Modem Status Enhancements for the Cisco uBR7200 Series Cable Router

Feature Overview

This modem status enhancements feature describes how cable management termination system (CMTS) users can obtain operating statistics directly from their CMTSs by using Simple Network Management Protocol (SNMP). You can now determine the state of your modems even if they are off line.

The uBR CMTS now polls its cable modems, caches the state information on the CMTS, then uses SNMP to manage the information. Specific information includes the downstream receive power ratio, downstream signal-to-noise ratio, upstream and downstream power levels, transmit timing offset, and micro reflection (in decibels).

This feature describes how you can identify and troubleshoot problems on the upstream channel. It also provides detailed summary information on the current system status of modems. The **show cable modem** command now includes the following information for each upstream channel:

- The total number of modems
- The number of active modems
- The number of registered modems
- The number of unregistered modems
- The number of offline modems.
- The time the modem went offline
- The status before the modem went offline
- The receive power before the modem went offline.

The **show controller upstream** command has been enhanced to display the following average percentage information on specified cable interfaces:

- Upstream channel utilization in minislots
- Contention slots
- Initial ranging slots
- Minislots lost due to the MAP interrupt being too late.

You can also limit your search for modem status to specific cable interfaces.

Benefits

This feature increases manageability of modems connected to the CMTS. Included is the ability to gather information about offline modems.

Related Features and Technologies

Table 1 lists the IOS cable router features released in the IOS 12.0 timeframe.

Table 1 uBR7200 Series Cable Router Features Available Since 12.0 T

Available With:	Category	Feature
11.3(5)NA & 12.0(3)T	Cable Features	Feature Enhancements
11.3(6)NA		MC16 Modem Card
11.3(8)NA		Access List Support Enhancements
12.0(4)T		Downstream Channel ID Configuration
12.0(4)T		Multiple Service ID Support
12.0(4)T		Cable Modem and Host Subnet Addressing
12.0(5)T		Telephone Return
12.0(5)T		Time Server Functionality
12.0(7)T		Amplitude Averaging Compensation
12.0(7)XR		Cable Interface Bundling
12.0(7)XR		Enhanced Modem Status Display
12.0(7)XR		Show Interface Cable Command Verbose Enhancements
12.0(7)XR		IP Address Verification
12.0(7)XR		Registration Timeout Configuration
12.0(7)XR		Show Cable Modem Command Enhancements
12.0(7)XR		Modem Status Summary Enhancements
12.0(7)XR		Show Controller Command Enhancements
12.0(7)XR		Configuring Concatenation
12.0(7)XR		Virtual Private Network Support
12.0(7)XR		Blind Hopping Support on the MC16S Modem Card
12.0(7)XR		Signal-to-Noise Ratio Data Support
11.3(9)NA and 12.0(4)T	Cable QoS	QoS Profile Enforcement
12.0(4)T		Quality of Service for Voice
11.3(9)NA	Network Management	Upstream Traffic Shaping Feature
12.0(5)T		Enhanced-Spectrum Management
12.0(5)T		Downstream Rate Shaping with TOS bits
12.0(7)XR		Spectrum Management Using the MC16S Modem Card
12.0(7)XR		Downstream Test Signals Configuration
12.0(7)XR	Wireless Features	Point-to-Point Wireless Support

Related Documents

The uBR7200 series cable router is described in *Voice, Video, and Home Applications Configuration Guide* for Cisco IOS Release 12.0 and in the following online feature modules:

- *Cisco uBR7246 Universal Broadband Router Feature Enhancements*
- *MC16 Modem Card for uBR7200*
- *uBR7200 Series Access List Support Enhancements*
- *QoS Profile Enforcement for the Cisco uBR7200 Series Router*
- *Upstream Traffic Shaping Feature*
- *Configuring Downstream Channel IDs*
- *Telephone Return for the Cisco uBR7200 Series Cable Router*
- *Enhanced-Spectrum Management for the Cisco uBR7200 Series Cable Router*
- *Time Server Functionality*
- *Cable Interface Bundling for the Cisco uBR7200 Series Cable Router*
- *Quality of Service for Voice on the Cisco uBR7200 Series Cable Router*
- *Modem Status Enhancements for the Cisco uBR7200 Series Cable Router* (this feature)
- *Load Sharing Support*
- *Cable Modem and Host Subnet Addressing*
- *MGX Resource Pool Management Hardware Diagnostics*
- *IP Address Verification for the Cisco uBR7200 Series Cable Router*
- *Configuring the Registration Timeout Value for the Cisco uBR7200 Series Cable Router*
- *Spectrum Management Using the MC16S Modem Card on the Cisco uBR7200 Series Cable Router*
- *Configuring Downstream Test Signals for the Cisco uBR7200 Series Cable Router*
- *Configuring Concatenation on the Cisco uBR7200 Series Cable Router*
- *Point-to-Point Wireless Support for the Cisco uBR7200 Series Universal Broadband Router*
- *Blind Hopping Support on the MC16S Modem Card for the Cisco uBR7200 Series Cable Router*
- *Downstream Rate Shaping with TOS bits on the uBR7200 Series Cable Router*
- *Amplitude Averaging Compensation on the Cisco uBR7200 Series Cable Router*

Supported Platforms

ubR7200 series

Supported Standards, MIBs, and RFCs

Standards

No new or modified standards are supported by this feature.

MIBs

- DOCS-IF-MIB

For descriptions of supported MIBs and how to use MIBs, see the Cisco MIB web site on CCO at http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml.

RFCs

No new or modified RFCs are supported by this feature.

Configuration Tasks

See the following configuration tasks for the monitoring modem status. Each task in the list indicates if the task is optional or required.

- Enabling SNMP (required)
- Configuring Remote Modem Monitoring (required)

Enabling SNMP

Command	Purpose
`Router(config)# snmp-server manager`	Opens the SNMP manager.
`Router(config)# snmp-server community [Community String] [Permissions]`	Defines user permissions.

