Manager, the provisioning and subscriber data is in two separate databases.

For both files, the following settings must be changed accordingly:

- db\_sid
- db\_port
- db\_userid
- db\_password

For more information, contact your local DBA.

- **Makefile**—Compiles the java files.

**start\_dm**—Starts the Data Manager HTTP application.

The current variable settings in start\_dm are:

```
debug_flag=1
(Send debug messages to a log file.)
port=8012
(Change to the port of your choice.)
logDir= /opt/CSCOcvt/jakarta-tomcat-4.0.3/logs
(Specify the location where the log file should be created and changes should be written.)
```

**stop\_dm**—Stops the Data Manager HTTP application.

The following variable settings are in stop\_dm:

```
ip=171.71.50.52
```

(IP address where the HTTP application is running.)

```
port=8012
```

(Port in which the HTTP application is running. This should be the same port specified in the start\_dm script.)

For these three scripts (Makefile, start\_dm, and stop\_dm), the following properties must be updated according to the system environment:

- ORACLE\_HOME
- JAVA\_HOME
- LIBRARY\_PATH

For more information, check with your DBA.

## Directions for Building and Running the Sample HTTP Application

1. Build class files and copy files to destination.

From the command line, type:

```
./make
```

```
./install
```

2. Start the application.

From the command line, type:

```
/opt/CSCObt/bin/start_dm
```

3. Stop the application.

From the command line, type:

```
/opt/CSCObt/bin/stop_dm
```

4. Link Data Manager to CBT.

- a. Start CBT. Log in as an **Admin** user.

- b. Click **Set External Interfaces**.

- c. Under **Subscriber Information**, select the **HTTP** radio button and enter the URL for the application in the **URL Location** text box:

```
http://your_machine_name:port_num/DataManager
```

5. Under **Provision Information**, select the **HTTP** radio button and enter the URL for the application in the **URL Location** text box:

```
http://your_machine_name:port_num/DataManager
```



**Note**

---

In the previous steps *port\_num* is the port number that is configured in start\_dm.

---

## Directions for Troubleshooting the Sample HTTP Application

- Failed to create database connection.

Make sure there is connectivity between the machine and the Oracle database. A quick way to test this is to invoke Oracle's sqlplus application. For example, assume that the following settings are in Db-Vital.properties:

- *db\_sid*=CBT
- *db\_userid*=user1
- *db\_password*=mypasswd

From the command line, type:

```
sqlplus user1/mypasswd@CBT
```

If there is no response or an error occurs, check the tnsnames.ora setting with your local DBA.

- Makefile failed - javac not found.

Make sure that JAVA\_HOME in the Makefile points to the correct JAVA compiler.

- Makefile failed while linking or missing Oracle library error generated during run time.

The sample HTTP application was written to use the Oracle OCI protocol for communicating with the database. Oracle OCI requires machine-dependent libraries, so make sure that the path to the libraries is set correctly in Makefile.

- Socket creation error.

This error occurs when *port\_num* is changed in start\_dm and stop\_dm. To correct it, restart the program  
`/opt/CSCObt/bin/start_dm`

- DbQuery returns error status.

It is possible that some of the Oracle environment did not get set up correctly. To check this, review oracle.csh, update it as required, and source it. Then, run start\_dm again.

## Sample Java Code

1. Setup HTTP Connection to receive request from CBT (HttpManager.java)

```
HttpRequest = new HttpRequest()
```

2. Fetch message's header (HttpRequest.java):

```
StringBuffer sb = new StringBuffer();
InputStream is = sock.getInputStream();
DataInputStream fromBrowser = new DataInputStream(is);
while (true) {
 msg = fromBrowser.readLine();
 if (msg.equals("")) break;
 sb.append(msg + nl); // put back the '\n\r' for newline
}
```

3. Fetch message's body (HttpRequest.java):

```
DataInputStream fromBrowser = sock.getInputStream();
StringBuffer sb = new StringBuffer();

for (int x=0; x < len; x++) {
 // return int range 0-255, -1: end of stream
 i = fromBrowser.read();
 if (i == -1) break;
 // however, char is 16 bits for unicode 2 bytes
 // now use 2 bytes to hold just one byte data.
 sb.append((char)i);
 //System.out.println (sb);
}
```

4. Parse message (HttpObj.java):

```
//parse and save message into Hashtable

String req_command = decodeString(command);
//System.out.println ("req_command=" + req_command);

// Parse the data from the servlet
StringTokenizer rdata = new StringTokenizer(req_command, "&");

if (rdata == null) return;

//System.out.println ("data=" + data + ", rdata=" + rdata);
while (rdata.hasMoreTokens()) {
 String cmd = rdata.nextToken();
 int index = cmd.indexOf("=");
 if (index == -1) return;
 String key = cmd.substring(0, index);
 String val = cmd.substring(index+1);
 hParams.put(key, val);
}
```

