

## Getting Started with Cisco Cable Troubleshooter 1.0

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Cisco Cable Troubleshooter (CCT) 1.0 is a GUI-based application that can manage a hybrid fiber coaxial (HFC) network and can diagnose problems with the HFC. This tool enables RF technicians to quickly isolate plant and provisioning problems and to characterize upstream and downstream trouble patterns. CCT is a standalone application that runs on both PCs and Solaris workstations and has the following features:

- Displays both online and flapping or intermittent DOCSIS modems, including set-top boxes, in tabular format with sortable data columns
- For each Cisco uBR7200 series router, the application analyzes and sorts the flapping modem list into four problem categories:
  - Provisioning problems
  - Reverse path noise problems
  - Reverse path attenuation problems
  - Packet corruption problems and CRC errors

- Provides summary statistics for each upstream port:
  - Total modems online
  - Percentage of modems online
  - Minimum and maximum power levels received by the Cisco uBR7200 series router
- On-demand queries of subscriber information stored in an LDAP directory

**Note** Before installing CCT, be sure to check the Readme file for additional information.

## System Requirements

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CCT can run on a Solaris workstation or a PC. This section lists the requirements for the following devices:

- Solaris system
- PC system
- Cisco uBR7200 series router

### **Solaris System Requirements**

- Ultra 5 Solaris workstation
- Solaris 2.6 OS installed
- 50 MB of available disk space
- 256 MB of memory
- CD-ROM drive
- SNMP connectivity between workstation and Cisco uBR7200 series router

### **PC System Requirements**

- Pentium II, Windows 95, Windows NT, or Windows 98 workstation
- 64 MB of memory
- 50 MB of disk space
- CD-ROM drive

## Cisco uBR7200 Series Router Requirements

- Cisco IOS Release 11.3(X)NA or higher

- SNMP enabled using the following command:

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

- Enable or secret password configured as follows:

```
Router(config)# enable password <password>
```

- Line password in the line configuration set to enable Telnet as follows:

```
Router(config)# line vty 0 4
```

```
Router(config)# password <password>
```

- Session timeout configured for all vty lines (because Telnet is used to communicate with the router) as follows:

```
Router(config)# line vty 0 4
```

```
Router(config-line)# session-timeout 10
```

**Note** SNMP is used to read the Cisco IOS release, router name, and type. Cable modem device information is retrieved using the command-line interface (CLI) commands over Telnet sessions to the Cisco uBR7200 series router.

## Installing and Starting CCT

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This section provides separate procedures to install and start CCT on either a Solaris workstation or a PC.

### **Solaris Workstation Installation**

To install CCT on a Solaris workstation:

- 1 Insert the Cisco Cable Troubleshooter CD-ROM into the CD-ROM drive.

- 2 Extract the files from the CD-ROM. Enter:

```
cp /cdrom/cdrom0/fla.tar /cct
cd /cct
tar xvf fla.tar
```

- 3 Set up file permissions using these commands:

```
chmod +x FlapListAnalyzerSetup.unix
./FlapListAnalyzerSetup.unix
```

- 4 Start the application:

```
./FlapListAnalyzer
```

## PC Installation

To install CCT on a PC:

- 1 Insert the Cisco Cable Troubleshooter CD-ROM into the CD-ROM drive.
- 2 Use Winzip to unzip fla.zip. Check **Use folder names** so that the directories are created properly during the unzipping process.
- 3 To start the application:

From *Windows Explorer*, double-click on **FlapListAnalyzer.bat**

From the *Command Prompt Window*, type **FlapListAnalyzer**

From *Run*, type **FlapListAnalyzer**

## Uninstalling CCT

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To uninstall CCT, exit CCT and then remove or delete the files that have been installed.

## Getting Started with CCT

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Implementing CCT begins with these tasks:

- Setting up users
- Setting up routers
- Troubleshooting cable modems

### Setting Up Users

The first step in using CCT is to set up user access. As the primary user, log in as **admin** with the default password, **changeme**. After logging in, change the password by choosing **Task>User List**. This username and password are the root-level Admin user that can add additional users and perform full device management.

For additional users, click **Task>User List** to create a list that contains all the valid end users that can access the CCT application and view data.

