isdn sending-complete

To specify that the Sending Complete information element (IE) is included in the outgoing Setup message, use the **isdn sending-complete** command in interface configuration mode. To disable the Sending Complete information element, use the **no** form of this command.

isdn sending-complete

no isdn sending-complete

Syntax Description

This command has no arguments or keywords.

Command Default

This command is disabled by default.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
11.2	This command was introduced.

Usage Guidelines

The Sending Complete IE tells the switch that all the digits and information necessary for the call are contained in this Setup message.

Some switches in some countries want a Sending Complete information element to be included in the outgoing Setup message to indicate that the entire number is included. The Sending Complete IE is required in Hong Kong and Taiwan, and the **isdn sending-complete** command forces it to be sent.

Note The **no isdn spoofing** command is not applicable when the ISDN BRI interface is configured as a network side.

Examples

In the following example, the **isdn sending-complete** command applies to an ISDN BRI interface:

```
interface BRI0
 description connected to PBX 61886
 ip address 172.31.1.1 255.255.255.0
 encapsulation ppp
 isdn sending-complete
 dialer idle-timeout 20
 dialer map ip 172.31.1.2 name name1 61884
 dialer map ip 172.31.1.3 name name2 61885
 dialer-group 1
 ppp authentication chap
```

The following example enables sending complete IE information on a serial interface:

```
interface serial 0:15
 description connected to PBX 61886
```

```
ip address 10.1.1.1 255.255.255.0
encapsulation ppp
isdn sending-complete
dialer idle-timeout 20
dialer map ip 10.1.1.2 name name1 61884
dialer map ip 10.1.1.3 name name3 61885
dialer-group 1
ppp authentication chap
```

Related Commands

Command	Description
isdn send-alerting	Specifies that an Alerting message be sent before a Complete message when making ISDN calls.

isdn service

To take an individual B channel or an entire PRI interface out of service or set it to a different channel service state that is passed to a time-division multiplexing (TDM) switch at the Public Switched Telephone Network (PSTN), use the **isdn service** command in interface configuration mode. To remove the configuration, use the **no** form of the command.

isdn service [**dsl** *number* | **nfas-int** *number*] **b_channel** *number* **state** {**0** | **1** | **2**} [**hard** | **immediate** | **soft**]

no isdn service

Syntax Description

dsl *number*	(Optional) Digital subscriber loop number; displayed with the **show isdn status** command. DSL numbers range from 0 to 31.
nfas-int *number*	(Optional) The Non-Facility Associated Signaling (NFAS) member interface number that has a B channel or channels to which you want to do maintenance.
b_channel *number*	B channel, or a range of B channels separated by a dash, to be set with the passed-in state value. Specifying *number* as 0 sets the entire PRI interface to a specific state value. B channel numbers range from 0 to 31, or 0 for the complete interface.
state {**0** | **1** | **2**} [**hard** | **immediate** | **soft**]	Desired channel service state to be set on the channels. Note that the ISDN service messages are sent only for switch types that support them. A state change from lower availability to higher availability is possible only after a service acknowledgment (SERV ACK) message is received. The following channel service state values are supported: **0**—In Service. Restore a channel or channels to service. **1**—Maintenance. An intermediate state between In Service and Out of Service. **2**—Out of Service (OOS). Take a channel or channels out of service. The switch might drop calls on active channels. Additionally, you can provide one of the following optional keywords to control when to modify the state of the B channel or channels: • **hard**—(Optional) Sends the service (SERV) message immediately, even if the channel is active, and clears the call if there is any. If there is no active call, this keyword has the same effect as using the **immediate** keyword. • **immediate**—(Optional) This keyword is the default. It sends the service message, but does not clear the call. The switch might clear the active channels if the state is changed to Maintenance or OOS. • **soft**—(Optional) Moves the active channel or channels to a pending change state. The service message is sent after the channel becomes idle.

Command Default

Disabled

Command Modes Interface configuration

Command History

Release	Modification
11.3	This command was introduced.
12.2	The **dsl** keyword was made optional.
12.3	The **hard**, **immediate**, and **soft** keywords were added as **state** keyword options.

Usage Guidelines Use this command to manage channels on ISDN NFAS and Primary Rate Interfaces (PRI) on Cisco routers.

Use the **b_channel 0** keywords to set the entire PRI interface to the specified state value.

Use the optional **soft** and **immediate state** keywords to take switches down gracefully, without impacting calls in progress. The **hard** keyword sends an immediate service message to the connected switch that will disconnect active B channels and drop active calls.

To display the digital subscriber loop (DSL) number on NFAS interfaces, use the **show isdn service** EXEC command. To find the NFAS interface value, use the **pri-group** T1 controller configuration command.

This command can be used only on North American switch types, because it supports the service message.

Examples The following example sets all the PRI B channel on the interface to the maintenance state:

```
isdn service b_channel 0 state 1
```

The following example restores B channels 2 through 4; the DSL number was obtained using the **show isdn** command with the **status** keyword, and the DSL number was then used in the command:

```
isdn service dsl 2 b_channel 2-4 state 0
```

The following example sets B channels 13 to 24 to the OOS state:

```
isdn service nfas-int 3 b_channel 13-24 state 1
```

In the following example, the first statement sets B channels 17 through 20 to the maintenance state and marks any busy B channel (or channels) as pending; the channel will change to the service state only when it becomes idle. The second statement will cause the service message to be sent immediately and will clear the call. If there is no call, the second statement will have the same effect as the **immediate** keyword, that is, it will send the service message, but will not clear the call.

```
isdn service b_channel 17-20 state 1 soft
isdn service b_channel 21 state 1 hard
```

Related Commands

Command	Description
isdn bcac service audit	Enables service audits on an interface configured for BCAC.
isdn bcac service audit interface	Specifies that the BCAC service audit needs to be triggered on the entire interface.

Command	Description
isdn bcac service audit trigger	Enables individual BCAC service triggers.
isdn bcac service retry in-serv-on-fail	Specifies that the BCAC service state of the channel needs to be changed to In Service because no acknowledgment was received.
isdn bcac service retry max	Specifies the maximum number of times a BCAC service message can be retransmitted when unacknowledged.
isdn bcac service timer	Changes the value of the BCAC T3M1 or T323 service message timer.
isdn bcac service update linkup	Triggers updates of the BCAC service states between peer nodes through exchange of SERV and SERV ACK messages.
isdn bcac service update provision	Enables the functionality of service status for provisioning ISDN PRI B channels.
show isdn	Displays the information about memory, Layer 2 and Layer 3 timers, and the status of PRI channels.

isdn silent-boot

To prevent the transmission and receipt of ISDN packets by the router during the boostrap loading process, use the **isdn silent-boot** command in global configuration mode. To allow the transmission and receipt of ISDN packets by the router during the boostrap loading process, use the **no** form of this command.

isdn silent-boot

no isdn silent-boot

Syntax Description

This command has no arguments or keywords.

