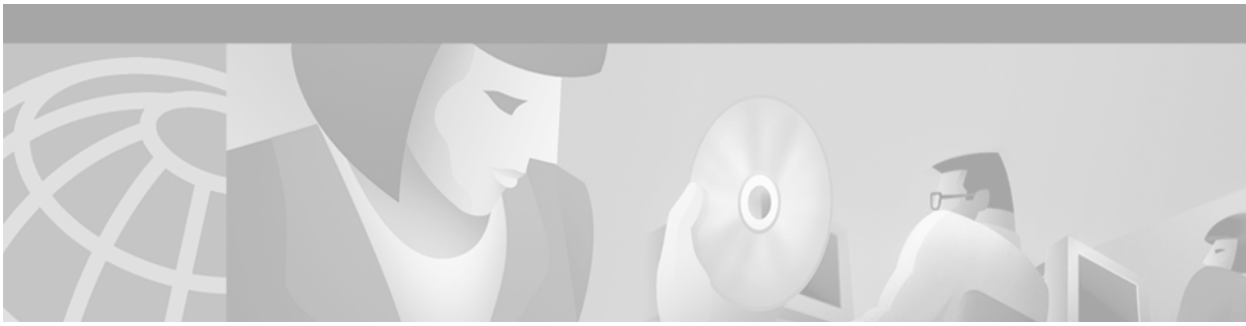


Telco Return for the Cisco uBR7200 Series Universal Broadband Router

This document describes the Telco Return feature for the Cisco uBR7200 series universal broadband router. The Telco Return feature implements the Data-over-Cable System Interface Specification (DOCSIS) standard for telephony return, giving cable operators that support only one-way radio frequency (RF) transmission the ability to provide Internet access to subscribers. With telco return, the upstream connection from the subscriber's cable modem to the headend is employed over standard phone lines.

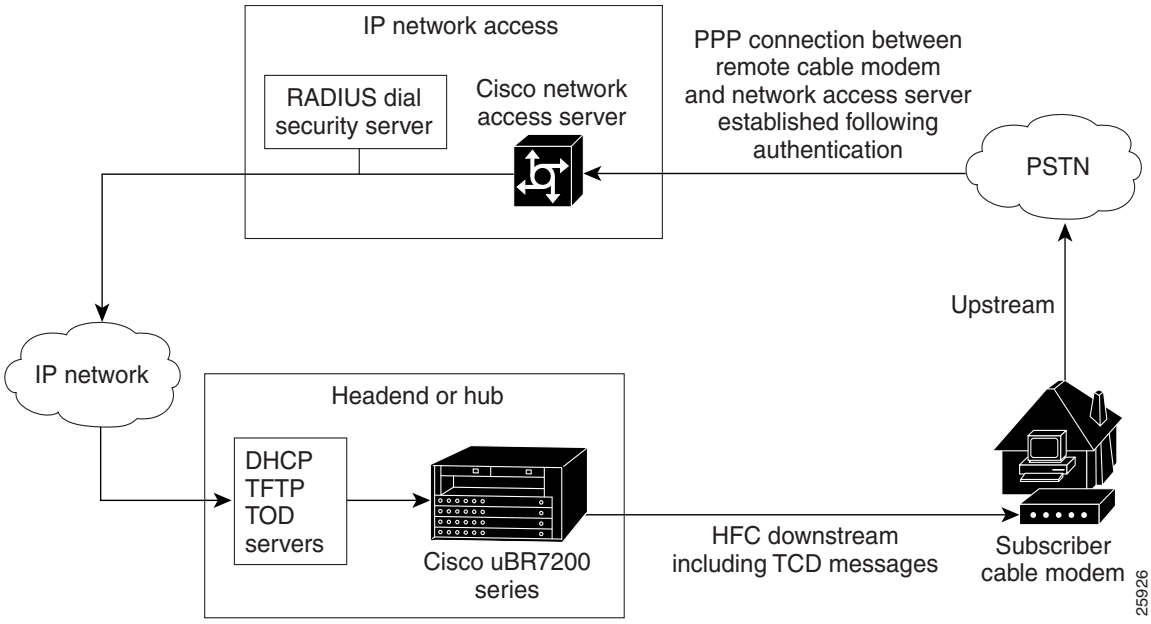
This document includes the following sections:

Feature Overview

In telco return configurations, the Cisco uBR7200 series universal broadband router provides downstream data flow from cable modem cards connected to the cable system and accepts upstream traffic via a combination of the local Public Switched Telephone Network (PSTN) and IP network path that terminates at the Cisco uBR7200 series. Upstream data is through a telephone modem (external or internal to a cable modem, as well as a cable modem card in a PC, based on the third-party cable modem vendor) connected to an analog telephone line typically. This enables cable companies that do not support two-way RF transmission or that have not upgraded specific service areas to offer fast downstream data services via the cable plant and upstream transmission via the PSTN.

