



Cable Interface Bundling for the Cisco uBR7200 Series Cable Router

Feature Overview

This feature allows multiple cable interfaces to share a single IP subnet. Currently, you must use an IP subnet for each cable interface. If you have limited IP address space, interface bundling conserves your IP address resources.

Interface bundling enhances the scalability of the cable network by allowing you to add new cable interface cards without having to reassign IP addresses to the interfaces or to the cable modem users on those interfaces. You can also move cable modems to any cable interface on the bundle without assigning the modems a new IP address. In particular, cable modems being assigned a static IP address can be inserted on to any interface that is part of the assigned bundle.

Benefits

Cable interface bundling eliminates the need for an IP subnet for each cable interface. With this feature, you only need one IP subnet for each cable bundle. You can also group all the cable interfaces on a Cisco uBR7200 series cable router into a single bundle and configure your uBR7200 router with a single IP subnet. This simplifies network management and conserves IP address space.

Restrictions

Cable interface bundling is only supported on cable interfaces. It is not supported on other interfaces.

Cable interface bundling can be used only in two-way cable installations. It is not supported for telco-return configurations.

One cable interface must be configured as the master interface for the bundle. The other cable interfaces are configured as slave interfaces.

Generic cable configuration commands such as the IP address, DHCP relay, ARP handling, and source-verify checking must be specified on the master interface. Do not specify these commands for the slave cable interfaces. Cable upstream and downstream parameters continue to be specified for each interface.

You must configure interface bundles only by using CLI commands. You cannot use MIB objects to configure cable interface bundles through SNMP sets.

If 1+1 redundancy has been configured, the failure of any card in the bundle moves the entire bundle to the redundant CMTS.

Related Features and Technologies

Table 1 shows the progression of documented features that have been added to the uBR platform in the Cisco IOS 12.0 time frame.

Table 1 uBR7200 Series Cable Router IOS 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

Table 1 uBR7200 Series Cable Router IOS Features Available Since 12.0 T (continued)

Available With:	Category	Feature
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 Cisco uBR7200 series cable router is described in *Voice, Video, and Home Applications Configuration Guide* for Cisco IOS Release 12.0 and in the feature modules that accompany each Cisco IOS Release. Also see the documents in the Broadband/Cable Solutions page on CCO (<http://www.cisco.com>) and the customer documentation CD-ROM.

Supported Platforms

Cisco 7200 series

Supported Standards, MIBs, and RFCs

Standards

No new or modified standards are supported by this feature.

MIBs

No new or modified MIBs are supported by this feature.

RFCs

No new or modified RFCs are supported by this feature.

Configuration Task

See the following section for configuring cable interface bundling.

- Creating Interface Bundles (Required)
- Monitoring Interface Bundling

Creating Interface Bundles

Command	Purpose
Router(config)# int cx/0	Enter configuration mode for the specified cable interface
Router(config-if)# cable bundle n master	Configures the cable interface to be the master for the interface bundle <i>n</i>
Router(config-if)# exit	Exit interface configuration mode
Router(config)# int cy/0	Enter configuration mode for a different cable interface
Router(config-if)# cable bundle n	Configures the cable interface to be part of the previously created interface bundle <i>n</i>
Router(config-if)# exit	Exit interface configuration mode



Note

Configuring a cable interface to be part of a bundle automatically shuts down and again enables the interface. All modems currently on the interface will go offline and have to reregister with the CMTS before coming back online.

Monitoring Interface Bundling

Command	Purpose
Router# show cable bundle n forwarding-table	Displays the forwarding table for the specified interface.

Configuration Examples

This section provides the following configuration examples:

- Specifying that cable interface 3/0 is the master interface for bundle 1
- Specifying that cable interface 4/0 is a secondary interface for bundle 1

- Displaying the contents of the bundle

```
Router(config)# int c3/0
Router(config-if)# cable bundle ?
<1-255> Bundle number
Router(config-if)# cable bundle 1 ?
master Bundle master
<cr>
Router(config-if)# cable bundle 1 master ?
<cr>
Router(config-if)# cable bundle 1 master
Router(config-if)# exit
07:28:17: %UBR7200-5-UPDOWN: Interface Cable3/0 Port U0, changed state to down
07:28:18: %UBR7200-5-UPDOWN: Interface Cable3/0 Port U0, changed state to up
Router(config)# int c4/0
Router(config-if)# cable bundle 1
Router(config-if)# exit
07:29:31: %UBR7200-5-UPDOWN: Interface Cable4/0 Port U0, changed state to down
07:29:32: %UBR7200-5-UPDOWN: Interface Cable4/0 Port U0, changed state to up
...

Router# show cable bundle 1 forwarding-table
MAC address      Interface
0050.7366.17ab   Cable3/0
0050.7366.1803   Cable3/0
0050.7366.1801   Cable3/0
0050.7366.120a   Cable4/0
0050.7366.4a01   Cable4/0
0050.7366.18ac   Cable4/0
```

Command Reference

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

- **cable bundle**
- **show cable bundle**

cable bundle

To configure a cable interface to belong to an interface bundle, use the **cable bundle** interface configuration command. To delete a cable interface bundle definition, use the **no** form of this command.

cable bundle *n* [**master**]

no cable bundle *n* [**master**]

Syntax Description	<i>n</i>	Specifies the bundle identifier. Valid range is from 1 to 255.
	master	(Optional) Defines the specified interface as the master. One cable interface in the bundle must be defined as the master.