## 5. Process message (HttpManager.java & DataManager.java):

```
//if POST message then process the message:
if (req.getReqType().equals ("POST")) {
 req.fetchBody(sock_);
 hParams = req.getParams();
 resp = new PostResponse(req);
 String status = null;
 status = dm_.processCommand(req);
 ...
}
//examine the request type and process the message accordingly:
Hashtable hParams = req.getParams();
String task = (String)hParams.get("REQUEST");
int status = 1;

 if (task.equals(GET_PROV_INFO)) {
 String sStr = "";
 String sType = (String)hParams.get("SEARCH_TYPE");
 if (sType.equals("MAC"))
 {
 String sTmp = (String)hParams.get("IN_PARAM");
 String sMac = sTmp.toLowerCase();
 Logger.debug("In Mac is " + sMac);
 sStr = DbQuery.getProvInfo(sMac);
 Logger.debug("Prov Info is " + sStr);
 }

 }

// retrieve information from the database (DbQuery.java):
public static String getProvInfo(String Mac) {

 String query = "";
 String subscriberId = "";
 String modemIp = "";
 String cmtsIp = "";
 Statement stmt = null;

 try {
 long start = (new java.util.Date()).getTime();

 start = (new java.util.Date()).getTime();
 stmt = vital_db_conn.createStatement();
 query = "select subscriberid, ipaddress,giaddr from device where deviceid = '"
+ Mac + "'";
 Logger.debug(query);
 boolean bFound = false;
 ResultSet rs = stmt.executeQuery(query);
 while (rs.next()) {
 bFound = true;
 subscriberId = rs.getString(1);
 modemIp = rs.getString(2);
 cmtsIp = rs.getString(3);
 rs.clearWarnings();
 }
 rs.close();
 rs = null;
 }
}
```

```

 stmt.close();
 stmt = null;

 long end = (new java.util.Date()).getTime();
 Logger.debug("total msec to execute getProvInfo: " + (end - start));
 if (!bFound)
 return ("OUT_DATA=ERROR^" + Mac + " does not exist in the Provisioning
Database.^");
 String sStr = "OUT_DATA=PROVISION^" + cmtsIp + "^" + modemIp + "^";
 return (sStr);
 }
 catch (SQLException se) {
 String sError = "OUT_DATA=ERROR^" + se.getMessage() + "^";
 if (stmt != null)
 {
 try {
 stmt.close();
 }
 catch (Exception e)
 {
 }
 stmt = null;
 }
 return sError;
 }
}

```

#### 6. Build a Post Http Response to return data to CBT (HttpResponse.java):

```

//send header to CBT
OutputStream os = null;
try {
 os = sock.getOutputStream();
}
catch (IOException e) {
 Logger.error("DataManager.HttpResponse:sendHeader: error: " + e);
 e.printStackTrace(DataManager.getLogPW());
 e.printStackTrace();
}

StringBuffer sb = new StringBuffer();
sb.append ("HTTP/1.0 200 OK" + nl);
sb.append ("Content-type: text/html" + nl);
byte[] b = (sb.toString()).getBytes();
try {
 os.write(b);
 os.flush();
}
catch (IOException e) {
 Logger.error ("DataManager.HttpResponse:sendHeader: error write: " + e);
 e.printStackTrace(DataManager.getLogPW());
 e.printStackTrace();
}

```

Send result data off to CBT

```

os.write(result_data);
os.flush();

```

# 16 Obtaining Documentation

Cisco provides several ways to obtain documentation, technical assistance, and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

## Cisco.com

You can access the most current Cisco documentation on the World Wide Web at this URL:

<http://www.cisco.com/univercd/home/home.htm>

You can access the Cisco website at this URL:

<http://www.cisco.com>

International Cisco websites can be accessed from this URL:

[http://www.cisco.com/public/countries\\_languages.shtml](http://www.cisco.com/public/countries_languages.shtml)

## Documentation CD-ROM

Cisco documentation and additional literature are available in a Cisco Documentation CD-ROM package, which may have shipped with your product. The Documentation CD-ROM is updated regularly and may be more current than printed documentation. The CD-ROM package is available as a single unit or through an annual or quarterly subscription.

Registered Cisco.com users can order a single Documentation CD-ROM (product number DOC-CONDOCCD=) through the Cisco Ordering tool:

[http://www.cisco.com/en/US/partner/ordering/ordering\\_place\\_order\\_ordering\\_tool\\_launch.html](http://www.cisco.com/en/US/partner/ordering/ordering_place_order_ordering_tool_launch.html)

All users can order annual or quarterly subscriptions through the online Subscription Store:

<http://www.cisco.com/go/subscription>

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You can find instructions for ordering documentation at this URL:

[http://www.cisco.com/univercd/cc/td/doc/es\\_inpk/pdi.htm](http://www.cisco.com/univercd/cc/td/doc/es_inpk/pdi.htm)

You can order Cisco documentation in these ways:

- Registered Cisco.com users (Cisco direct customers) can order Cisco product documentation from the Networking Products Marketplace:

<http://www.cisco.com/en/US/partner/ordering/index.shtml>

- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco Systems Corporate Headquarters (California, USA.) at 408 526-7208 or, elsewhere in North America, by calling 800 553-NETS (6387).