Configuring Remote Modem Monitoring

Command	Purpose
`Router(config)# cable modem remote-query [polling interval] [Community string]`	Specifies how often SNMP polls the modem and allows you to configure access.

Verifying Remote query Information

To display information from a queried modem, enter the **show cable modem remote-query** command.

Troubleshooting Tips

To display debugging information, enter the **debug cable remote-query** command.

Monitoring and Maintaining Remote Querying

Use the following show commands to gather status information about the specified modems.

Command	Purpose
`Router#` **show cable flap-list**	Displays statistics on the quality of the modem connection.
`Router#` **show cable modem**	Displays statistics on modem states.
`Router#` **show cable modem remote-query**	Displays statistics gathered by SNMP agents on modem states.
`Router#` **show interface cable**	Displays statistics on the quality of the cable interface.
`Router#` **show interface cable sid**	Displays statistics on the service IDs of the specified modems.

Configuration Examples

None

Command Reference

This section documents new or modified commands. All other commands used with this feature are documented in the Cisco IOS Release 12.0 command reference publications.

- **cable modem remote-query**
- **show cable flap-list**
- **show cable modem**
- **show interface cable**
- **show interface cable sid**

In Cisco IOS Release 12.0(1)T or later releases, you can search and filter the output for **show** and **more** commands. This functionality is useful when you need to sort through large amounts of output, or if you want to exclude output that you do not need to see.

To use this functionality, enter a **show** or **more** command followed by the "pipe" character (**|**), one of the keywords **begin**, **include**, or **exclude,** and an expression that you want to search or filter on:

command **|** {**begin | include | exclude**} *regular-expression*

See the following example of the **show atm vc** command in which you want the command output to begin with the first line where the expression "PeakRate" appears:

show atm vc | begin PeakRate

For more information on the search and filter functionality, refer to the Cisco IOS Release 12.0(1)T feature module *CLI String Search*.

cable modem remote-query

To gather cable modem performance statistics on a CMTS, use the **cable modem remote-query** configuration command. To disable the gathering of cable modem statistics, use the **no** form of this command.

cable modem remote-query [*polling interval*] [**Community string**]

no cable modem remote-query [*polling interval*] [**Community string**]

Syntax Description

polling interval	Specifies how often the CMTS polls for cable modem statistics. Valid range is from 1 to 500 seconds.
Community string	Defines the SNMP community string.

Default

No default behavior or values.

Command Mode

Configuration

Command History

Release	Modification
12.0(7)XR	This command was introduced.

Usage Guidelines

You can change the polling interval at any time. However, to change the SNMP community string, you must unconfigure and reconfigure this command.

Example

The following example illustrates how to set the polling interval to 5 seconds and the SNMP community string to private:

```
Router(config)# cable modem remote-query 5 private
```

Related Commands

Command	Description
debug cable remote-query	Turns on debugging to gather information from remote modems.

show cable flap-list

To display the cable flap-list, use the **show cable flap-list** privileged EXEC configuration command.

show cable flap-list [**sort-flap | sort-time**]

Syntax Description

sort-flap	(Optional) Sorted by number of times the cable modem has flapped.
sort-time	(Optional) Sorted most recent time the cable modem is detected to have flapped.

Default

None

Command Mode

Privileged EXEC

Command History

Release	Modification
11.3(5) NA	This command was introduced.
12.0(3)T	Ported to mainline release.

Examples

The following example shows the output of the **show cable flap-list** command:

```
router #show cable flap-list
MAC Address     Upstream     Ins   Hit   Miss  CRC   P-Adj Flap  Time
 0010.7bb3.fd19  Cable5/0/U1  0     2792  281   0     *45    58    Jul 27 16:54:50
 0010.7bb3.fcfc  Cable5/0/U1  0     19    4     0     !43    43    Jul 27 16:55:01
 0010.7bb3.fcdd  Cable5/0/U1  0     19    4     0     *3     3     Jul 27 16:55:01
```

The following example shows the return for flap-list tables sorted by MAC address and by time:

```
router# show cable flap-list sort-flap
Mac Addr       CableIF    Ins    Hit   Miss    CRC  P-Adj   Flap    Time
.1eab.2c0b     C6/0 U0    108    318     27      0      0    108 Sep 10 15:26:56
.1eb2.bb07     C6/0 U0      0    293     31      1      1      1 Sep 10 15:15:49
.7b6b.71cd     C6/0 U0      1    288     32      0      0      1 Sep 10 15:12:13
.1eb2.bb8f     C6/0 U0      1    295     30      0      0      1 Sep 10 15:11:44
router#
Router# show cable flap-list sort-time
Mac Addr       CableIF    Ins    Hit   Miss    CRC  P-Adj   Flap    Time
00e0.2222.2202 C4/0 U0    464   2069    242      0    421    885 Oct 16 22:47:23
0010.7b6b.57e1 C4/0 U0      0   2475     43      0   1041   1041 Oct 16 22:47:04
```

Table 2 Show Cable flap-list Field Descriptions

Field	Description
Mac Addr	The customer account or street address.
CableIF	The physical port, including the upstream port.
Ins	The number of times the modem comes up and inserts itself into the network. This parameter can indicate intermittent downstream sync loss or DHCP or modem registration problems.
Hit	The number of times the modem responds to MAC layer keep alive messages. (The minimum hit rate is once per 30 seconds. This parameter can indicate intermittent upstream, laser clipping, or common-path distortion.
Miss	The number of times the modem misses the MAC layer keep alive message. An 8 percent miss rate is normal for the MC11 card. This parameter can indicate intermittent upstream, laser clipping, or common-path distortion.
CRC	The number of Cyclic Redundancy Check errors from this modem. This parameter can indicate intermittent upstream, laser clipping, or common-path distortion.
P-Adj	The number of times the CMTS instructed the modem to adjust TX power more than 3 dB. This parameter can indicate amplifier degradation, poor connections, or thermal sensitivity. * means the noise power adjustment method is active for this modem. ! means the modem has reached its maximum transmit power.
Flap	The sum of P-Adj and Ins values. Modems with high flap counts will have high SIDs and may not register.
Time	The most recent time that the modem dropped the connection.