Figure 1 illustrates a telco return configuration.

Figure 1 Telco Return Network Example



Downstream traffic is precluded by Telephony Channel Descriptor (TCD) messages to enable upstream telco return traffic. TCD messages contain information necessary for the telco return cable modem to access the headend/ISP network access server (for example, a Cisco AS5300 or Cisco AS5800) over the PSTN. The dialing and access attributes are defined in the Service Provider Descriptor (SPD). Each TCD message contains at least one and as many as five SPDs.

The SPD within TCD packets contains three critical telco return elements:

- As many as three dial-up telephone numbers for the telco return cable modem to use when attempting to connect to the headend's network access server
- Username for authentication
- Password for authentication

When connected, the network access server feeds the subscriber username and password to a RADIUS dial security server for authentication. When access is granted, the network server sets up a Point-to-Point Protocol (PPP) negotiation and connection. The dialing and access attributes in the SPD are defined through Cisco IOS. For a description of the related commands, see the "Command Reference" section on page 7.

Benefits

- Allows cable companies to offer Internet access services to their subscribers without upgrading their plant to support two-way.

Restrictions

- Because upstream transmission is via the PSTN, MC11 cable modem cards meet requirements. If a mixed plant is involved or if you plan to upgrade to two-way soon, use cable modem cards that support more than one upstream port, such as MC16 cable modem cards.

- Cisco uBR7200 series telco return images that support Baseline Privacy Interface (BPI), do not support encryption/decryption in the telco return path.
- Some vendors' telco-return cable modems cannot receive traffic over the same downstream channel as cable modems operating on a two-way data system. In these instances, segment your cable plant to allow more than one downstream channel.

Related Documents

- *Cisco IOS Multiservice Applications Configuration Guide,* Cisco IOS Release 12.1
- *Cisco IOS Multiservice Applications Command Reference,* Cisco IOS Release 12.1
- *Cisco uBR7200 Series Hardware Installation Guide*
- *Cisco uBR7200 Series Software Configuration Guide*

Supported Platforms

Cisco uBR7200 series

Supported MIBs and RFCs

Standards

DOCSIS Cable Modem Telephony Return Interface Specification (SP-CMTRI-I01-970804)

MIBs

No new or modified MIBs are supported by this feature.

RFCs

No new or modified RFCs are supported by this feature.

Prerequisites

To use the Telco Return feature, you must ensure that:

- Your Cisco uBR7200 series universal broadband router is running Cisco IOS Release 12.0(4)XI or 12.0(5)T, or a later release. Cisco IOS Release software images that support telco return contain a "t" in the file name.
- Your downstream plant meets DOCSIS specifications.
- Your headend is wired for narrowcast downstream data transmission.
- You have assigned downstream frequencies.
- All equipment needed to support upstream traffic over the PSTN, as well as to monitor telco return service features is installed. Key components include:
  - Dial-up access server (for example, the Cisco AS5300 or Cisco AS5800)
  - RADIUS dial security server

- All third-party, telco-return cable modems are DOCSIS-compliant and configured for telco return.
- DHCP and DOCSIS configuration files have been created and pushed to appropriate servers so that each cable modem, when initialized, can transmit a DHCP request, receive an IP address, obtain TCIP and TOD server addresses, and download a DOCSIS configuration file.
- CPE equipment (telco return cable modem or PCs) meet requirements for your network and server offerings.

Configuration Tasks

See the following tasks to configure the Telco Return feature:

- Configuring Telco Return (Required)
- Defining the SPD Attributes (Optional)
- Configuring the Registration IP Address (Optional)
- Verifying the Telco Return Configuration (Optional)

Configuring Telco Return

To enable telco return on the Cisco uBR7200 series, perform the following steps in interface configuration mode:

	Command	Purpose
Step 1	`Router(config)# interface cable slot/port`	Enters interface configuration mode.
Step 1	`Router(config-if)# cable telco-return enable`	Enables telco return.
Step 2	`Router(config-if)# cable telco-return interval seconds`	Sets the interval for sending Telephony Channel Descriptor (TCD) and Termination System Information (TSI) messages to the downstream cable modems.

Defining the SPD Attributes

To define the telephony attributes contained in the Service Provider Descriptor (SPD) sent in TCD messages, perform the following steps in interface configuration mode:

	Command	Purpose
Step 1	`Router(config)# interface cable slot/port`	Enters interface configuration mode.
Step 2	`Router(config-if)# cable telco-return spd number phonenum dial-string`	Sets the telephone numbers that the telco return cable modem uses to connect to the headend's network access server.
Step 3	`Router(config-if)# cable telco-return spd number username login-string`	Sets the username that the telco return cable modem uses for authentication when establishing a PPP connection.