Command Default

The transmission and receipt of ISDN packets by the router is allowed during the bootstrap process.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.2	This command was introduced.

Usage Guidelines

ISDN traffic will not be sent from any interfaces on the router (ISDN BRI or PRI) when you use the **isdn silent-boot** command. Disabling the ISDN traffic on the router is appropriate when the router is part of a hunt group that is accepting incoming ISDN calls because you do not want the router to receive calls until after it has reloaded and is ready to accept the incoming calls.

Examples

The following example disables ISDN traffic:

```
Router(config)# isdn silent-boot
```

isdn snmp busyout b-channel

To enable PRI B channels to be busied out via Simple Network Management Protocol (SNMP), use the **isdn snmp busyout b-channel** command in interface configuration mode. To prevent B channels from being busied out via SNMP, use the **no** form of this command.

isdn snmp busyout b-channel

no isdn snmp busyout b-channel

Syntax Description

This command has no arguments or keywords.

Command Default

The default value is TRUE; that is, setting busyout using SNMP is allowed.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
12.1(3)T	This command was introduced.

Usage Guidelines

To busy out B-channels on a PRI, the ISDN switch must support service messages. The **isdn snmp busyout b-channel** command sets the MIB object, cpmDS0BusyoutAllow, indicating whether or not the switch supports service messages, thereby allowing the busyout of B channels. When the network access server receives an SNMP request for a busyout, it checks the value of this object. If the **no isdn snmp busyout b-channel** command is configured, the busyout request fails.

Examples

The following example allows the busyout of B-channels for serial interface 0:23:

```
configure terminal
interface serial 0:23
isdn snmp busyout b-channel
```

isdn spid1, isdn spid2

To associate up to three ISDN local directory numbers (LDNs) provided by your telephone service provider to the first service profile identifier (SPID), use the **isdn spid1** command in interface configuration mode. To disable the specified SPID and prevent access to the switch, use the **no** form of this command.

isdn spid1 *spid-number ldn* [*ldn*] [*ldn*]

no isdn spid1 *spid-number ldn* [*ldn*] [*ldn*]

To associate up to three ISDN LDNs provided by your telephone service provider to the second service SPID, use the **isdn spid2** interface configuration command. To disable the specified SPID and prevent access to the switch, use the **no** form of this command.

isdn spid2 *spid-number ldn* [*ldn*] [*ldn*]

no isdn spid2 *spid-number ldn* [*ldn*] [*ldn*]

Syntax Description

spid-number	Number identifying the service to which you have subscribed. This value is assigned by the ISDN service provider and is usually a 10-digit telephone number with additional digits such as 40855501220101.
ldn	ISDN LDN, which is a 7-digit number assigned by the service provider. You can optionally specify a second and third LDN.

Command Default

A default SPID number and ISDN local directory numbers are not defined.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
10.3	This command was introduced.
12.0(3)T	This command was enhanced with the option of associating the SPID with up to three LDNs.

Usage Guidelines

This command applies only to North America and is required for DMS-100 and National ISDN switches. Typically, DMS-100 and National ISDN switch implementations using BRI interfaces with SPIDS require two terminal endpoint identifiers (TEIs), two SPIDS, and two phone numbers. If you want to take advantage of both B channels, it is advised you configure the router with the LDN value after the SPID.

Note Some DMS-100 and National ISDN switch installations may be configured as a "hunt group" whereby all calls are initially forwarded to the primary number. Under these circumstances, you should not configure the LDN. You can determine this by enabling the **debug isdn q931** command. If the endpoint identifier (EID) information element is delivered in the incoming setup message, then the switch is addressing the TEIs with the EID, instead of the LDN.

If you want the SPID to be automatically detected, you can specify 0 for the *spid-number* argument.

The ISDN switch checks for the LDN to determine whether both channels can be used to transmit and receive data. If there is not an LDN present, then only the B1 channel can be used for full-duplex communication. However, the B2 channel can still be used to make outgoing calls.

If you include the local directory number in the **no** form of this command, access to the switch is permitted, but the other B channel may not be able to receive incoming calls.

Examples

The following example defines, on the router, a SPID and LDN for the B1 channel:

```
isdn spid1 41555501130101 5550113
```

The following example shows how to specify that the SPID should be automatically detected, that the primary ISDN local directory number is 4085550111, and that the secondary number is 4085550122:

```
isdn spid1 0 4085550111 4085550122
```

The following example defines, on the router, a SPID and LDN for the B2 channel:

```
isdn spid2 41555501140101 5550114
```

The following example specifies that the SPID should be automatically detected, that the primary ISDN local directory number is 4085550111, and that the secondary number is 4085550122:

```
isdn spid2 0 4085550111 4085550122
```

Related Commands

Command	Description
isdn autodetect	Enables the automatic detection of ISDN SPIDs and switch type.

isdn spoofing

To enable ISDN spoofing so that loss of Layer 1 or Layer 2 connectivity of the ISDN BRI interface is not detected by the Trunk Group Resource Manager (TGRM) or similar application, use the **isdn spoofing** command in interface configuration mode. To disable ISDN spoofing so the TGRM or similar application can detect when the BRI interface is not operational (when the Layer 1 or Layer 2 connection is down), use the **no** form of this command.

isdn spoofing

no isdn spoofing

Syntax Description

This command has no arguments or keywords.

Command Default

The ISDN BRI interface is spoofing, which means that applications always see the BRI interface connection as operational (unless the interface has been manually shut down [ADMINDOWN state]).

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
12.3(14)T	This command was introduced.

Usage Guidelines

The ISDN BRI interface is spoofing by default. Spoofing makes the ISDN BRI interface available (up) for operation (for dialing in ISDN), even if the interface is down. For an ISDN BRI interface to be set to a down condition, the interface must be manually shut down (IDBS_ADMINDOWN state). Spoofing enables upper layers to dial out even when the interface is down.

Some upper layer modules, such as TGRM and similar applications, allow dial-out only if the channel is available. If the record for TGRM or similar application is notified of the actual status of BRI, then the TGRM or similar application can dial out accordingly. In this case, the **no isdn spoofing** command is appropriate.

Note ISDN spoofing can be applied only to BRI interfaces—it does not apply to PRI interfaces.

Examples

The following example shows how to configure an ISDN BRI interface to disable ISDN spoofing:

```
Router# config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# interface bri0/0
Router(config-if)# no isdn spoofing
Router(config-if)#
```

Related Commands

Command	Description
interface bri	Configures a BRI interface and enters interface configuration mode.
show isdn status	Displays the status of all ISDN interfaces or a specific ISDN interface.

isdn static-tei

To configure a static ISDN Layer 2 terminal endpoint identifier (TEI) over the D channel, use the **isdn static-tei** command in interface configuration mode. To remove a static TEI configuration, use the **no** form of this command.

isdn static-tei *tei-number*

no isdn static-tei *tei-number*

Syntax Description

tei-number	Terminal endpoint identifier, in the range from 0 to 63.