Related Commands

Command	Description
cable flap-list aging	Sets the number of days to keep entries in the flap list table.
cable flap-list insertion-time	Sets the insertion time interval.
cable flap-list power-adjust threshold	Specifies the power-adjustment threshold for recording a flap-list event.
cable flap-list size	Specifies the maximum number of modems that can be reported to the flap-list table.
clear cable flap-list	Resets the flap-list table.

show cable modem

To display operational information for modems, use the **show cable modem** EXEC command.

show cable modem [*ip-address* | *interface* | *mac-address*] [**detail | maintenance | offline | registered | remote-query | summary | unregistered**]

Syntax Description

ip-address	The IP address of the specified modem.
interface	Specifies the head-end cable interface to display modem information.
mac-address	The MAC address of the specified modem.
detail	Displays detailed information on modems.
maintenance	Displays Station Maintenance Error Statistics report.
offline	Displays information about connected modems that are offline.
registered	Displays information about registered modems.
remote-query	Displays modem information gathered by the SNMP agent.
summary	Displays information about all the modems connected to this interface.
unregistered	Displays information about unregistered modems.

Command Mode

EXEC

Command History

Release	Modification
11.3XA	This command was introduced.
11.3(5)NA	Output was reorganized and the Receive Power field was added.
12.0(3)T	Was ported to the mainstream release.
12.0(4)XI	Output was expanded to show primary SID and CPE count.
12.0(5)T	Was ported to the mainstream release.
12.0(7)XR	Offline status was added.
12.0(7)T	Detail option was added.

Usage Guidelines

Use this command to display information on all cable modems or a particular cable modem on the network.

Examples

See the following sample output from the **show cable modem** command:

```
router#show cable modem
 Interface   Prim Online     Timing Rec    QoS CPE IP address       MAC address
             Sid  State      Offset Power
 Cable3/0/U0 1    online     2257    0.00  3   0   209.165.200.142  0090.8330.0217
 Cable3/0/U0 2    online     2262  *-0.50  3   0   209.165.200.145  0090.8330.020f
 Cable3/0/U0 3    online     2260    0.25  3   0   209.165.200.146  0090.8330.0211
 Cable3/0/U0 4    online     2256   *0.75  3   0   209.165.200.143  0090.8330.0216
 Cable3/0/U0 5    online     2265   *0.50  3   0   209.165.200.140  0090.8330.0214
 Cable3/0/U0 6    online     2256    0.00  3   0   209.165.200.141  0090.8330.0215
 Cable3/0/U0 7    online     4138  !-1.00  3   1   209.165.200.182  0050.7366.124d
 Cable3/0/U0 8    online     4142  !-3.25  3   1   209.165.200.164  0050.7366.1245
 Cable3/0/U0 9    online     4141  !-3.00  3   1   209.165.200.185  0050.7366.17e3
 Cable3/0/U0 10   online     4142  !-2.75  3   0   209.165.200.181  0050.7366.17ab
 Cable3/0/U0 11   online     4142  !-3.25  3   1   209.165.200.169  0050.7366.17ef
```

See the following sample of detailed output from the **show cable modem** command:

```
router#show cable modem detail
Interface   SID  MAC address    Max CPE  Concatenation  Rx SNR
Cable3/0/U0 1    0090.8330.0215 3        yes            -----
Cable3/0/U0 2    0090.8330.0213 3        yes            -----
Cable3/0/U0 3    0090.8330.0214 3        yes            -----
Cable3/0/U0 4    0090.8330.0217 3        yes            -----
Cable3/0/U0 5    0090.8330.020f 3        yes            -----
Cable3/0/U0 6    0050.7366.17e3 3        no             -----
Cable3/0/U0 7    0090.8330.0211 3        yes            -----
Cable3/0/U0 8    0050.7366.17af 3        no             -----
Cable3/0/U0 9    0090.8330.0216 3        yes            -----
Cable3/0/U0 10   0050.7366.1801 3        no             -----
Cable3/0/U0 11   0050.7366.124d 3        no             -----
Cable3/0/U0 12   0050.7366.1241 3        no             -----
Cable3/0/U0 13   0050.7366.17db 3        no             -----
Cable3/0/U0 14   0050.7366.1239 3        no             -----
Cable3/0/U0 15   0050.7366.17ab 3        no             -----
Cable4/0/U0 1    0050.7366.1db1 3        no             26.50
Cable4/0/U1 2    0050.7318.e97f 3        no             23.87
Cable4/0/U1 3    0050.7318.e965 3        no             23.85
Cable4/0/U0 4    0050.7318.e931 3        no             26.72
Cable4/0/U1 5    0050.7318.e92d 3        no             23.31
Cable4/0/U1 6    0050.7318.e97b 3        no             23.85
Cable4/0/U0 7    0050.7366.1d8d 3        no             26.88
Cable4/0/U0 8    0050.7318.e953 3        no             26.54
Cable4/0/U1 9    0050.7366.1d9d 3        no             23.72
Cable4/0/U1 10   0050.7318.e96b 3        no             23.79
Cable4/0/U1 11   0050.7366.1d95 3        no             23.82
Cable4/0/U0 12   0050.7318.e93f 3        no             26.26
Cable4/0/U1 13   0050.7318.e96d 3        no             23.51
Cable4/0/U0 14   0050.7318.e941 3        no             26.69
Cable4/0/U0 15   0050.7366.1dcd 3        no             26.94
Cable4/0/U1 16   0050.7318.e939 3        no             23.98
Cable4/0/U0 17   0050.7366.1d8f 3        no             27.13
Cable4/0/U0 18   0050.7302.3da3 3        no             26.58
Cable4/0/U0 19   0050.7318.e93b 3        no             26.49
Cable4/0/U0 20   0050.7318.e901 3        no             26.68
Cable4/0/U1 21   0050.7366.1dbb 3        no             23.45
Cable4/0/U0 22   0050.7318.e957 3        no             26.35
Cable4/0/U0 23   0050.7318.e985 3        no             26.40
Cable4/0/U0 24   0050.7366.1dbd 3        no             26.69
```