	Command	Purpose
Step 4	`Router(config-if)# cable telco-return spd number password password-string`	Sets the password that the telco return cable modem uses for authentication when establishing a PPP connection.
Step 5	`Router(config-if)# cable telco-return spd number ppp-authenticate [both | chap | pap]`	Selects the authentication procedure that is used when the telco-return cable modem is establishing a PPP connection.
Step 6	`Router(config-if)# cable telco-return spd number radius realm string`	Selects a RADIUS server domain for the login response string.
Step 7	`Router(config-if)# cable telco-return spd number dhcp-authenticate`	Requires the telco-return cable modem to use a specific Dynamic Host Configuration Protocol (DHCP) server.
Step 8	`Router(config-if)# cable telco-return spd number dhcp-server ip-address`	Identifies the IP address of the Dynamic Host Configuration Protocol (DHCP) server that the telco-return cable modem must access.
Step 9	`Router(config-if)# cable telco-return spd number dial-timer seconds`	Sets the number of seconds that a telephone connection is idle before the telco-return cable modem disconnects the call.
Step 10	`Router(config-if)# cable telco-return spd number threshold threshold`	Sets the number of failed dial-up connections that can occur before the cable modem indicates a connection failure.
Step 11	`Router(config-if)# cable telco-return spd number service-provider string`	Includes the service provider name in the SPD.
Step 12	`Router(config-if)# cable telco-return spd number factory-default`	Indicates the SPD that the telco-return cable modem uses during the initialization process.
Step 13	`Router(config-if)# cable telco-return spd number manual-dial`	Enables the telco-return cable modem to operate in manual dial mode.

Configuring the Registration IP Address

To configure a different registration IP address in the TSI message, perform the following steps in interface configuration mode:

	Command	Purpose
Step 1	`Router(config)# interface cable slot/port`	Enters interface configuration mode.
Step 1	`Router(config-if)# cable telco-return registration-ip ip-address`	Selects an alternate IP address for the telco-return cable modem to send registration requests.

Verifying the Telco Return Configuration

To verify that the subscriber modem can log into the Cisco uBR7200 series in telco-return mode:

Step 1 Reboot the subscriber modem.

Step 2 Allow the subscriber modem to complete telco registration (will take several minutes).

Step 3 Enter the **show cable modem** command on the Cisco uBR7200 series to verify that the subscriber modem is shown in the list. The letter "T" indicates that a modem is a telco-return modem.

```
ubr7246-1# show cable modem
Interface   Prim Online     Timing Rec    QoS CPE IP address      MAC address
            Sid  State      Offset Power
Cable4/0/U0 2    online     2848   -0.50  5   1   10.2.0.3        0010.7b6b.53d5
Cable4/0/T  3    offline    0       0.00  2   1   10.2.0.101      0020.4001.4af6
Cable4/0/U0 4    online     2852   -0.75  5   1   10.2.0.6        0010.7b6b.7255
Cable4/0/U0 5    online     2850    0.25  5   1   10.2.0.7        0010.7b6b.5669
Cable4/0/U0 6    online     2851    0.00  2   1   10.2.0.4        0010.7b6b.53c9
Cable4/0/T  7    offline    0       0.00  2   0   10.2.0.102      0020.4001.4b32
```

Step 4 Ping the subscriber modem from the Cisco uBR7200 series to ensure that the router receives the echo reply packets.

Note The **ping docsis** command is not supported for telco-return cable modems, and telco-return cable modems are not displayed when using the **show cable flap list** command. The **clear cable modem reset** command has no effect on one-way cable modems.

Configuration Examples

The following example displays the screen output using the **show running-config** command:

```
!
interface cable 6/0
 ip address 172.16.1.1 secondary
 ip address 10.1.1.1
 no ip directed-broadcast
 ip helper-address 192.168.1.1
 no keepalive
 cable insertion-interval 500
 cable downstream annex B
 cable downstream modulation 64qam
 cable downstream interleave-depth 32
 cable downstream frequency 687000000
 cable upstream 0 frequency 13008000
 no cable upstream 0 shutdown
 cable telco-return enable
 cable telco-return spd 1 factory-default
 cable telco-return spd 1 phonenum 8005551212
 cable telco-return spd 1 phonenum 4085551212
 cable telco-return spd 1 phonenum 6505551212
 cable telco-return spd 1 service-provider norcal
 cable telco-return spd 1 dhcp-server 172.31.172.172
 cable telco-return spd 1 username joe
 cable telco-return spd 1 password testing
 cable telco-return spd 1 dhcp-authenticate
 cable telco-return spd 1 threshold 5
 cable telco-return spd 1 ppp-authenticate both
 cable telco-return spd 1 manual-dial
 cable telco-return spd 1 dial-timer 7200
 cable telco-return registration-ip 172.16.1.1
!
```

Command Reference

This section documents new commands. All other commands used with this feature are documented in the Cisco IOS Release 12.1 command references.