Command Default

Dynamic TEI (**no isdn static-tei**)

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
11.3	This command was introduced.

Usage Guidelines

Depending on the telephone company you subscribe to, you may have a dynamically or statically assigned TEI for your ISDN service. The default TEI behavior is dynamic, and the **isdn static-tei** command changes that behavior to static for the specified service.

When you reconfigure a TEI with the **isdn static-tei** command, you must activate the configuration using the **shutdow**n and **no shutdown** commands.

Examples

The following example configures German Anlagenanschluss ISDN lines. These lines are often provided in a group intended to be connected to single ISDN device such as a private branch exchange. To use the Anlagenanschluss ISDN lines on a Cisco router, you must set the TEI to 0, as follows:

```
Router# configure terminal
Router(config)# interface bri 0
Router(config-if)# isdn static-tei 0
Router(config-if)# shutdown
Router(config-if)# no shutdown
```

Related Commands

Command	Description
interface bri	Configures a BRI interface and enters interface configuration mode.
isdn x25 static-tei	Configure a static TEI for X.25 over the ISDN D channel.
shutdown	Disables an interface.

isdn switch-type (BRI)

To specify the central office switch type on the ISDN interface, use the **isdn switch-type** command in global or interface configuration mode. To remove an ISDN switch type, use the **no** form of this command.

isdn switch-type *switch-type*

no isdn switch-type *switch-type*

Syntax Description

switch-type	ISDN service provider switch type. Table 1 in the "Usage Guidelines" section lists the supported switch types.

Defaults

No ISDN switch type is specified.

Command Modes

Global configuration (config)
Interface configuration (config-if)

Command History

Release	Modification
9.21	This command was introduced as a global command.
11.3T	This command was introduced as an interface command.
12.0(3)XG	The **basic-qsig** and **primary-qsig s**witch type options were added to support BRI QSIG voice signaling.

Usage Guidelines

For the Cisco AS5300 access server, you have the choice of configuring the **isdn-switch-type** command to support Q.SIG in either global configuration mode or interface configuration mode. When entered in global configuration mode, the setting applies to the entire Cisco AS5300 access server. When entered in interface configuration mode, the setting applies only to the T1/E1 interface specified. The interface configuration mode setting overrides the global configuration setting.

Note This command can be entered in either global configuration or interface configuration mode. When entered in global configuration mode, the **basic-qsig** switch type command specifies that the Cisco MC3810 use QSIG signaling on all BRI interfaces; when entered in interface configuration mode, the command specifies that an individual BRI voice interface use QSIG signaling. The interface configuration mode setting overrides the global configuration setting on individual interfaces.

For example, if you have a Q.SIG connection on one line as well as on the PRI port, you can configure the ISDN switch type in one of the following combinations:

- Set the global **isdn-switch-type** command to support Q.SIG and set the interface **isdn-switch-type** command for **interface serial 0:23** to a PRI setting such as 5ess.
- Set the global **isdn-switch-type** command to support PRI 5ess and set the interface **isdn-switch-type** command for **interface serial 1:23** to support Q.SIG.
- Configure the global **isdn-switch-type** command to another setting (such as switch type VN3), set the interface **isdn-switch-type** command for **interface serial 0:23** to a PRI setting, and set the interface **isdn-switch-type** command for **interface serial 1:23** to support Q.SIG.

For the Cisco MC3810 router, if you are using different Cisco MC3810 BRI port interfaces with different ISDN switch types, you can use global and interface commands in any combination, as long as you remember that interface commands always override a global command.

For example, if you have a BRI QSIG switch interface on BRI voice ports 1, 2, 3 and 4, but a BRI 5ess switch interface on BRI backup port 0, you can configure the ISDN switch types in any of the following combinations:

- Enter the **isdn switch-type basic-qsig global configuration command**, and enter the **isdn switch-type bri-5ess command** on interface 0.
- Enter the **isdn switch-type bri-5ess** global configuration command, and enter the **isdn switch-type basic-qsig command** on interfaces 1, 2, 3, and 4 individually.
- Enter the **isdn switch-type bri-5ess** command on interface 0, and enter the **isdn switch-type basic-qsig command** on interfaces 1, 2, 3, and 4 individually.

If you use the **no isdn switch-type** global configuration command, any switch type that was originally entered in global configuration mode is canceled; however, any switch type originally entered on an interface is not affected. If you use the **no isdn switch-type** interface configuration command, any switch type configuration on the interface is canceled.

Note In the Cisco MC3810, ISDN BRI voice ports support *only* switch type **basic-qsig**; ISDN BRI backup ports support all other listed switch types, but *not* **basic-qsig**.

Note The dial-peer **codec** command must be configured before any calls can be placed over the connection to the PINX. The default codec type is G729a.

If you are using the Multiple ISDN Switch Types feature to apply ISDN switch types to different interfaces, refer to the chapters “Configuring ISDN BRI” and “Configuring ISDN PRI” in the *Cisco IOS Dial Technologies Configuration Guide* for additional details.

The Cisco IOS command parser accepts the following switch types: basic-nwnet3, vn2, and basic-net3; however, when viewing the NVRAM configuration, the basic-net3 or vn3 switch types are displayed, respectively.

To remove an ISDN switch type from an ISDN interface, specify **the no isdn switch-type** *switch-type command*.

Table 1 lists supported BRI switch types by geographic area.

Table 1 ISDN Service Provider BRI Switch Types

Keywords by Area	Switch Type
Voice/PBX Systems	
basic-qsig	PINX (PBX) switches with QSIG signaling per Q.931
Australia, Europe, UK	
basic-1tr6	German 1TR6 ISDN switch
basic-net3	NET3 ISDN BRI for Norway NET3, Australia NET3, and New Zealand NET3switch types; ETSI-compliant switch types for Euro-ISDN E-DSS1 signaling system
vn3	French ISDN BRI switches
Japan	
ntt	Japanese NTT ISDN switches
North America	
basic-5ess	Lucent (AT&T) basic rate 5ESS switch
basic-dms100	Northern Telecom DMS-100 basic rate switch
basic-ni	National ISDN switches
All Users	
none	No switch defined

Examples

The following example configures the French VN3 ISDN switch type:

```
isdn switch-type vn3
```

The following example uses the Multiple ISDN Switch Types feature and shows use of the global ISDN switch type **basic-ni** keyword (formerly **basic-ni1**) and the **basic-net3** interface-level switch type keyword. ISDN switch type **basic-net3** is applied to BRI interface 0 and overrides the global switch setting.

```
isdn switch-type basic-ni
!
interface BRI0
 isdn switch-type basic-net3
```

The following example configures the Cisco MC3810 router to use BRI QSIG signaling for all of its BRI voice ports:

```
isdn switch-type basic-qsig
```

The following example configures the Cisco MC3810 to use BRI QSIG signaling for BRI voice port 1. On port 1, this setting overrides any different signaling set in the previous example.

```
interface bri 1
 isdn switch-type basic-qsig
```

isdn switch-type (PRI)

To specify the central office switch type on the ISDN interface, or to configure the Cisco MC3810 PRI interface to support QSIG signaling, use the **isdn switch-type** command in global or interface configuration mode. To disable the switch or QSIG signaling on the ISDN interface, use the **no** form of this command.

isdn switch-type *switch-type*

no isdn switch-type *switch-type*

Syntax Description

switch-type	Service provider switch type; see Table 2 for a list of supported switches.