See the following sample output of modems connected on upstream channel 0 for cable interface slot 3, port 0:

```
router#show cable modem cable 3/0 upstream 0
Interface   Prim Online     Timing Rec    QoS CPE IP address        MAC address
            Sid  State      Offset Power
Cable3/0/U0 1    offline    2264   -0.50  2   0   209.165.200.2     0090.8330.0214
Cable3/0/U0 2    offline    4137  !-3.50  2   0   209.165.200.9     0050.7366.17d3
Cable3/0/U0 3    init(d)    4136  !-2.50  2   0   209.165.200.0     0050.7366.17ab
Cable3/0/U0 4    init(d)    4138  !-4.75  2   0   209.165.200.0     0050.7366.1803
Cable3/0/U0 5    init(d)    4137  !-2.25  2   0   209.165.200.0     0050.7366.1801
Cable3/0/U0 6    init(o)    2251   -0.25  2   0   209.165.200.3     0090.8330.0213
Cable3/0/U0 7    offline    2264    0.75  2   0   209.165.200.4     0090.8330.020f
Cable3/0/U0 8    offline    2266   -0.50  2   0   209.165.200.5     0090.8330.0211
Cable3/0/U0 9    init(rc)   4662    1.00  2   0   209.165.200.0     00d0.bad3.c459
```

See the following sample output of registered modems connected on upstream channel 0 for cable interface 3, port 0:

```
router#show cable modem cable 3/0 upstream 0 registered
Interface   Prim Online     Timing Rec    QoS CPE IP address      MAC address
            Sid  State      Offset Power
```

See the following sample output of unregistered modems connected on upstream channel 0 for cable interface 3, port 0:

```
router#show cable modem cable 3/0 upstream 0 unregistered
Interface   Prim Online     Timing Rec    QoS CPE IP address        MAC address
            Sid  State      Offset Power
Cable3/0/U0 1    offline    2264   -0.50  2   0   209.165.200.2     0090.8330.0214
Cable3/0/U0 2    offline    4137  !-3.50  2   0   209.165.200.9     0050.7366.17d3
Cable3/0/U0 3    init(d)    4136  !-2.75  2   0   209.165.200.0     0050.7366.17ab
Cable3/0/U0 4    init(d)    4137  !-3.25  2   0   209.165.200.0     0050.7366.1803
Cable3/0/U0 5    init(d)    4141  !-2.75  2   0   209.165.200.0     0050.7366.1801
Cable3/0/U0 6    offline    2251   -0.25  2   0   209.165.200.3     0090.8330.0213
Cable3/0/U0 7    offline    2254   -1.00  2   0   209.165.200.4     0090.8330.020f
Cable3/0/U0 8    offline    2248    0.00  2   0   209.165.200.5     0090.8330.0211
Cable3/0/U0 9    init(rc)   4665   -0.50  2   0   209.165.200.0     00d0.bad3.c459
```

See the following sample output of offline modems connected on upstream channel 0 for cable interface 3, port 0:

```
router#show cable modem cable 3/0 upstream 0 offline
Interface   MAC address    Prim Previous  Offline          Rx     Rx    SM
                           Sid  State     Time             Power  SNR   Exhaust
                                                                       Count
Cable3/0/U0 0050.7366.17d3 2    init(o)   Jan 16 20:30:26 !-3.50  ----- 1
Cable3/0/U0 0090.8330.0213 6    init(o)   Jan 16 20:30:55  -0.25  ----- 181
Cable3/0/U0 0090.8330.020f 7    init(o)   Jan 16 20:31:07  -1.00  ----- 181
Cable3/0/U0 0090.8330.0211 8    init(o)   Jan 16 20:31:23   0.00  ----- 181
```

See the following sample output of status display information gathered by the SNMP agent:

```
router#show cable modem remote-query
IP address      MAC address    S/N   US    DS    Tx Timing  Micro (dB) Modem
                               Ratio Power Power Offset     Reflection State
209.165.200.31  0010.7bed.9c2d 35.2  35.0   0.0   12458      0          online
209.165.200.9   0010.7bed.9c3d 34.5  35.0   0.0   12458      0          online
209.165.200.4   0010.7bed.9cf3 36.6  36.0   0.0   12458      0          online
209.165.200.40  0010.7bed.9cb5 35.9  36.0   0.0   12458      0          online
209.165.200.33  0010.7bed.9cb3 36.6  36.0   0.0   12462      0          online
209.165.200.52  0010.7bed.9cf9 36.6  36.0   0.0   12457      0          online
209.165.200.51  0010.7bed.9d13 37.4  35.0   0.0   12457      0          online
209.165.200.53  0010.7bed.9c93 35.9  36.0   0.0   12462      0          online
209.165.200.19  0010.7bed.9ca7 35.9  36.0   0.0   12459      0          online
209.165.200.24  0010.7bed.9ce1 36.6  36.0   0.0   12461      0          online
209.165.200.34  0010.7bed.9d83 36.6  36.0   0.0   12460      0          online
209.165.200.45  0010.7bed.9c99 36.6  36.0   0.0   12458      0          online
```

Table 3 describes the fields shown in the **show cable modem** display.