- **cable telco-return enable**
- **cable telco-return interval**
- **cable telco-return registration-ip**
- **cable telco-return spd dhcp-authenticate**
- **cable telco-return spd dhcp-server**
- **cable telco-return spd dial-timer**
- **cable telco-return spd factory-default**
- **cable telco-return spd manual-dial**
- **cable telco-return spd password**
- **cable telco-return spd phonenum**
- **cable telco-return spd ppp-authenticate**
- **cable telco-return spd radius-realm**
- **cable telco-return spd service-provider**
- **cable telco-return spd threshold**
- **cable telco-return spd username**

cable telco-return enable

To enable telco return support, use the **cable telco-return enable** interface configuration command. To disable this feature, use the **no** form of this command.

cable telco-return enable

no cable telco-return enable

Syntax Description

This command has no arguments or keywords.

Defaults

Telco return support is disabled.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Examples

The following example enables telco return:

```
interface cable 6/0
 cable telco-return enable
```

Related Commands

Command	Description
cable telco-return interval	Defines the interval for sending Telephony Channel Descriptor (TCD) and Termination System Information (TSI) messages.

cable telco-return interval

To set the interval for sending Telephony Channel Descriptor (TCD) and Termination System Information (TSI) messages, use the **cable telco-return interval** interface configuration command. To restore the default value, use the **no** form of this command.

cable telco-return interval *seconds*

no cable telco-return interval

Syntax Description

seconds	Number of seconds between intervals for sending TCD and TSI messages. Valid range is 2 through 60 seconds.

Defaults

2 seconds

Command Modes

Interface configuration

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Examples

The following example sets the TCD and TSI message interval to 40 seconds:

```
interface cable 6/0
 cable telco-return interval 40
```

Related Commands

Command	Description
cable telco-return enable	Enables telco return functionality.

cable telco-return registration-ip

To select a different IP address for the telco-return cable modem to send its registration requests, use the **cable telco-return registration-ip** interface configuration command. To restore the default value, use the **no** form of this command.

cable telco-return registration-ip *ip-address*

no cable telco-return registration-ip

Syntax Description

ip-address	Registration IP address that is sent in Termination System Information (TSI) messages. Value is any of the cable interface's IP addresses.

Defaults

The downstream channel IP address of the Cisco uBR7200 series is used.

Command Modes

Interface configuration

Command History

Release	Modification
12.1(2)EC	This command was introduced.

Usage Guidelines

This command sets the Registration IP Address parameter in TSI messages. By default, the downstream channel IP address of the Cisco uBR7200 series is also used for the registration IP address. When this **cable telco-return registration-ip** command is configured, telco-return cable modems send their registration requests to this IP address instead of to the downstream channel IP address.

Examples

The following example sends the cable modem's registration requests to IP address 172.16.1.1:

```
interface cable 6/0
 cable telco-return registration-ip 172.16.1.1
```

Related Commands

Command	Description
cable telco-return enable	Enables telco return functionality.
cable telco-return interval	Sets the interval for sending Telephony Channel Descriptor (TCD) and Termination System Information (TSI) messages.

cable telco-return spd dhcp-authenticate

To require the telco-return cable modem to use a specific Dynamic Host Configuration Protocol (DHCP) server, use the **cable telco-return spd dhcp-authenticate** interface configuration command. To restore the default value, use the **no** form of this command.

cable telco-return spd *spd-number* **dhcp-authenticate**

no cable telco-return spd *spd-number* **dhcp-authenticate**

Syntax Description

spd-number	Service provider descriptor number for which this parameter is set. Valid range is 1 through 5.

Defaults

The cable modem can use any available DHCP server.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Usage Guidelines

This command sets the DHCP Authenticate parameter to True (1) for the specified SPD in the TCD messages. It indicates that the cable modem must use the DHCP server that is specified with the **cable telco-return spd dhcp-server** command.