Command Default

The switch type defaults to **none**, which disables the switch on the ISDN interface.

Command Modes

Global configuration (confi)
Interface configuration (config-if)

Note This command can be entered in either global configuration mode or in interface configuration mode. When entered in global configuration mode, the setting applies to the entire Cisco MC3810. When entered in interface configuration mode, the setting applies only to the T1/E1 interface specified. The interface configuration mode setting overrides the global configuration setting.

Command History

Release	Modification
9.21	This command was introduced as a global command.
11.3T	This command was introduced as an interface command.
12.0(2)T	The **primary-qsig-slave** and **primary-qsig master** switch type options were added to support PRI QSIG signaling.

Usage Guidelines

You have a choice of configuring the **isdn-switch-type** command to support QSIG at either the global configuration level or at the interface configuration level. For example, if you have a QSIG connection on one line as well as on the BRI port, you can configure the ISDN switch type in one of the following combinations:

- Set the global **isdn-switch-type** command to support QSIG, and set the interface **isdn-switch-type** command for the **interface bri 0** command to a BRI setting such as 5ess.
- Set the global **isdn-switch-type** command to support BRI 5ess, and set the interface **isdn-switch-type** command for the **interface serial 1:23** command to support QSIG.
- Configure the global **isdn-switch-type** command to another setting (such as switch type VN3), and then set the interface **isdn-switch-type** command for the **interface bri 0** command to a BRI setting, and set the interface **isdn-switch-type** command for the **interface serial 1:23** command to support QSIG.

The voice-port **codec** command must be configured before any calls can be placed over the connection to the PINX. The default codec type is G729a.

To disable the switch on the ISDN interface, specify the **isdn switch-type none command**.

Table 2 lists supported PRI switch types by geographic area.

Note If you are using the Multiple ISDN Switch Types feature to apply the ISDN switch types to different interfaces, refer to the chapter "Setting Up Basic ISDN Service" in the *Cisco IOS Dial Technologies Configuration Guide* for additional details.

Table 2 ISDN Service Provider PRI Switch Types

Keywords by Area	Switch Type
Voice/PBX Systems	
primary-qsig	Supports QSIG signaling per Q.931. Network side functionality is assigned with the **isdn protocol-emulate** command.
Australia and Europe	
primary-net5	NET5 ISDN PRI switch types for Asia, Australia, and New Zealand; ETSI-compliant switches for Euro-ISDN E-DSS1 signaling system.
Japan	
primary-ntt	Japanese ISDN PRI switch.
North America	
primary-4ess	AT&T 4ESS switch type for the United States.
primary-5ess	AT&T 5ESS switch type for the United States.
primary-dms100	NT DMS-100 switch type for the United States.
primary-ni	National ISDN switch type.
All users	
none	No switch defined.

Examples

The following example demonstrates the Multiple ISDN Switch Type Feature. The global ISDN switch type setting is basic-net3. The PRI interface (channelized T1 controller), is configured to use the **isdn switch-type primary-net5** command and BRI interface 0 is configured for the **isdn switch-type basic-ni** command (formerly **isdn switch-type basic-ni1**).

```
isdn switch-type basic-net3
!
interface serial0:23
 isdn switch-type primary-net5
 ip address 172.21.24.85 255.255.255.0
!
interface BRI0
 isdn switch-type basic-ni
```

The following example configures T1 interface 23 on the Cisco AS5300 to support Q.SIG signaling:

```
interface serial 1:23
 isdn switch-type primary-qsig
```

Related Commands

Command	Description
isdn protocol-emulate (dial)	Configures the Layer 2 and Layer 3 port protocol of a BRI voice port or a PRI interface to emulate NT (network) or TE (user) functionality.
pri-group nec-fusion	Configures your NEC PBX to support FCCS.
show cdapi	Displays the CDAPI.
show rawmsg	Displays the raw messages owned by the required component.

isdn t306

Note Effective with Cisco IOS Release 12.4(11)T, the **isdn t306** command is replaced by the **isdn timer** command. See the **isdn timer** command for more information.

To set a timer for disconnect messages sent by a router, use the **isdn t306** command in interface configuration mode. To reset to the default, use the **default** or **no** form of this command.

isdn t306 *milliseconds*

default isdn t306

no isdn t306

Syntax Description

milliseconds	Time, in milliseconds, that the router waits before disconnecting a call after it receives a disconnect message with a progress indicator of 8. Range is from 1 to 400000.
default	This keyword resets the default value for the T306 timer.

Command Default

Default depends on the switch, usually from 5000 to 30000 ms.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
12.1(3)XI	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2(2)XA	This command was implemented on the Cisco AS5400 and Cisco AS5350.
12.2(2)XB1	This command was implemented on the Cisco AS5850.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T.
12.4(11)T	This command was replaced by the **isdn timer** command.

Usage Guidelines

The T306 timer is designed for routers that are configured as an ISDN network-side switch. When a router sends out a disconnect message with a progress indicator of 8, it disconnects the call after waiting for the specified number of milliseconds (ms) while the in-band announcement or error tone is playing. Be sure to set the timer long enough for the announcement to be heard or the tone to be recognized. This command is used only for disconnect messages with a progress indicator of 8; otherwise, the T305 timer is used. The **default** and **no** forms of this command have the same result: the timer waits for the default number of ms before disconnecting the call.

Examples

The following example sets the T306 timer to 60000 ms for serial interface 0:23:

```
interface serial 0:23
 isdn t306 60000
```

Related Commands

Command	Description
isdn t309	Changes the value of the timer to clear the network connection, and release the B channel and call reference when a data-link disconnection has occurred.
isdn t310	Changes the value of the T310 timer for Call Proceeding messages.
isdn timer t321	Changes the value of the T321 timer for D channel switchover when the primary D channel fails.

isdn t310

Note Effective with Cisco IOS Release 12.4(11)T, the **isdn t310** command is replaced by the **isdn timer** command. See the **isdn timer** command for more information.

To set a timer for the call proceeding state, use the **isdn t310** comman in interface configuration mode. To reset to the default, use the **no** form of this command.

isdn t310 *milliseconds*

no isdn t310

Syntax Description

milliseconds	Time, in milliseconds, that the router waits before disconnecting a call after receiving a call proceeding message. Range is from 1 to 400000.