Table 3 show cable modem Field Descriptions

Field	Description
Interface	The interface on which the cable modem has an active connection.
Prim Sid	The primary service identifier assigned to the modem.
SID	The service identifier assigned to a modem.
Online State	The status of the modem.
Timing Offset	The cable modem's current timing adjustment.
Rec Power	The nominal receive power in decibels for this SID. * means the noise power adjustment method is active for this modem. ! means the modem has reached its maximum transmit power.
QoS	The service cass assigned to the modem.
CPE	The number of customer premises equipment devices (PCs, Macintoshes, Unix workstations, etc.) behind this cable modem.
Max CPE	The maximum number of customer premises equipment configured for this modem.
IP address	The IP address of the modem.
MAC address	The media access layer address of the modem.
Concatenation	The status of concatenation. You can enable it (yes) or disable it (no). For more information, see *Configuring Concatenation on the Cisco uBR7200 Series Cable Router.*
Rx SNR	The receive signal-to-noise ratio level in dBmV as perceived by the cable modem. This parameter is only meaningful for cable modems. A CMTS will return a zero. For offline modems, the signal-to-noise ratio before going offline.
S/N Ratio	For remote-queried modems. Same as Rx SNR.
US Power	The transmit power level for the upstream channel in dBmVs.
DS Power	The received power level at the downstream modem, in dBmVs. If power level measurement is not supported, set this parameter to zero. Also, if the interface is down, this value will be the CMTS-configured value, the most current CM value, or zero.

Field	Description
Tx Timing Offset	The current round trip time at the CM. Used to synchronize upstream transmissions to the CMTS. Measured in units of 6.25 microseconds/64.
Micro (dB) Reflection	Total microreflections including in-channel response as perceived on this interface, measured in dBc below the signal level. This object is not assumed to return an absolutely accurate value, but gives a rough indication of microreflections received on this interface.
Modem State	The status of the modem when it was last polled. Possible states are: init(o)—option file transfer was started init(t)—TOD exchange was started init(r1)—modem sent initial ranging init(r2)—modem is ranging init(rc)—ranging is complete init(d)—DHCP request was received init(i)—DHCP reply was received; IP address assigned online—modem registered; enabled for data online(d)—modem registered but network access for the CM is disabled online(pk)—modem registered; BPI enabled, and KEK is assigned online(pt)—modem registered; BPI enabled, and TEK is assigned reject(m)—modem did attempt to register; registration was refused due to bad mic reject(c)—modem did attempt to register; registration was refused due to bad COS reject(pk)—KEK modem key assignment is rejected reject(pt)—TEK modem key assignment is rejected offline—modem is considered to be offline. Offline Time—Time the modem went offline. The format is same as other **show cable modem** commands (month, day, time and year info).
Offline Time	For offline modems, the time the modem went offline.
Previous State	For offline modems, the status prior to going offline. See Modem State for definitions.
Rx Power	For offline modems, the last receive power measurement before going offline.
SM Exhaust Count	The number of times the CMTS declared that modem to be offline. The modem could be marked offline due to various reasons (modem went dead, modem has not been active for a while, and so on.)

Related Commands

Command	Description
show cable modem	Displays operational information about the specified cable modem.
debug cable remote-query	Turns on debugging for the gathering of information from remote modems.
cable modem remote-query	Specifies that information will be gathered from specified remote modems.

show interface cable

To display cable interface information, use the **show interface cable** privileged EXEC command.

show interface cable *slot/port* [**downstream | upstream**]

Syntax Description

slot/port	Identifies the Cisco uBR7200 chassis slot number and downstream port number. Valid values are from 3 to 6.
downstream	(Optional) Displays cable downstream port information for a cable modem.
upstream	(Optional) Displays cable upstream port information for a cable modem.

Default

No default behavior or values.

Command Mode

Privileged EXEC

Command History

Release	Modification
11.3 XA	This command was introduced.
12.0(3)T	Command ported to the mainline release.
12.0(7)XR	Output expanded for **show interface cable upstream** command.
12.0(7)T	Command ported to the mainline release.

Example

See the following sample output for the cable modem located in slot 6/port 0 from the **show interface cable** command:

```
router# show interface cable 6/0
Cable6/0 is up, line protocol is up
  Hardware is BCM3210 FPGA, address is 00e0.1e5f.7a60 (bia 00e0.1e5f.7a60)
  Internet address is 1.1.1.3/24
  MTU 1500 bytes, BW 27000 Kbit, DLY 1000 usec, rely 255/255, load 1/255
  Encapsulation, loopback not set, keepalive not set
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 4d07h, output 00:00:00, output hang never
  Last clearing of "show interface" counters never
  Queueing strategy: fifo
  Output queue 0/40, 0 drops; input queue 0/75, 0 drops
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     10908 packets input, 855000 bytes, 0 no buffer
     Received 3699 broadcasts, 0 runts, 0 giants, 0 throttles
     3 input errors, 3 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     5412 packets output, 646488 bytes, 0 underruns
     0 output errors, 0 collisions, 13082 interface resets
   0 output buffer failures, 0 output buffers swapped out
```

Table 4 describes the fields shown in the **show interface cable** display.

Table 4 show interface cable Command Field Descriptions

Field	Description
Cable slot/port is up/...administratively down	Indicates whether the interface hardware is currently active or taken down by the administrator.
line protocol is up/...administratively down	Indicates whether the software processes that handle the line protocol believe the interface is usable or if it has been taken down by the administrator.
hardware	Hardware type and address.
Internet address	Internet address followed by subnet mask.
MTU	Maximum Transmission Unit (MTU) of the interface.
BW	Bandwidth of the interface in kilobits per second.
DLY	Delay of the interface in microseconds.
rely	Reliability of the interface as a fraction of 255, calculated as an exponential average over 5 minutes. (For example, 255/255 is 100% reliability.)
load	Load on the interface as a fraction of 255, calculated as an exponential average over 5 minutes. (For example, 255/255 is complete saturation.)
Encapsulation	Encapsulation method assigned to this interface.
ARP type	Type of Address Resolution Protocol (ARP) and timeout value assigned.
Last input	Number of hours, minutes, and seconds since the last packet was successfully received by an interface.
output	Number of hours, minutes, and seconds since the last packet was successfully transmitted by an interface.