Defaults No default behavior or values.

Command Modes Interface configuration

Command History	Release	Modification
	12.0(7)XR and 12.1(1a)T1	This command was introduced.
	12.0(8)SC	This command was supported.
	12.1(2)EC1	This command was supported.

Usage Guidelines

You can configure up to four interface bundles. In each bundle, specify one interface as the master interface by using the optional **master** keyword. The master interface is configured with layer 3 configuration commands, such as primary and secondary IP addresses and other layer 3 specific configuration commands such as **cable arp**.

Only configure an IP address on the master interface. Any attempt to add an interface to a bundle will be rejected, if an IP address is configured and the interface is not specified as master interface.

You must specify all generic IP networking information (IP address, routing protocols, switching modes, and so on.) on the bundle master interface. Do not specify generic IP networking information on bundle slave interfaces.

If you attempt to add an interface to a bundle as non-master interface and an IP address is assigned to this interface, the command will fail. You must remove the IP address configuration before you can add the interface to a bundle.

If you have configured an IP address on a bundled interface and the interface is not the master interface, a warning message appears.

Specify generic (that is, not downstream or upstream related) cable interface configurations, such as source-verify or ARP handling, on the master interface. Do not specify generic configuration on non-master interfaces.

Configuring a cable interface to be part of a bundle automatically shuts down and enables the interface. All modems currently on the interface will go offline and have to reregister with the CMTS before coming back online.

If you configure an interface as part of a bundle and it is not the master interface, all generic cable configuration for this interface is removed. The master interface configuration will then apply to all interfaces in the bundle.

If you shut down or remove the master interface in a bundle, no data packets is sent to any of the interfaces in this bundle. Packets will still be physically received from non-master interfaces which have not been shut down, but those packets will be discarded. This means that modems connected to those interfaces will not be disconnected immediately, but modems coming online will not be able to obtain an IP address, download their configuration file, or renew their IP address assignment if the DHCP lease expires.

If you shut down a slave interface, only this shut down interface is affected.

Examples

The following example configures the c3/0 cable interface to be the master interface for bundle 25:

```
Router(config)# int c3/0
Router(config-if)# cable bundle 25 master
Router(config-if)# exit
Router(config)#
07:28:17: %UBR7200-5-UPDOWN: Interface Cable3/0 Port U0, changed state to down
07:28:18: %UBR7200-5-UPDOWN: Interface Cable3/0 Port U0, changed state to up
```

The following example shows the error message you get if you try to configure an interface with an IP address that is not the master interface:

```
Router(config)# int c4/0
Router(config-if)# ip address 196.100.82.14 255.255.255.0
Router(config-if)# cable bundle 25
Please remove ip address config first then reenter this command
```

Use the **no ip address** command to remove to the IP address assignment and reenter the **cable bundle** command.

Related Commands

Command	Description
show cable bundle	Displays the forwarding table for the specified interface bundle.

show cable bundle

To display the forwarding table for the specified interface, use the **show cable bundle** privileged EXEC command.

show cable bundle *n* **forwarding-table**

Syntax Description		
	<i>n</i>	Specifies the bundle identifier. Valid range is from 1 to 255.
	forwarding-table	Displays the forwarding table for the specified interface.

Defaults No default behavior or values.

Command Modes Privileged EXEC

Command History	Release	Modification
	12.0(7)XR and 12.1(1a)T1	This command was introduced.
	12.0(8)SC	This command was supported.
	12.1(2)EC1	This command was supported.

Examples

```
Router# show cable bundle 25 forwarding-table
MAC address      Interface
0050.7366.17ab   Cable3/0
0050.7366.1803   Cable3/0
0050.7366.1801   Cable3/0
0050.7366.120a   Cable4/0
0050.7366.4a01   Cable4/0
0050.7366.18ac   Cable4/0
```

Table 2 describes the fields shown in the **show cable bundle** display.

Table 2 *show cable bundle* Field Descriptions

Field	Description
MAC address	Media Access Control ID for each interface in the bundle.
Interface	The cable interface slot and port number.

Related Commands	Command	Description
	cable bundle	Creates an interface bundle.

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