Command Default

Default depends on the switch; usually from 5000 to 30000 ms.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
12.1(3)XI	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2(2)XA	This command was implemented on the Cisco AS5350 and Cisco AS5400.
12.2(2)XB1	This command was implemented on the Cisco AS5850.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T.
12.4(11)T	This command was replaced by the **isdn timer** command.

Usage Guidelines

The T310 timer starts when a router receives a call proceeding message; it stops when the call exits the call proceeding state, typically when the call moves to the alerting, connect, or progress state. If the timer expires while the call is in the call proceeding state, the router releases the call. Set the timer to match the specific characteristics of your network.

Examples

The following example sets the T310 timer to 40,000 ms for serial interface 0:23:

```
interface serial 0:23
 isdn t310 40000
```

Related Commands

Command	Description
isdn protocol-emulate	Sets a timer for disconnect messages.
isdn t306	Changes the value of the T306 timer to disconnect a call after the router sends a disconnect message.
isdn test call interface	Changes the value of the T309 timer to clear the network connection, and to release the B channel and call reference when a data-link disconnection has occurred.
isdn timer t321	Changes the value of the T321 timer for D-channel switchover when the primary D channel fails.

isdn tei-negotiation (global)

To configure when Layer 2 becomes active and ISDN terminal endpoint identifier (TEI) negotiation occurs, use the **isdn tei-negotiation** command in global configuration mode. To remove TEI negotiation configuration, use the **no** form of this command.

isdn tei-negotiation [**first-call** | **powerup**]

no isdn tei-negotiation

Syntax Description

first-call	(Optional) ISDN TEI negotiation should occur when the first ISDN call is placed or received.
powerup	(Optional) ISDN TEI negotiation should occur when the router is powered on.

Command Default

The **powerup** state is the default condition.

Command Modes

Global configuration (config)

Command History

Release	Modification
9.21	This command was introduced as a global command.

Usage Guidelines

This command is for BRI configuration only.

This command is useful for switches that may deactivate Layers 1 and 2 when there are no active calls or primary DMS-100 switches which activate TEI when the first ISDN call is placed or received.

Examples

The following example applies the **isdn tei negotiation first-call** command to BRI interface 0. BRI interface 1 will use the **isdn tei negotiation powerup command**, which is the default setting. Defaults settings do not appear in the router configuration.

```
isdn switch-type basic-net
!
interface bri0
! Configure the ISDN switch type on this interface and set TEI negotiation to first-call.
 isdn switch-type basic-ni
 isdn tei-negotiation first-call
! BRI interface 1 uses the default TEI negotiation value.
interface bri1
```

isdn tei-negotiation (interface)

To configure when Layer 2 becomes active and ISDN terminal endpoint identifier (TEI) negotiation occurs, use the **isdn tei-negotiation** command in interface configuration mode. To remove TEI negotiation from an interface, use the **no** form of this command.

isdn tei-negotiation {**first-call** | **powerup**} {**preserve** | **remove**}

no isdn tei-negotiation

Syntax Description

first-call	ISDN TEI negotiation occurs when the first ISDN call is placed or received.
powerup	ISDN TEI negotiation occurs when the router is powered up.
preserve	Preserves dynamic TEI negotiation when ISDN Layer 1 flaps, and when the **clear interface** or the **shutdown** and **no shutdown** EXEC commands are executed.
remove	Removes dynamic TEI negotiation when ISDN Layer 1 flaps, and when the **clear interface** or the **shutdown** and **no shutdown** EXEC commands are executed.

Command Default

The **powerup** state is the default condition. Depending on the ISDN switch type configured, the default action is to preserve or remove the TEI negotiation options.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
11.3T	This command was introduced as an interface command.
12.2	The **preserve** and **remove** keywords were added.

Usage Guidelines

This command is for BRI configuration only.

The **first-call** and **powerup**, and **preserve** and **remove** command pairs are mutually exclusive, that is, you must choose only one command from either the **first-call** and **powerup** or **preserve** and **remove** command pairs, per command line.

The **no isdn tei-negotiation** command returns the configuration to default to the **powerup** state.

Use of the **preserve** keyword causes different behavior depending on the ISDN switch type configured, that is, the TEI negotiation configured will be preserved during ISDN Layer 1 flaps, and when the **clear interface** or the **shutdown** and **no shutdown** EXEC commands are executed, on the switch types listed in Table 3.

Table 3 Switch Types with Preserved TEI Negotiation

Switch Type	Cisco IOS Keyword
French ISDN switch types	**vn2, vn3**
Lucent (AT&T) basic rate 5ESS switch	**basic-5ess**

Table 3 Switch Types with Preserved TEI Negotiation (continued)

Switch Type	Cisco IOS Keyword
Northern Telecom DMS-100 basic rate switch	**basic-dms100**
National ISDN basic rate switch	**basic-ni**
PINX (PBX) switches with QSIG signaling per Q.931	**basic-qsig**

For all other ISDN switch types, the TEI negotiation will be removed during ISDN Layer 1 flaps, and when the **clear interface** or the **shutdown** and **no shutdown** EXEC commands are executed. Use the **remove** keyword to specifically set one of the switches listed in Table 3 to the remove state.

The **first-call** keyword and its functionality are not supported on U.S. switch types (basic-ni, basic-5ess, basic-dms100, primary-ni, primary-4ess, primary-5ess, and primary-dms100), especially for service profile identifier (SPID) negotiations. The **first-call** keyword and its functionality are supported on European switch types (basic-net3 and primary-net5) to prevent Layer 2 activity when there are no Layer 3 calls.

Examples

The following example shows the ISDN TEI negotiation configuration with default settings. (Defaults settings do not appear in the router configuration.)

```
interface BRI0/0
 no ip address
 isdn switch-type basic-ni
 cdapi buffers regular 0
 cdapi buffers raw 0
 cdapi buffers large 0
```

The following example shows how to set TEI negotiation timing to the first call:

```
Router(config-if)# isdn tei-negotiation first-call
Router(config-if)# exit
Router(config)# exit
Router# show startup-config
.
.
.
interface BRI0/0
 no ip address
 isdn switch-type basic-ni
 isdn tei-negotiation first-call
 cdapi buffers regular 0
 cdapi buffers raw 0
 cdapi buffers large 0interface BRI0/0
```

The following example shows how to change TEI negotiation timing back to the default power-up state:

```
Router(config-if)# no isdn tei-negotiation
Router(config-if)# exit
Router(config)# exit
Router# show startup-config
.
.
.
interface BRI0/0
 no ip address
 isdn switch-type basic-ni
 cdapi buffers regular 0
 cdapi buffers raw 0
```

```
 cdapi buffers large 0
```