Examples

The following example indicates that for SPD 2, cable modems must use the DHCP server identified by IP address 192.168.255.255:

```
interface cable 6/0
 cable telco-return spd 2 dhcp-authenticate
 cable telco-return spd 2 dhcp-server 192.168.255.255
```

Related Commands

Command	Description
cable telco-return enable	Enables telco return functionality.
cable telco-return spd dhcp-server	Identifies the IP address of the DHCP server that the telco return cable modems must use.

cable telco-return spd dhcp-server

To identify the IP address of the Dynamic Host Configuration Protocol (DHCP) server that the telco-return cable modem must access, use the **cable telco-return spd dhcp-server** interface configuration command. To restore the default value, use the **no** form of this command.

cable telco-return spd *spd-number* **dhcp-server** *ip-address*

no cable telco-return spd *spd-number* **dhcp-server**

Syntax Description

spd-number	Service provider descriptor number for which this parameter is set. Valid range is 1 through 5.
ip-address	IP address of the DHCP server that cable modems must use.

Defaults

The IP address is set to 0.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Usage Guidelines

This command sets the DHCP Server parameter in the specified SPD in TCD messages. Telco return cable modems use the DHCP server that is identified by this IP address if the **cable telco-return spd dhcp-authenticate** command is configured. If the **cable telco-return spd dhcp-authenticate** command is not configured, the cable modems will use any available DHCP server.

Examples

The following example indicates that for SPD 2, cable modems must use the DHCP server identified by IP address 192.168.255.255:

```
interface cable 6/0
 cable telco-return spd 2 dhcp-authenticate
 cable telco-return spd 2 dhcp-server 192.168.255.255
```

Related Commands

Command	Description
cable telco-return enable	Enables telco return functionality.
cable telco-return spd dhcp-authenticate	Indicates that telco return cable modems must use a specific Dynamic Host Configuration Protocol (DHCP) server.

cable telco-return spd dial-timer

To set the number of seconds that a telephone connection is idle before the telco-return cable modem disconnects the call, use the **cable telco-return spd dial-timer** EXEC command. To restore the default value, use the **no** form of this command.

cable telco-return spd *spd-number* **dial-timer** *seconds*

no cable telco-return spd *spd-number* **dial-timer**

Syntax Description

spd-number	Service provider descriptor number for which this parameter is set. Valid range is 1 through 5.
seconds	Number of seconds that a connection is idle before the cable modem disconnects the call. Valid range is 0 through 4,294,967,295. The default of 0 means that the dial-timer is not used.

Defaults

The dial-timer is set to 0, which means that inactive telephone connections are not disconnected.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Usage Guidelines

This command sets the Demand Dial Timer parameter for the specified SPD in TCD messages. This enables the cable modem to emulate true dial-on-demand functionality by monitoring inactive networking time and allowing it to disconnect any telephone connection that exceeds the timer.

Examples

The following example sets the timer to 2 hours:

```
interface cable 6/0
 cable telco-return spd 2 dial-timer 7200
```

Related Commands

Command	Description
cable telco-return enable	Enables telco return functionality.
cable telco-return spd phonenum	Sets the telephone numbers that the telco-return cable modem dials when connecting to the headend's network access server.
cable telco-return spd ppp-authenticate	Selects the authentication procedure to use when the telco-return cable modem is establishing a PPP connection.

cable telco-return spd factory-default

To indicate the service provider descriptor (SPD) that the telco-return cable modem uses during the initialization process, use the **cable telco-return spd factory-default** interface configuration command. To restore the default value, use the **no** form of this command.

cable telco-return spd *spd-number* **factory-default**

no cable telco-return spd *spd-number* **factory-default**

Syntax Description

spd-number	Service provider descriptor that contains the set of telephony attributes used by the cable modem during initialization. Valid range is 1 through 5.

Defaults

The Factory Default Flag in the SPD is set to 0, which means that this SPD is not used for the initialization process.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Usage Guidelines

This command sets the Factory Default parameter in the specified SPD in TCD messages. This determines the set of telephony attributes, as defined by the SPD, that are used for the initialization process when the cable modem is powered on or is reset to its factory default.

Examples

The following example instructs the telco-return cable modem to use SPD 2 during the initialization procedure:

```
interface cable 6/0
 cable telco-return spd 2 factory-default
```

Related Commands

Command	Description
cable telco-return enable	Enables telco return functionality.
cable telco-return spd service-provider	Includes the service provider name in the SPD.

cable telco-return spd manual-dial

To enable the telco-return cable modem to operate in manual-dial mode, use the **cable telco-return spd manual-dial** interface configuration command. To restore the default value, use the **no** form of this command.

cable telco-return spd *spd-number* **manual-dial**

no cable telco-return spd *spd-number* **manual-dial**

Syntax Description

spd-number	Service provider descriptor number for which this parameter is set. Valid range is 1 through 5.

Defaults

Manual-dial mode is disabled.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Usage Guidelines

This command sets the Manual Dial vendor-specific parameter in the specified SPD in TCD messages.