Specify the following user data:

- Username
- Password

- User Type (Admin or User)

An Admin user can perform the following tasks:

- Add/delete users who can access CCT
- View and change the SNMP (READ) community string
- View and change CLI passwords that CCT uses for accessing the Cisco uBR7200 series routers
- Add/remove Cisco uBR7200 series routers from the uBR list
- Change the parameters CCT uses for accessing the LDAP server
- Run and view the flap list analysis
- Save and load data

Users who are not Admin users can perform the same tasks for displaying and analyzing data, but cannot add/delete routers, perform user administration, or modify application settings.

## **Setting Up Routers**

As the Admin user, add/delete the desired Cisco uBR7200 series routers to be managed. Only Admin users can add or delete routers and unmask the passwords.



**Note** For successful management of these routers, make sure the correct router passwords are entered and SNMP is enabled on these routers. For routers authenticated by AAA servers, click the **User Name and User Password** column for more information.

To create a router list, choose **Task>UBR List** and specify the following router data:

- IP address
- SNMP community strings – Enter the SNMP read community string configured on the router in the Community String (Read) column. The default value is public. Verify that access lists, if configured in the router, allow for SNMP Read access from your workstation.
- Router name—The Router Name column reflects the DNS name of the router. If the DNS name is not available, its IP address will be displayed. The Router Name is queried from the router using SNMP. Users cannot edit this column.
- Username—Enter a value in the User Name column only when user authentication is configured on the vty lines of the router. If login local is the authentication method on the router's vty lines, then you can find the username by using the router's **show config** command. For AAA server authentication, enter your TACACS account name.

- **User Password**—In the User Password column, enter a value only when user authentication is configured on the vty lines of the router. The value to enter is the password expected for the given username. For AAA server authentication, enter your TACACS password.
- **Line Password**—In the Line Password column, enter a value only when the router has a password configured on its vty lines. This is the case when both login and a password are found in the router configuration file under an entry such as **line vty 0 4**. Routers with no line passwords cannot be managed by CCT.
- **Enable Password**—In the Enable Password column, enter the password required to enable the router for configuration changes. This can be configured on the router as either **enable password <password>** or **enable secret <password>**. Routers with no enable passwords cannot be managed by CCT.
- **Cisco IOS Release**—The IOS Version column indicates the Cisco IOS software image that is running on the router. The Cisco IOS release is queried from the router using SNMP. Users cannot edit this column.
- **Router Type**—The Router Type column indicates the model of the Cisco uBR7200 series router. The values for this column are discovered by the Flap List Analyzer when the Admin user adds the

router to the list, provided the router is reachable at that point. The Router Type is queried from the router using SNMP. Users cannot edit this column.

**Note** Only Admin users can add routers and unmask the router passwords.

An optional feature of CCT is the ability to link cable modem device information with subscriber information stored in an LDAP directory. To make this possible, the Admin user needs to configure access to LDAP using the LDAP configuration screen from the Task pull-down menu. See “Displaying LDAP Information” on page 20.

## **Troubleshooting Cable Modems**

CCT enables you to perform the following troubleshooting tasks:

- Display and analyze flapping modems
- Show flap list details
- Load analysis

## Displaying and Analyzing Flapping Modems

The Flap List Analysis screen shows the output of the following data for modems with a total online time of more than 60 seconds:

- Upstream global analysis
- Problem categories for flapping modems

**Note** If the Cisco IOS release of the Cisco uBR7200 series router has changed, go to the UBR List screen and click **Apply** to obtain the updated Cisco IOS release information before displaying this screen. If a cable modem appears in the flap-list (output of the **show cable flap-list** command), but does not appear in the active cable modem list (output of the **show cable modem** command), it will get filtered out from the flap list analysis calculation.

The top of the screen shows the details for the selected Cisco uBR7200 series router.

**Note** Double-click a field to enter or modify values. Select a row by clicking once on the row number. To sort table information, click the column heading you want to use for sorting. Modem online time is rounded up to the next hour for the flap rate calculations.

### Upstream Global Analysis

This is a global summary report for each upstream port for each line card in the selected Cisco uBR7200 series router. The following data is displayed for each upstream port:

- Cable interface identifier
- Upstream port identifier
- Minimum receive power computed over all cable modems reported in the output of the **show cable modem** command for the upstream port
- Maximum receive power computed over all cable modems reported in the output of the **show cable modem** command for the upstream port
- Percentage of modems reported as online for the upstream port
- Number of modems reported as online for the upstream port
- Total number of modems reported for the upstream port

If the upstream has a minimum receive power lower than -2 db or a maximum receive power higher than 2 db, the power level is highlighted and indicates a problem with the cable plant.