The following example shows how to remove TEI negotiation when ISDN Layer 1 flaps (the preserve state is the default for the National ISDN basic rate switch):

```
Router(config-if)# isdn tei-negotiation remove
Router(config-if)# exit
Router(config)# exit
Router# show startup-config
.
.
.
interface BRI0/0
 no ip address
 isdn switch-type basic-ni
 isdn tei-negotiation first-call
 isdn tei-negotiation remove
 cdapi buffers regular 0
 cdapi buffers raw 0
 cdapi buffers large 0
```

The following example shows how to return the National ISDN basic rate switch to its default preserve state:

```
Router(config-if)# no isdn tei-negotiation
Router(config-if)# exit
Router(config)# exit
Router# show startup-config
.
.
.
interface BRI0/0
 no ip address
 isdn switch-type basic-ni
 isdn tei-negotiation first-call
 cdapi buffers regular 0
 cdapi buffers raw 0
 cdapi buffers large 0
```

isdn test call interface

To make an ISDN data call, use the **isdn test call interface** command in privileged EXEC mode.

isdn test call interface *interface-number dialing-string* [**speed** {**56** | **64**}]

Syntax Description

interface-number	Interface number.
dialing-string	Telephone number used for making ISDN data call.
speed {**56** | **64**}	(Optional) Line speed (56 or 64 kbps) used for making ISDN data call.

Command Default

The default B-channel speed is 64 kbps.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2	This command was introduced.

Usage Guidelines

You can use the **isdn test call interface** command to test your DDR configuration. You can also use this command to verify the dialing string and speed without having to know the IP address of the remote router or without configuring a dialer map or string.

The **isdn test call interface** command replaces the **isdn call interface** command.

Examples

The following example makes an ISDN data call through interface bri 0 to 555-0111 and at a line speed of 56 kbps:

```
isdn test call interface bri 0 5550111 speed 56
```

Related Commands

Command	Description
isdn caller	Disconnects an ISDN data call without bringing down the interface.

isdn test disconnect interface

To disconnect an ISDN data call without bringing down the interface, use the **isdn test disconnect interface** command in privileged EXEC mode.

isdn test disconnect interface *type number* {**b1** | **b2** | **all**}

Syntax Description

type number	Interface type and number, such as bri 0.
b1	B channel 1.
b2	B channel 2.
all	B channels 1 and 2.

Command Default

A default interface is not defined.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2	This command was introduced.

Usage Guidelines

You can use the **isdn test disconnect interface** command to disconnect any ongoing data calls placed manually or caused by DDR.

The **isdn test disconnect interface** command replaces the **isdn disconnect interface** command.

Examples

The following example disconnects an ISDN data call through interface bri 0 and B channel 1:

```
isdn test disconnect interface bri 0 b1
```

Related Commands

Command	Description
isdn call interface	Makes an ISDN data call.

isdn test l2 flap interface

To simulate an ISDN Layer 2 interface flap without sending a DISC frame, use the **isdn test l2 flap interface** command in privileged EXEC mode.

isdn test l2 flap interface serial *slot/port*

Syntax Description

serial *slot/port*	Specifies the slot and port on the serial interface on which the flap will occur. The slash is required.

Command Default No flaps are simulated.

Command Modes Privileged EXEC (#)

Command History

Release	Modification
12.4(22)T	This command was introduced.

Examples The following example shows how to simulate an ISDN Layer 2 interface flap:

```
Router# isdn test l2 flap interface Serial 0/0
```

Related Commands

Command	Description
isdn layer 2-flap	Sends RESTART or STATUS ENQUIRY messages over the ISDN PRI line when a Layer 2 link flap and recovery occurs.

isdn timer

Note Effective with Cisco IOS Release 12.4(11)T, the **isdn timer** command replaces the **isdn t-activate**, **isdn t306**, **isdn t310**, **isdn timer t309**, and **isdn timer t321** commands. If any of these replaced commands are entered, the command-line interface responds with a message indicating the new syntax and a request that you update the startup configuration with the running configuration.

To identify and configure an ISDN timer and change the value of the timer for network and call connect and disconnect waiting periods, use the **isdn timer** command in interface configuration mode. To restore the default value, use the **no** form of this command.

isdn timer *timer milliseconds*

no isdn timer *timer milliseconds*

Syntax Description

timer	Type of ISDN timer to be configured. The timer is the wait period between two signficant events (the events vary according to the type of timer selected). The following are acceptable ISDN timers: **t-activate**, **t200**, **t203**, **t300s, t301**, **t303**, **t306**, **t307**, **t309**, **t310**, **t321**, and **t322**.
milliseconds	Number of milliseconds (ms) that the router or switch waits before taking action. Values for the different ISDN timers are as follows: • **t-activate**—The range is from 1000 to 15,000. The default is 4000 (5000 is recommended). • **t200**—The range is from 400 to 400,000. The default is 1000. • **t203**—The range is from 400 to 400,000. The default is 10,000. • **t300s**—The range is from 500 to 86,400,000. The default is 300,000. • **t301**—The range is from 180,000 to 86,400,000. The default is switch-dependent. • **t303**—The range is from 400 to 86,400,000. The default is 10,000. • **t306**—The range is from 400 to 86,400,000. The default is switch-dependent. • **t307**—The range is from 30,000 to 300,000. The default is 180,000. • **t309**—The range is from 0 to 86,400,000. The default is 90,000. • **t310**—The range is from 400 to 400,000. The default is 10,000. • **t321**—The range is from 0 to 86,400,000. The default is 30,000. • **t322**—The range is from 4,000 to 86,000,000. The default is 4,000. **Note** Setting the timer to 0 for the T309 and T321 timers causes the expiration time to be infinite so the wait period will never expire.

Command Default

The default values vary according to the type of ISDN timer and, in some cases, are switch-dependent. To restore a specific default value, use the **no isdn timer** command.

Command Modes Interface configuration

Command History

Release	Modification
12.4(11)T	This command was introduced. This command replaces the **isdn t-activate**, **isdn t306**, **isdn t310**, **isdn timer t309**, and **isdn timer t321** commands and standardizes the syntax for ISDN timer configuration.