Examples

The following example sets manual-dial mode for SPD 1:

```
interface cable 6/0
 cable telco-return spd 1 manual-dial
```

Related Commands

Command	Description
cable telco-return enable	Enables telco-return functionality.
cable telco-return spd dial-timer	Sets the number of seconds that a telephone connection is idle before the telco-return cable modem disconnects the call.

cable telco-return spd password

To set the password that the telco-return cable modem uses for authentication when establishing a PPP connection with the access server, use the **cable telco-return spd password** interface configuration command. To restore the default value, use the **no** form of this command.

cable telco-return spd *spd-number* **password** *password-string*

no cable telco-return spd *spd-number* **password**

Syntax Description

spd-number	Service provider descriptor number for which this parameter is set. Valid range is 1 through 5.
password-string	Login password that the cable modem uses for authentication during the initialization procedure.

Defaults

No password is used.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Usage Guidelines

This command sets the Login Password parameter for the specified SPD in TCD messages.

Examples

The following example sets the password to 9JwoKd7 in service provider descriptor 2:

```
interface cable 6/0
 cable telco-return spd 2 password 9JwoKd7
```

Related Commands

Command	Description
cable telco-return enable	Enables telco-return functionality.
cable telco-return spd phonenum	Sets the telephone numbers that the telco-return cable modem dials when connecting to the headend's network access server.
cable telco-return spd username	Sets the username that the telco-return cable modem uses for authentication when establishing a PPP connection.

cable telco-return spd phonenum

To set the telephone numbers that the telco-return cable modem uses when connecting to the headend's network access server, use the **cable telco-return spd phonenum** interface configuration command. To delete previously entered telephone numbers, use the **no** form of this command.

cable telco-return spd *spd-number* **phonenum** *dial-string*

no cable telco-return spd *spd-number* **phonenum** *dial-string*

Syntax Description

spd-number	Service provider descriptor number for which this parameter is set. Valid range is 1 through 5.
dial-string	Telephone number that the cable modem uses to connect to the headend's network access server.

Defaults

No default behavior or values.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Usage Guidelines

This command sets the Phone Number parameters in the specified SPD in TCD messages. You can repeat this command, entering as many as three telephone numbers for the cable modem to use when attempting to establish a PPP connection with the network access server. The phone numbers are mapped to the parameters Phone Number1, Phone Number2, Phone Number3 in the order in which you enter them. The cable modem attempts to connect using Phone Number1 first. If it fails to connect, and its number of retries exceeds the limit set with the **cable telco-return spd threshold** command, the cable modem dials the next number in the list.

Examples

The following example sets the primary phone number to 9255551212. If the cable modem fails to connect using that number, it will try the next phone number, 9255551234:

```
interface cable 6/0
 cable telco-return spd 2 phonenum 9255551212
 cable telco-return spd 2 phonenum 9255551234
```

Related Commands

Command	Description
cable telco-return enable	Enables telco-return functionality.
cable telco-return spd password	Sets the password that the telco-return cable modem uses for authentication when establishing a PPP connection.
cable telco-return spd username	Sets the username that the telco-return cable modem uses for authentication when establishing a PPP connection.

cable telco-return spd ppp-authenticate

To select the authentication method used when the telco-return cable modem is establishing a PPP connection, use the **cable telco-return spd ppp-authenticate** interface configuration command. To restore the default value, use the **no** form of this command.

cable telco-return spd *spd-number* **ppp-authenticate** [**both** | **chap** | **pap**]

no cable telco-return spd *spd-number* **ppp-authenticate**

Syntax Description

spd-number	Service provider descriptor number for which this parameter is set. Valid range is 1 through 5.
both	Challenge Handshake Authentication Protocol (CHAP) is used if the network access server supports CHAP. Password Authentication Protocol (PAP) is used only if the network access server does not support CHAP.
chap	CHAP authentication is used.
pap	PAP authentication is used.

Defaults

The default is **both**; either CHAP or PAP is used depending on the methods supported by the network access server.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Usage Guidelines

This command sets the PPP Authentication parameter for the specified SPD in TCD messages.

Examples

The following example requires the cable modem to perform CHAP authentication:

```
interface cable 6/0
 cable telco-return spd 2 ppp-authenticate chap
```

Related Commands

Command	Description
cable telco-return enable	Enables telco-return functionality.
cable telco-return spd password	Sets the password that the telco-return cable modem uses for authentication when establishing a PPP connection.
cable telco-return spd phonenum	Specifies the Telephone Numbers parameter in TCD messages.
cable telco-return spd username	Sets the username that the telco-return cable modem uses for authentication when establishing a PPP connection.

cable telco-return spd radius-realm

To select a RADIUS server domain to use for the login response string, use the **cable telco-return spd radius-realm** interface configuration command. To restore the default value, use the **no** form of this command.

cable telco-return spd *spd-number* **radius-realm** *string*

no cable telco-return spd *spd-number* **radius-realm**

Syntax Description

spd-number	Service provider descriptor number for which this parameter is set. Valid range is 1 through 5.
string	Alphanumeric string identifying a RADIUS server domain.