Table 4 show interface cable Command Field Descriptions (continued)

Field	Description
Last clearing of "show interface" counters	Time when the counters that measure cumulative statistics, such as number of bytes transmitted and received, were last reset to zero.
Queueing strategy	Displays the type of queueing configured for this interface. In the example output, the type of queueing configured is First In First Out (FIFO).
Output queue	Number of packets in the output queue. The format of this number is A/B where A indicates the number of packets in the queue, and B indicates the maximum number of packets allowed in the queue.
drops	Indicates the number of packets dropped due to a full queue.
input queue/drops	Number of packets in the input queue. The format of this number is A/B where A indicates the number of packets in the queue, and B indicates the maximum number of packets allowed in the queue.
drops	Indicates the number of packets dropped due to a full queue.
Five minute input rate Five minute output rate	Average number of bits and packets transmitted per second in the last five minutes.
packets input	Total number of error-free packets received by the system.
bytes input	Total number of bytes, including data and MAC encapsulation, in the error-free packets received by the system.
no buffer	Number of received packets discarded because there was no buffer space in the main system.
Received broadcast	Total number of broadcast or multicast packets received by the interface.
runts	Number of packets that are discarded because they are smaller than the medium's minimum packet size.
giants	Number of packets that are discarded because they exceed the medium's maximum packet size.
input errors	Includes runts, giants, no buffers, CRC, frame, overrun, and ignored counts.
CRC	Indicates the number of times the cyclic redundancy checksum generated by the originating LAN station or far-end device does not match the checksum calculated from the data received.
frame	Number of packets received incorrectly (with a CRC error and a non-integer number of octets).
overrun	Number of times the receiver hardware was unable to forward received data to a hardware buffer because the input rate exceeded the receiver's ability to handle the data.
ignored	Number of received packets ignored by the interface because the interface hardware ran low on internal buffers.
packets output	Total number of messages transmitted by the system.
bytes	Total number of bytes, including data and MAC encapsulation, transmitted by the system.
underruns	Number of times the transmitter ran faster than the receiving device could handle.
output errors	Sum of all errors that prevented the final transmission of packets out of the interface being examined.

Table 4 show interface cable Command Field Descriptions (continued)

Field	Description
collisions	Not applicable to the Cisco uBR7246.
interface resets	Number of times an interface has been completely reset.
output buffer failures	Number of times the output buffer has failed.
output buffer swapped out	Number of times the output buffer has been swapped out.

See the following sample output for the downstream cable interface of slot 6 on port 0 from the **show interface cable downstream** command:

```
router# show interface cable 6/0 downstream
Cable6/0: Downstream is up
     111947771 packets output, 1579682655 bytes, 0 discarded
     0 output errors
```

Table 5 describes the fields shown in the **show interface cable downstream** display.

Table 5 show interface cable downstream Command Field Descriptions

Field	Description
Cable	Indicates the location of the downstream interface.
Downstream is up/...administratively down	Indicates the administrative state of the interface.
packets output	Total number of packets transmitted out of this interface.
bytes	Total number of bytes transmitted out of this interface.
discarded	Total number of packets discarded.
output errors	Sum of all errors that prevented downstream transmission of packets out of this interface.

See the following sample output for the upstream cable interface located in slot 3/port 0 from the **show interface cable upstream** command:

```
router# show interface cable 3/0 upstream 0
Cable3/0: Upstream 0 is up
     Received 16873 broadcasts, 0 multicasts, 73310 unicasts
     0 discards, 89053 errors, 0 unknown protocol
     90183 packets input, 1 uncorrectable
     89042 noise, 0 microreflections
     Total Modems On This Upstream Channel : 8 (4 active)
     Default MAC scheduler
     Queue[Rng Polls]  0/20, fifo queueing, 0 drops
     Queue[Cont Mslots]  0/104, fifo queueing, 0 drops
     Queue[CIR Grants]  0/20, fair queueing, 0 drops
     Queue[BE Grants]  0/30, fair queueing, 0 drops
     Queue[Grant Shpr]   0/30, calendar queueing, 0 drops
     Reserved slot table currently has 0 CBR entries
     Req IEs 134469315, Req/Data IEs 0
     Init Mtn IEs 385879, Stn Mtn IEs 131059
     Long Grant IEs 10766, Short Grant IEs 15895
     Avg upstream channel utilization : 1%
     Avg percent contention slots : 97%
     Avg percent initial ranging slots : 0%
     Avg percent minislots lost on late MAPs : 0%
     Total channel bw reserved 0 bps
     CIR admission control not enforced
     Current minislot count   : 6676390    Flag: 0
     Scheduled minislot count : 6676545    Flag: 0
```

Table 6 describes the fields shown in the **show interface cable upstream** display.