Usage Guidelines Selection of the different timers serves different purposes in the ISDN configuration. The functions of the different ISDN timers are as follows:

- **t-activate**—The T-activate timer starts when the voice gateway sends a Facility message to the public switched telephone network (PSTN). If a response is not received within the specified time, the Tool Command Language (TCL) Interactive Voice Response (IVR) script for Malicious Call Identification (MCID) is notified. Depending on how the script is written, it could reinvoke MCID or perform some other action, such as playing a message if the MCID attempt fails. The ISDN interface must use the NET5 switch type, which is set using the **isdn switch-type primary-net5** command. Protocol emulation must be set to **user**, which is the default for the **isdn protocol-emulate** command.
- **t200**—The T200 timer defines the wait period until the retransmission of a message will occur. This wait period must exceed the time it takes to send a frame and receive its acknowledgment.
- **t203**—The T203 timer specifies the maximum wait period between exchanges of Q.921 frames. Although the default is 10,000 ms, most switches allow modification of this timer as needed. In cases of long distances and delay, this timer should be modified for continued operation.
- **t300s**—The T300S timer is specific to Cisco IOS software configurations. The T300S timer specifies the wait period between attempts to initiate ISDN Layer 2 communication.
- **t301**—The T301 timer is configured on the user side and the network side. On the user side, the timer indicates Call Delivered—Alerting Received. On the network side, this timer indicates Call Received—Alerting Received.
- **t303**—The T303 timer starts when a calling party initiates call establishment by transferring a setup message on the assigned signaling virtual channel across the interface. If no response to the setup message is received by the user side before the first expiry of the T303 timer, the setup message will be retransmitted and the T303 timer restarted. If the user side has not received any response to the setup message after the final expiry of timer T303, the user side manually clears the call internally.
- **t306**—The T306 timer is configured on the network side. The T306 timer defines a wait period only for disconnect messages with a progress indicator of 8. When a router sends out a disconnect message with a progress indicator of 8, it disconnects the call after waiting for the specified number of milliseconds while the in-band announcement or error tone is playing. The timer must be set with sufficient duration for the announcement to be heard or the tone to be recognized.
- **t307**—The T307 timer is configured on the network side for BRI switch-types (Primary-net5, Primary-NI, and Primary-NI2C) for Suspend—Remove message processing.

- **t309**—The T309 timer defines a wait period before clearing the network connection and releasing the B channel and call reference when a data-link disconnection has occurred. When a data link layer malfunction occurs, calls that are not in the active state are cleared. For calls that are not in the active state, the T309 timer is started. The timer is stopped when the data link is reconnected. If the T309 timer expires prior to the reestablishment of the data link, the network clears the connection and call to the remote user, sending a disconnect cause of 27 to indicate that the call destination is out of order. The network releases and disconnects the B channel and releases the call reference, thereby entering the Null state. The T309 timer is mandatory for routers that are configured as ISDN network-side switches. The implementation of the T309 timer is optional for the user side of the network.
- **t310**—The T310 timer starts when a router receives a call-proceeding message; it stops when the call exits the call proceeding state, typically when the call moves to the alerting, connect, or progress state. If the timer expires while the call is in the call-proceeding state, the router releases the call.
- **t321**—The T321 timer specifies a wait period for D-channel switchover when the primary D channel fails. The T321 timer must be implemented when you use the D-channel backup procedure involving D-channel switchover.
- **t322**—The T322 timer facilitates q.931 debug tracing during a flap because this tracing can cause unintended retransmissions. The T322 timer starts when a STATUS-ENQUIRY message is sent. If no response is received before the first expiry of the T322 timer, the STATUS-ENQUIRY message will be retransmitted. If no response is received after the final expiry of timer T322, the call is cleared.

Examples

The following example sets the T309 timer to 60,000 ms (60 seconds) for serial interface 0:24:

```
interface serial 0:24
 isdn timer t309 60000
```

The following example sets the T321 timer expiration to 0 ms so that it will never expire for serial interface 0:24:

```
interface serial 0:24
 isdn timer t321 0
```

Related Commands

Command	Description
isdn protocol-emulate	Configures the PRI interface to serve as either the primary slave (user) or the primary master (network).
isdn switch-type primary-net5	Specifies the central office switch type on the ISDN interface as NET5.
isdn t-activate	Specifies how long the gateway waits for a response from the PSTN after sending a MCID request.
isdn t306	Changes the value of the T306 timer to disconnect a call after the router sends a disconnect message.
isdn t310	Changes the value of the T310 timer for call proceeding messages.
isdn timer t309	Changes the value of the T309 timer to clear the network connection and to release the B channel and call reference when a data-link disconnection has occurred.
isdn timer t321	Changes the value of the T321 timer for D-channel switchover when the primary D channel fails.

isdn timer t309

Note Effective with Cisco IOS Release 12.4(11)T, the **isdn timer t309** command is replaced by the **isdn timer** command. See the **isdn timer** command for more information.

To change the value of the T309 timer to clear the network connection and to release the B channel and call reference when a data-link disconnection has occurred, use the **isdn timer t309** command in interface configuration mode. To restore the default value, use the **no** form of this command.

isdn timer t309 *milliseconds*

no isdn timer t309

Syntax Description

milliseconds	Number of milliseconds (ms) that the router waits before clearing the network connection, and releasing the B channel and call reference. Values are from 0 to 86,400,000 ms (0 to 86,400 seconds).

Command Default

90,000 ms (90 seconds)

Command Modes

Interface configuration

Command History

Release	Modification
12.2	This command was introduced.
12.4(11)T	This command was replaced by the **isdn timer** command.

Usage Guidelines

When a data link layer malfunction occurs, calls that are not in the active state are cleared. For calls that are not in the active state, the T309 timer is started. The timer is stopped when the data link is reconnected. If the T309 timer expires prior to the reestablishment of the data link, the network clears the connection and call to the remote user, sending a disconnect cause of 27 to indicate that the call destination is out of order. The network releases and disconnects the B channel, and releases the call reference, entering the Null state. The T309 timer is mandatory for routers that are configured as an ISDN network-side switch and by default the timer is set to expire after 90,000 ms (90 seconds). The implementation of the T309 timer is optional for the user side of the network. The **isdn timer t309** command is used for changing the value of the T309 timer.

Note Setting the timer to 0 causes the timer expiry to become infinite so the wait period never expires.

Examples

The following example sets the T309 timers to 60,000 ms (60 seconds) for serial interface 0:24:

```
interface serial 0:24
 isdn timer t309 60000
```

Related Commands

Command	Description
isdn t306	Changes the value of the T306 timer to disconnect a call after the router sends a disconnect message.
isdn t310	Changes the value of the T310 timer for call proceeding messages.
isdn timer t321	Changes the value of the T321 timer for D-channel switchover when the primary D channel fails.

isdn timer t321

Note Effective with Cisco IOS Release 12.4(11)T, the **isdn timer t321**command is replaced by the **isdn timer** command. See the **isdn timer** command for more information.

To change the value of the timer for D-channel switchover when the primary D channel fails, use the **isdn timer t321** command in interface configuration mode. To restore the default value, use the **no** form of this command.

isdn timer t321 *milliseconds*

no isdn timer t321

Syntax Description

milliseconds	Number of milliseconds (ms) that the router waits before sending a DL-ESTABLISH request on both D channels to request a switchover. Values are from 0 to 86,400,000.

Command Default

The default wait period is 30,000 ms.

Command Modes

Interface configuration

Command History

Release	Modification
12.2	This command was introduced.
12.4(11)T	This command was replaced by the **isdn timer** command.

Usage Guidelines

The T321 timer must be set when you use the D-channel backup procedure involving D-channel switchover. The **isdn timer t321** command is used for changing the value of the T321 timer.

Note Setting the timer to 0 causes the timer expiry to become infinite so that the wait period never expires.