### **Problem Categories**

CCT displays flapping modems in the following four categories to facilitate problem diagnosis and resolution:

**Note** The categories are not exclusive, so one modem can appear in multiple lists.

- **Provisioning Problems**—Total number of modems that have a provisioning problem along with detailed data for each modem.
- **Reverse Path Noise Problems**—Total number of modems with a reverse path noise problem category along with the following detailed data for each modem:
  - Cable interface identifier
  - Upstream port identifier
  - MAC address
  - Noise flaps per hour (ratio of the total flaps reported for the modem with respect to the total modem online time in hours)

**Note** For calculating the noise flaps per hour, if the flap list is cleared, if any of the flap list counters are cleared by the router administrator, or if the modem goes out of the flap list (via aging) and back in again, the modem's flap rate calculation might not be accurate.

- Reverse Path Attenuation Problems—Total number of modems with reverse path attenuation problems along with the following detailed data for each modem:
  - Cable interface identifier
  - Upstream port identifier
  - MAC address
  - Power flaps per hour (ratio of the total number of power adjustments reported for the modem with respect to the total modem online time in hours)

**Note** For calculating the power flaps per hour, if the flap list is cleared, if any of the flap list counters are cleared by the router administrator, or if the modem goes out of the flap list (via aging) and back in again, the modem's flap rate calculation might not be accurate.

- Path CRC Problems—Total number of modems with packet corruption or CRC error problems along with the following detailed data for each modem:
  - Cable interface identifier
  - Upstream port identifier
  - MAC address
  - Packet corruption count (number of CRC errors detected for the modem)

The display in the Problem tables is limited to 1000 modems at a time. Click the **Prev Page/Next Page** buttons to display additional sets of 1000 modems.

Click on a modem's **MAC address** and click **Display LDAP Info** to display all the information associated with a particular modem that has been previously entered into the provisioning database. If the modem is found in the provisioning database, all the attributes set up for the modem will be displayed in a separate window.

**Note** Prior to accessing the provisioning database, the LDAP server information has to be configured via the LDAP Access screen from the Task menu. See “Displaying LDAP Information” on page 20.



Click **Capture and Analyze Flap List** to perform a new capture of the flap list and modem data and to analyze the new data.

Click **Save** to save the current set of captured data from the selected Cisco uBR7200 series router. The save operation generates two files: *flaplist.ip address of router* and *analysis.ip address of router*.

**Note** Data displayed using the **Load** operation (data already saved) is not allowed to be saved again. Click **Load** to view the previously saved data.

### **Showing Flap List Details**

Flap list detailed information mirrors the data available from the following Cisco IOS commands:

**show cable modems**

**show cable flap-list**

**Note** If the Cisco IOS release of the Cisco uBR7200 series router has changed, go to the UBR List screen and click **Apply** to obtain the updated Cisco IOS release information before displaying the Flap List Details screen.

The Flap List Details screen shows the raw output captured from the selected Cisco uBR7200 series router. Use this data for a visual check on the various operating parameters, state, and flap counters reported by the router for each cable modem.

- Capture Time—Time the data was captured from the router.
- Router Information:
  - IP address
  - Router name
  - Router type
  - Cisco IOS release running on the router
- Output of **show cable modem**—Includes the total number of modems reported from the router followed by the actual output from the router in a tabular format. For each cable modem, the router reports the following data:
  - Primary SID
  - Modem state
  - Timing offset

- Receive power
- QoS
- Number of CPEs (reported only for Cisco IOS Release 12.0 and higher)
- IP address
- MAC address
- Output of **show cable flap-list**—Total number of modems reported from the router followed by the actual output from the router in a tabular format. For each cable modem, the router reports the following data:
  - MAC address
  - Cable interface/upstream port
  - Number of insertion failures
  - Number of station maintenance hits
  - Number of station maintenance misses
  - Number of CRC errors
  - Number of power adjustments

- Total number of flaps
- Time stamp for the last flap

The display in the two tables is limited to 1000 modems at a time. Click the **Prev Page/Next Page** buttons to display the previous/next set of 1000 modems.