## Documentation Feedback

You can submit comments electronically on Cisco.com. On the Cisco Documentation home page, click **Feedback** at the top of the page.

You can send your comments in e-mail to [bug-doc@cisco.com](mailto:bug-doc@cisco.com).

You can submit comments by using the response card (if present) behind the front cover of your document or by writing to the following address:

Cisco Systems  
Attn: Customer Document Ordering  
170 West Tasman Drive  
San Jose, CA 95134-9883

We appreciate your comments.

## 17 Obtaining Technical Assistance

For all customers, partners, resellers, and distributors who hold valid Cisco service contracts, the Cisco Technical Assistance Center (TAC) provides 24-hour, award-winning technical support services, online and over the phone. Cisco.com features the Cisco TAC website as an online starting point for technical assistance.

### Cisco TAC Website

The Cisco TAC website (<http://www.cisco.com/tac>) provides online documents and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The Cisco TAC website is available 24 hours a day, 365 days a year.

Accessing all the tools on the Cisco TAC website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a login ID or password, register at this URL:

<http://tools.cisco.com/RPF/register/register.do>

### Opening a TAC Case

The online TAC Case Open Tool (<http://www.cisco.com/tac/caseopen>) is the fastest way to open P3 and P4 cases. (Your network is minimally impaired or you require product information). After you describe your situation, the TAC Case Open Tool automatically recommends resources for an immediate solution. If your issue is not resolved using these recommendations, your case will be assigned to a Cisco TAC engineer.

For P1 or P2 cases (your production network is down or severely degraded) or if you do not have Internet access, contact Cisco TAC by telephone. Cisco TAC engineers are assigned immediately to P1 and P2 cases to help keep your business operations running smoothly.

To open a case by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411 (Australia: 1 800 805 227)

EMEA: +32 2 704 55 55

USA: 1 800 553-2447

For a complete listing of Cisco TAC contacts, go to this URL:

<http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml>

### TAC Case Priority Definitions

To ensure that all cases are reported in a standard format, Cisco has established case priority definitions.

**Priority 1 (P1)**—Your network is “down” or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

**Priority 2 (P2)**—Operation of an existing network is severely degraded, or significant aspects of your business operation are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

**Priority 3 (P3)**—Operational performance of your network is impaired, but most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

Priority 4 (P4)—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

## 18 Obtaining Additional Publications and Information

Information about Cisco products, technologies, and network solutions is available from various online and printed sources.

- The Cisco Product Catalog describes the networking products offered by Cisco Systems, as well as ordering and customer support services. Access the Cisco Product Catalog at this URL:  
[http://www.cisco.com/en/US/products/products\\_catalog\\_links\\_launch.html](http://www.cisco.com/en/US/products/products_catalog_links_launch.html)
- Cisco Press publishes a wide range of networking publications. Cisco suggests these titles for new and experienced users: Internetworking Terms and Acronyms Dictionary, Internetworking Technology Handbook, Internetworking Troubleshooting Guide, and the Internetworking Design Guide. For current Cisco Press titles and other information, go to Cisco Press online at this URL:  
<http://www.ciscopress.com>
- Packet magazine is the Cisco quarterly publication that provides the latest networking trends, technology breakthroughs, and Cisco products and solutions to help industry professionals get the most from their networking investment. Included are networking deployment and troubleshooting tips, configuration examples, customer case studies, tutorials and training, certification information, and links to numerous in-depth online resources. You can access Packet magazine at this URL:  
<http://www.cisco.com/go/packet>
- iQ Magazine is the Cisco bimonthly publication that delivers the latest information about Internet business strategies for executives. You can access iQ Magazine at this URL:  
<http://www.cisco.com/go/iqmagazine>
- Internet Protocol Journal is a quarterly journal published by Cisco Systems for engineering professionals involved in designing, developing, and operating public and private internets and intranets. You can access the Internet Protocol Journal at this URL:  
[http://www.cisco.com/en/US/about/ac123/ac147/about\\_cisco\\_the\\_internet\\_protocol\\_journal.html](http://www.cisco.com/en/US/about/ac123/ac147/about_cisco_the_internet_protocol_journal.html)
- Training—Cisco offers world-class networking training. Current offerings in network training are listed at this URL:  
<http://www.cisco.com/en/US/learning/index.html>









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