Table 6 show interface cable upstream Command Field Descriptions

Field	Description
Cable	Indicates the location of the upstream interface.
Upstream is up/...administratively down	Indicates the administrative state of the upstream interface.
Received broadcasts	Number of broadcast packets received through this upstream interface.
multicasts	Number of multicast packets received through this upstream interface.
unicasts	Number of unicast packets received through this interface.
discards	Number of packets discarded by this interface.
errors	Sum of all errors that prevented upstream transmission of packets through this interface.
unknown protocol	Number of packets received that were generated using a protocol unknown to the Cisco uBR7246.
packets input	Number of packets received through this upstream interface that were free from errors.
corrected	Number of error packets received through this upstream interface that were corrected.
uncorrectable	Number of error packets received through this upstream interface that could not be corrected.
noise	Number of upstream packets corrupted by line noise.
microreflections	Number of upstream packets corrupted by microreflections.
Guaranteed-rate service queue depth	Number of bandwidth requests queued up in the Guarantee-rate queue. This queue is only available to modems that have a reserved minimum upstream rate in their Class of Service.
Best-effort service queue depth	Number of bandwidth requests queued up in the Best-effort queue. This queue is available to all modems that do not have any reserved rate on the upstream.
Total Modems On This Upstream Channel	Number of cable modems currently sharing this upstream channel. This field also shows how many of these modems are active.
Current Total Bandwidth Reserved	Total amount of bandwidth reserved by all modems sharing this upstream channel that require bandwidth reservation. The Class of Service for these modems specifies some non-zero value for the guaranteed-upstream rate. When one of these modems is admitted on the upstream, this field value is incremented by this guaranteed-upstream rate value.
CIR admission control (formerly: Current Admission Control Status)	Indicates the status of admission control on the upstream channel. ENFORCED status allows users to enable admission control on a per port basis. This controls how limited bandwidth is allocated. NOT ENFORCED status indicates that there is no admission control. Every modem that registers with a class of service specifying a minimum upstream rate will be admitted by the CMTS regardless of how much aggregate bandwidth is actually available. Users enable admission control by using the admission control CLI.

Table 6 show interface cable upstream Command Field Descriptions (continued)

Field	Description
Default MAC scheduler	Indicates the status of the MAC scheduler as being in default mode as opposed to Automated Test Procedure (ATP).
Queue[Rng Polls]	The MAC scheduler queue showing the number of ranging polls.
Queue[Cont Mslos]	The MAC scheduler queue showing the number of forced contention request slots in MAPS.
Queue[CIR Grants]	The MAC scheduler queue showing the number of CIR grants pending.
Queue[BE Grants]	The MAC scheduler queue showing the number of BE grants pending.
Queue[Grant Shpr]	The MAC scheduler queue showing the number of grants that have been buffered for traffic shaping.
drops	Number of packets dropped.
Reserved slot table currently has 0 CBR entries	Number of CBR sessions active on an upstream channel at any given time.
Req IEs	The running counter of request IEs sent in MAPS.
Req/Data IEs	The counter of request/data IEs sent in MAPS.
Init Mtn IEs	The counter of Initial Maintenance IEs.
Stn Mtn IEs	Number of station maintenance (ranging poll) IEs.
Long Grant IEs	Number of long grant IEs.
Short Grant IEs	Number of short grant IEs.
Avg upstream channel utilization	Indicates on average what percent of the upstream channel bandwidth is being used.
Avg percent contention slots	Indicates on average what percent of slots are in contention state.
Avg percent initial ranging slots	Indicates on average what percent of slots are in initial ranging state.
Avg percent minislots lost on late MAPs	Indicates on average what percent of slots are lost because a MAP interrupt was too late.
Current minislot count (formerly: Last Minislot Stamp (current_time_base))	Indicates the current minislot count at the CMTS. FLAG indicates the timebase reference. This field is used only by developers.
Scheduled minislot count (formerly: Last Minislot Stamp (scheduler_time_base))	Indicates the furthest minislot count allocated at the indicated time. FLAG indicates the timebase reference. This field is used by developers.

Related Commands

Command	Description
show interface cable sid	Displays the service identifier information for each cable modem on the network.
show interface cable signal-quality	Displays signal quality information for the specified slot.

show interface cable sid

To display per-SID counters for bandwidth requests, use the **show interface cable** privileged EXEC command.

show interface cable *interface* **sid** [*sid*] **counters verbose**

Syntax Description

interface	Specifies the cable interface for bandwidth requests.
sid	Optional. Specifies which SID to monitor.
counters	Displays the values of the per-SID usage counters. Same as the keyword **stats** in pre 11.3(6)NA releases.
verbose	Displays all details.

Default

No default behavior or values.

Command Mode

Privileged EXEC

Command History

Release	Modification
11.3 XA	This command was introduced.
11.3(6)NA	Keyword **stats** changed to **counters**.
12.0(4)XI	Added primary SID information.
12.0(7)XR	Added **verbose** keyword.
12.0(7)T	Was ported to mainline train.

Usage Guidelines

Data transport over the RF link uses the registered SID address rather than the Ethernet address. This allows multiple hosts to access the network by using a single cable modem.

Examples

See the following display output for the **verbose** keyword extension for SID 1 on interface **cable slot 3, port 0**:

```
router# show interface c3/0 sid 1 counters verbose
 Sid                           : 1
 Input packets                 : 39
 Input octets                  : 15964
 Output packets                : 30
 Output octets                 : 8796
 BW requests received          : 40
 Grants issued                 : 40
 Rate exceeded BW request drops : 0
 Rate exceeded DS packet drops  : 0
```

See the following display output for the **verbose** keyword extension for all SIDs on the specified interface:

```
 router# show interface c3/0 sid counters verbose
 Sid                           : 1
 Input packets                 : 39
 Input octets                  : 15964
 Output packets                : 30
 Output octets                 : 8796
 BW requests received          : 40
 Grants issued                 : 40
 Rate exceeded BW request drops : 0
 Rate exceeded DS packet drops  : 0
 Sid                           : 2
 Input packets                 : 0
 Input octets                  : 0
 Output packets                : 0
 Output octets                 : 0
 BW requests received          : 0
 Grants issued                 : 0
 Rate exceeded BW request drops : 0
 Rate exceeded DS packet drops  : 0
 Sid                           : 3
 Input packets                 : 0
 Input octets                  : 0
 Output packets                : 0
 Output octets                 : 0
 BW requests received          : 0
 Grants issued                 : 0
 Rate exceeded BW request drops : 0
 Rate exceeded DS packet drops  : 0
```