Use **Find MAC Addr:** to quickly search for a particular modem. Enter the MAC address and press **Return**. If the modem is found, the entire row in the table corresponding to the modem will be highlighted.

**Note** The MAC address format "xxx.xxx.xxx" must be used, as displayed in the "MAC address" cells in the tables; do not use the format "xx:xx:xx:xx:xx:xx" when specifying the MAC address to be found.

### **Displaying LDAP Information**

The LDAP server typically contains subscriber-specific information that is used when provisioning cable modems. CCT links its collected device information with the subscriber information using the LDAP interface.

You need to specify the LDAP Access parameters in the LDAP Access Information screen before displaying LDAP information. Click **Task>LDAP Access** and enter the following data:

- LDAP Server Name—Enter the LDAP server name you want CCT to use for retrieving LDAP information.
- LDAP Server Port Number—Enter the LDAP server port number of the LDAP server.
- LDAP Parent Name—Enter the LDAP parent name. For example:  
o=xxx.com
- LDAP User Name—Enter an LDAP username. This field is optional if the LDAP server supports the anonymous user. For example:  
uid=admin, ou=Administrators, ou=TopologyManagement, o=NetscapeRoot
- LDAP User Password—Enter the LDAP user password. This field is optional if the LDAP server supports the anonymous user.

Click **Apply** to validate the LDAP parameters by attempting a connection to the LDAP server using the supplied LDAP parameters. If the parameters are valid, the parameters are saved.

To display LDAP information, go to the Flap List Analysis screen and click **Display LDAP Information**. The "LDAP Information" window displays all LDAP information using the settings from the LDAP Access Information screen.

**Note** If the LDAP information is stored under two nodes under the same LDAP parent, (for example: "ou=leases, o=xxx.com" and "ou=modems, o=xxx.com"), the attributes/values from the two nodes are combined and displayed in this window.

Click **OK** to close down this window.

## **Saving Data**

CCT allows you to save the current data to time-stamped files so the data can be accessed and analyzed. Click **Load Analysis** to save the current data to a file in the installed directory as tab-delimited ASCII files. Files are *flaplist.ip address of router* and *analysis.ip address of router*.

### **flaplist.ip address of router File**

This file contains the raw output from the execution of the three Cisco IOS commands used for the flap list analysis. Every time you click

**Save**, the appropriate file for the selected Cisco uBR7200 series router is appended with the following sections of information:

- Time stamp of the capture
- Cisco IOS release
- Output from **show cable modem**
- Output from **show cable flap-list**
- For each cable interface/uBR linecard, the output from **show interface cable interface sid connectivity**. The subsections for each cable interface are delimited by the "~" character.

All of the above sections are delimited by the "^" character.

#### **analysis.ip address File**

This file contains the output from the flap-list analysis report. Every time you click **Save**, the *analysis.ip address of router* file for the selected Cisco uBR7200 series router is appended with the following sections of information:

- Time stamp of the capture
- Global Upstream Analysis details

- Provisioning Problem Bucket details
- Reverse Path Noise Problem Bucket details
- Reverse Path Attenuation Problem Bucket details
- Packet Corruption (CRC) Problem Bucket details

Each one of the upstream analysis and problem category detail sections is preceded by "{" and followed by "}." The various sections are delimited by a new line.

**Note** This file is not used by CCT for the restoration of the flap list analysis reports. This file is for reference only.

## Printing Data

To print data displayed on the current screen, select **Task>Print**, specify the desired print settings, and click **OK**.

The data is formatted as a postscript (.ps) file for screen display.

**Note** To print all the data used for a flap list analysis report, click **Load Analysis** to save the data to the data files *flaplist.ip address of router* and *analysis.ip address of router*, and then print the desired file.



## Additional Documentation

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Cisco documentation and additional literature are available in a CD-ROM package, which ships with your product. The Documentation CD-ROM, a member of the Cisco Connection Family, is updated monthly. Therefore, it might be more current than printed documentation. To order additional copies of the Documentation CD-ROM, contact your local sales representative or call customer service. The CD-ROM package is available as a single package or as an annual subscription. You can also access Cisco documentation on the World Wide Web at <http://www.cisco.com>, <http://www-china.cisco.com>, or <http://www-europe.cisco.com>.

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