Defaults

The default value is the null string.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Usage Guidelines

This command sets the RADIUS Realm parameter for the specified SPD in TCD messages. When this command is configured, telco return cable modems use this realm string to construct a domain name for the login username when responding to a PPP login query.

Examples

The following example indicates a login response string of *sandy@sunol*:

```
interface cable 6/0
 cable telco-return spd 3 radius-realm sunol
 cable telco-return spd 3 username sandy
```

Related Commands

Command	Description
cable telco-return enable	Enables telco-return functionality.
cable telco-return spd username	Sets the username that the telco-return cable modem uses for authentication when establishing a PPP connection.
cable telco-return spd password	Sets the password that the telco-return cable modem uses for authentication when establishing a PPP connection.

cable telco-return spd service-provider

To include the service provider name in the SPD, use the **cable telco-return service-provider** interface configuration command. To remove the parameter from the SPD, use the **no** form of this command.

cable telco-return spd *spd-number* **service-provider** *spd-string*

no cable telco-return spd *spd-number* **service-provider**

Syntax Description

spd-number	Service provider descriptor number for which this parameter is set. Valid range is 1 through 5.
spd-string	Alphanumeric string that identifies the service provider.

Defaults

No default behavior or values.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Usage Guidelines

This command sets the Service Provider Name parameter for the specified SPD in the TCD messages.

Examples

The following example sets the service provider name to “san_jose” for SPD 2:

```
interface cable 6/0
 cable telco-return spd 2 service-provider san_jose
```

Related Commands

Command	Description
cable telco-return enable	Enables telco-return functionality.
cable telco-return spd factory-default	Indicates the service provider descriptor (SPD) that the telco-return cable modem uses during the initialization process.

cable telco-return spd threshold

To set the number of failed dial-up connections that can occur before the cable modem indicates a connection failure, use the **cable telco-return spd threshold** interface configuration command. To restore the default value, use the **no** form of this command.

cable telco-return spd *spd-number* **threshold** *threshold-number*

no cable telco-return spd *spd-number* **threshold**

Syntax Description

spd-number	Service provider descriptor number for which this parameter is set. Valid range is 1 through 5.
threshold-number	Number of dial-up attempts that fail before the cable modem declares a connection failure. Valid range is 1 through 255.

Defaults

The default value is 1.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Usage Guidelines

This command sets the Connection Threshold parameter for the specified SPD in the TCD messages. A dial-up attempt is considered a connection failure if an answer connection is not made after ten rings. The cable modem continues to try to connect until the connection threshold is reached. If multiple phone numbers are configured using the **cable telco-return spd phonenum** command, the cable modem dials each phone number until it makes a connection or exceeds the configured threshold.

Examples

The following example sets the connection threshold to 20:

```
interface cable 6/0
 cable telco-return spd 2 threshold 20
```

Related Commands

Command	Description
cable telco-return enable	Enables telco-return functionality.
cable telco-return spd dial-timer	Sets the number of seconds that the telco-return cable modem waits before disconnecting any inactive upstream telephone connection.
cable telco-return spd phonenum	Sets the telephone numbers that the telco-return cable modem dials when connecting to the headend's network access server.

cable telco-return spd username

To set the username that the telco-return cable modem uses for authentication when establishing a PPP connection with the access server, use the **cable telco-return spd username** interface configuration command. To restore the default value, use the **no** form of this command.

cable telco-return spd *spd-number* **username** *login-string*

no cable telco-return spd *spd-number* **username** *login-string*

Syntax Description

spd-number	Service provider descriptor number for which this parameter is set. Valid range is 1 through 5.
login-string	Username that the cable modem uses for authentication during the initialization procedure.

Defaults

The default value is "guest."

Command Modes

Interface configuration

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Usage Guidelines

This command sets the Login Username parameter for the specified SPD in the TCD messages.

Examples

The following example sets the username to "sandy" for SPD 3:

```
interface cable 6/0
 cable telco-return spd 3 username sandy
```

Related Commands

Command	Description
cable telco-return enable	Enables telco-return functionality.
cable telco-return spd password	Specifies the Login Password parameter in TCD messages.
cable telco-return spd ppp-authenticate	Selects the authentication procedure to use when the telco-return cable modem is establishing a PPP connection.

Debug Commands

This section documents new or modified commands. All other commands used with this feature are documented in the Cisco IOS Release 12.1 command references.