See the following display for the SIDs connected to the specified interface:

```
Lab-CMTS# show inter cab 3/0 sid
Sid  Prim Type Online     Admin   QoS Create      IP Address        MAC Address
     Sid       State      Status      Time
23        stat init(d)    enable  2   04:00:54    209.165.200.0     0050.7366.17ab
24        stat init(d)    enable  2   04:00:58    209.165.200.0     0050.7366.1803
25        stat init(rc)   enable  2   04:01:05    209.165.200.0     00d0.bad3.c459
26        stat init(d)    enable  2   04:01:10    209.165.200.0     0050.7366.1801
27        stat offline    enable  2   04:01:31    209.165.200.225   0090.8330.0213
28        stat offline    enable  2   04:01:59    209.165.200.226   0090.8330.0211
29        stat offline    enable  2   04:02:07    209.165.200.227   0090.8330.0214
30        dyn  init(o)    enable  2   04:03:09    209.165.200.228   0090.833
```

See the following connection information for all SIDs on the specified interface:

```
router# show interface c3/0 sid connectivity
Sid   1st time    Times  %online     Online time            Offline time
      online      Online           min     avg     max     min     avg     max
1     15:37:24    1      99.73   00:00   1h45m   1h45m   00:17   00:17   00:17
2     15:37:24    1      99.73   00:00   1h45m   1h45m   00:17   00:17   00:17
3     15:37:24    1      99.73   00:00   1h45m   1h45m   00:17   00:17   00:17
```

See the following connection information for SID 1 on the specified interface:

```
router# show interface c3/0 sid 1 connectivity
Sid   1st time    Times  %online     Online time            Offline time
      online      Online           min     avg     max     min     avg     max
1     15:37:24    1      99.72   00:00   1h41m   1h41m   00:17   00:17   00:17
```

See the following display for the counters of the SIDs connected to the specified interface:

```
router# show interface c3/0 sid counters
Sid   Inpackets  Inoctets   Outpackets Outoctets  Ratelimit  Ratelimit
                                                  BWReqDrop  DSPktDrop
1     40         16586      31         9160       0          0
2     0          0          0          0          0          0
3     0          0          0          0          0          0
```

See the following display for the counters of SID 1 on the specified interface:

```
router# show interface c3/0 sid 1 counters
Sid   Inpackets  Inoctets   Outpackets Outoctets  Ratelimit  Ratelimit
                                                  BWReqDrop  DSPktDrop
1     39         15964      30         8796       0          0
```

Table 7 describes the fields shown in the output for the **show interface cable sid** displays.

Table 7 show interface cable sid Command Field Descriptions

Field	Description
Sid	Service identification number.
Prim Sid	The primary service identifier assigned to the modem.
Type	Indicates this SID was created statically at the time of registration or dynamically by the exchange of dynamic service messages between the CM and CMTS.
Online State	“Online” means the modem owning this SID is processing traffic. “Offline” means the modem owning this SID is not processing traffic.
Admin Status	“Disable” means that the SID has been turned off. “Enable” is the normal state.
QoS	Quality of service.
Create time	When the SID was created, number of seconds since the system booted.
Input octets (Inoctets)	Number of octets received by using this SID.
Input packets (Inpackets)	Number of packets received by using this SID.
Output octets (Outoctets)	Number of octets sent from this SID.
Output packets (Outpackets)	Number of packets sent from this SID.
IP address	IP address of the modem owning this SID.
MAC address	MAC address of the modem owning this SID.
BW requests received	Number of bandwidth requests received by this SID.

Table 7 show interface cable sid Command Field Descriptions

Field	Description
Grants issued	Number of bandwidth requests granted by this SID.
Rate exceeded BW request drops	Number of bandwidth requests not granted by this SID.
Rate exceeded DS packet drops	Number of downstream packets lost by this SID.
Ratelimit BWReqDrop	Number of bandwidth requests not granted by this SID.
Ratelimit DSPktDrop	Number of downstream packets lost by this SID.
1st time online	Time at which the modem with this SID connected.
Times online	Number of times the modem with this SID has connected.
% online	Percentage of time the modem with this SID has been connected.
Online time	The minimum, average, and maximum number of hours and minutes the modem with this SID has been connected.
Offline time	The minimum, average, and maximum number of hours and minutes the modem with this SID has been disconnected.

Related Commands

Command	Description
show interface cable signal-quality	Displays signal quality information for the specified slot.

Debug Commands

This section documents the new **debug cable remote-query** command. All other commands used with this feature are documented in the Cisco IOS Release 12.0 T command reference publications.

debug cable remote query

To display debug messages for remote modem queries, use the **debug cable remote query** EXEC command. To stop displaying debug messages, use the **no** form of this command.

[no] debug cable remote query

Syntax Description

This command has no arguments or keywords.

Default

No default behavior or values.

Command History

Release	Modification
12.0(7)XR	This command was introduced.

Examples

See the following for an example debug message of a successful poll of the modems:

```
router# debug cable remote-query
remote-query debugging is on
.
For IP address 209.165.200.223
Nov 10 15:56:50.241: docsIfSignalQualityEntry.5.4 = 380
Nov 10 15:56:50.241: docsIfMibObjects.2.2.1.3.2 = 360
Nov 10 15:56:50.245: docsIfDownstreamChannelEntry.6.4 = -30
Nov 10 15:56:50.245: docsIfUpstreamChannelEntry.6.3 = 12422
Nov 10 15:56:50.249: docsIfSignalQualityEntry.6.4 = 0
Nov 10 15:56:50.477:
```

See the following for an example debug message when the waiting queue at the CMTS is empty:

```
SNMP proxy exec got event, but queue is empty
```

See the following for an example debug message when you try to modify the polling interval or community string while the polling in is progress:

```
Community string if modified will not be reflected
```

Note The polling interval will be changed but to change the community string, you must unconfigure the **snmp-server community** command and reconfigure it with the new community string.

Related Commands

Command	Description
cable modem remote-query	Specifies that information will be gathered from specified remote modems.