- **debug cable telco-return**
- **debug cable telco-return msg**

debug cable telco-return

To display debug messages for telco-return events, use the **debug cable telco-return** EXEC command. To disable debugging output, use the **no** form of this command.

debug cable telco-return

no debug cable telco-return

Syntax Description

This command has no arguments or keywords.

Defaults

Debugging for telco-return events is not enabled.

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Examples

The following is sample output from the **debug cable telco-return** and **debug cable telco-return msg** commands:

```
01:17:31:Sending TCD message:
  TLV type = 1
  TLV len = 56
   Factory default flag: 1
   Phone number 1:       5551212
   Service provider name:uBR7246
   Connection threshold: 10
   Username:             guest
   Password:             password
   DHCP authenticate:    1
   DHCP server:          10.10.255.255
   PPP authentication:   2
   Manual dial:          1
Sending TSI message:
   DS channel IP address:  10.10.10.10
   Registration IP address:10.10.10.10
   CMTS boot time:         3080626752
   DS channel ID:          0
   Epoch:                  1
```

Related Commands

Command	Description
debug cable telco-return msg	Displays the Telephony Channel Descriptor (TCD) and Termination System Information (TSI) messages.

debug cable telco-return msg

To display the Telephony Channel Descriptor (TCD) and Termination System Information (TSI) messages that are sent downstream to the telco-return cable modems, use the **debug cable telco-return msg** EXEC command. To disable debugging output, use the **no** form of this command.

debug cable telco-return msg

no debug cable telco-return msg

Syntax Description

This command has no arguments or keywords.

Defaults

TCD and TSI messages are not displayed.

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Examples

The following is sample output from the **debug cable telco-return msg** command:

```
01:17:31:Sending TCD message:
  TLV type = 1
  TLV len = 56
   Factory default flag: 1
   Phone number 1:       5551212
   Service provider name:uBR7246
   Connection threshold: 10
   Username:             guest
   Password:             password
   DHCP authenticate:    1
   DHCP server:          10.10.255.255
   PPP authentication:   2
   Manual dial:          1
Sending TSI message:
   DS channel IP address:  10.10.10.10
   Registration IP address:10.10.10.10
   CMTS boot time:         3080626752
   DS channel ID:          0
   Epoch:                  1
```

Related Commands

Command	Description
debug cable telco-return	Displays debug messages for telco-return events.

Glossary

CHAP—Challenge Handshake Authentication Protocol. Security feature supported on lines using PPP encapsulation that prevents unauthorized access. CHAP does not itself prevent unauthorized access, it merely identifies the remote end. The router or access server then determines whether that user is allowed access.

DHCP—Dynamic Host Configuration Protocol. Provides a mechanism for allocating IP addresses dynamically so that addresses can be reused when hosts no longer need them.

DOCSIS—Data-over-Cable Service Interface Specifications. Defines technical specifications for equipment at both subscriber locations and cable operators' headends. Adoption of DOCSIS will accelerate deployment of data-over-cable services and ensure interoperability of equipment throughout system operators' infrastructures.

headend—Central distribution point for a CATV system. Video signals are received here from satellite (either co-located or remote), frequency converted to the appropriate channels, combined with locally originate signals, and rebroadcast onto the HFC plant. For a CATV data system, the headend is the typical place to link between the HFC system and any external data networks.

PAP—Password Authentication Protocol. Authentication protocol that allows PPP peers to authenticate one another. The remote router attempting to connect to the local router is required to send an authentication request. Unlike CHAP, PAP passes the password and host name or username in the clear (unencrypted). PAP does not itself prevent unauthorized access, but merely identifies the remote end. The router or access server then determines if that user is allowed access. PAP is supported only on PPP lines.

PPP—Point-to-Point Protocol. Successor to SLIP that provides router-to-router and host-to-network connections over synchronous and asynchronous circuits. Whereas SLIP was designed to work with IP, PPP was designed to work with several network layer protocols, such as IP, IPX, and ARA. PPP also has built-in security mechanisms, such as CHAP and PAP.

PSTN—Public Switched Telephone Network. General term referring to the variety of telephone networks and services in place worldwide. Sometimes called plain old telephone service (POTS) .

RF—radio frequency. Generic term referring to frequencies that correspond to radio transmissions. Cable TV and broadband networks use RF technology.

SPD—Service Provider Descriptor. Set of configuration attributes that are used by the telco-return cable modem to initiate a telephone call when the cable modem is first powered on or is reset to its factory default. Each TCD message contains at least one and as many as five SPDs.

TCD—Telephony Channel Descriptor.

TSI—Termination System Information. TSI messages are transmitted by the headend router at periodic intervals to report cable modem termination system (CMTS) status information to the downstream cable modems.