Examples

The following example sets the T321 timers to 25 ms for serial interface 0:23:

```
interface serial 0:23
 isdn timer t321 25
```

Related Commands

Command	Description
isdn t306	Changes the value of the T306 timer to disconnect a call after the router sends a disconnect message.
isdn timer t309	Changes the value of the T309 timer to clear the network connection, and to release the B channel and call reference when a data-link disconnection has occurred.
isdn t310	Changes the value of the T310 timer for call proceeding messages.

isdn transfer-code

To activate call transferring, use the **isdn transfer-code** command in interface configuration mode. To disable call transferring, use the **no** form of this command.

isdn transfer-code *code*

no isdn transfer-code

Syntax Description

code	Number from 0 to 999 (ISDN transfer code).

Command Default

The default code is 61.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(3)T	This command was introduced.

Usage Guidelines

Use this command if your ISDN line is connected to a NI1 or a Nortel DMS-100 Custom switch. Your telephone service provider should issue an ISDN transfer code when you order call transferring.

Examples

The following example specifies 62 as the ISDN transfer code:

```
isdn transfer-code 62
```

isdn transparent

To configure an ISDN interface to pass specified cause-code values transparently from VoIP to PSTN on the terminating gateway without mapping the values, use the **isdn transparent** command in interface configuration mode. To disable the transparent handling of specified cause codes, use the **no** form of this command.

isdn transparent cause-value *cause-value*

no isdn transparent cause-value *cause-value*

Syntax Description

cause-value	Sends a cause-code value number (submitted as an integer in the range of 1 through 127) to the switch. You can include up to 16 cause-code values in each command.

Command Default

When the **isdn transparent** command is not enabled, all ISDN cause-code values are mapped according to the configuration when they are passed from VoIP to PSTN on the terminating gateway.

Command Modes

Interface configuration

Command History

Release	Modification
12.2(15)T9	This command was introduced.
12.3(7)XI	This command was integrated into this release.
12.3(8)T	This command was integrated into this release.
12.3(8)	This command was integrated into this release.

Usage Guidelines

This command must be enabled under the serial D-channel to pass specified cause-code values transparently. The command syntax allows you to configure up to 16 cause-code values to be passed transparently at the terminating gateway.

Examples

The following example shows how to configure the serial D-channel interface 7/7:23 to pass ISDN cause codes 4, 42, and 95 transparently at the terminating gateway:

```
Router# configure terminal
Router(config)# interface serial7/7:23
Router(config-if)# isdn transparent cause-value 4 42 95
Router(config-if)# end
```

Related Commands

Command	Description
interface serial	Specifies a serial interface created on a channelized E1 or channelized T1 controller (for ISDN PRI, CAS, or robbed-bit signaling).

isdn twait-disable

To delay a National ISDN BRI switch a random time before activating the Layer 2 interface when the switch starts up, use the **isdn twait-disable** command in interface configuration mode. To remove the delay, use the **no** form of this command.

isdn twait-disable

no isdn twait-disable

Syntax Description

This command has no arguments or keywords.

Command Default

This command is enabled by default.

Command Modes

Interface configuration

Command History

Release	Modification
11.3	This command was introduced.

Usage Guidelines

The random-length delay set by this command prevents mass power failures from causing the network ISDN switches to be overwhelmed when power returns and all the devices startup at the same time.

The random delay is in the range 1 to 300 seconds.

Examples

The following example configures a random wait period after a power failure:

```
isdn twait-disable
```

isdn v110 only

To selectively accept incoming V.110 calls based on data bit, parity, and stop bit modem communication settings, use the **isdn v110 only** command in interface configuration mode. To change or disable the expected incoming V.110 modem call configuration, use the **no** form of this command.

isdn v110 only [**databits** {**5** | **7** | **8**}] [**parity** {**even** | **mark** | **none** | **odd** | **space**}] [**stopbits** {**1** | **1.5** | **2**}]

no isdn v110 only

Syntax Description

databits {**5** | **7** | **8**}	(Optional) Allowed data bits, as follows: • **5**—Allow 5 data bits only. • **7**—Allow 7 data bits only. • **8**—Allow 8 data bits only.
parity {**even** | **mark** | **none** | **odd** | **space**}	(Optional) Allowed parity, as follows: • **even**—Allow even parity only. • **mark**—Allow mark parity only. • **none**—Allow no parity only. • **odd**—Allow odd parity only. • **space**—Allow space parity only.
stopbits {**1** | **1.5** | **2**}	(Optional) Allowed stop bits, as follows: • **1**—Allow 1 stop bit only. • **1.5**—Allow 1.5 stop bits only. • **2**—Allow 2 stop bits only.

Command Default

No default behavior or values.

Command Modes

Interface configuration

Command History

Release	Modification
12.1(4)T	This command was introduced.

Usage Guidelines

The **isdn v110 only** command provides a way to screen incoming V.110 modem calls and reject any calls that do not have the communication settings configured as the network expects them to be.

Examples

The following example filters out all V.110 modem calls except those with communication settings of 8 data bits, no parity bit, and 1 stop bit:

```
interface serial 0:23
  isdn v110 only databits 8 parity none stopbits 1
```

isdn v110 padding

To enable the padded V.110 modem speed report required by the V.110 modem standard, use the **isdn v110 padding** command in interface configuration mode. To disable the padded V.110 modem speed report, use the **no** form of this command.

isdn v110 padding

no isdn v110 padding

Syntax Description

This command has no arguments or keywords.

Command Default

V.110 modem speed padding is enabled.

Command Modes

Interface configuration

Command History

Release	Modification
12.2(8)T	This command was introduced.

Usage Guidelines

The **no isdn v110 padding** command is useful for networks with devices such as terminal adapters (TAs) and global system for mobile communication (GSM) handsets that do not fully conform to the V.110 modem standard. The V.110 modem standard specifies that the incoming asynchronous data must be padded by adding stop elements to fit the nearest channel rate. For example, a 14400 bits per second (bps) user data signaling rate is adapted to a synchronous 19200-bps stream rate. The software reports the adapted rate (19200 bps) to the modem for an incoming V.110 call. However, for those devices that do not fully conform to the V.110 supplications, the software must report the speed as 14400 instead of 19200 to the modem for a successful connection. By setting the modem interface to **no isdn v110 padding**, padding is disabled and the actual bit rate can be reported to the modem.

Examples

The following example shows how to disable V.110 asynchronous-to-synchronous padding:

```
!
 interface Serial0:23
  no ip address
  isdn switch-type primary-ni
  isdn bchan-number-order ascending
  no isdn v110 padding
  no cdp enable
```

isdn voice-priority

To control the priority of data and voice calls for the telephones, fax machines, and modems connected to the router telephone ports, use the **isdn voice-priority** command in interface configuration mode. To disable a specified ISDN voice priority setting and to use the default setting, use the **no** form of this command.

isdn voice-priority *local-directory-number* {**in** | **out**} {**always** | **conditional** | **off**}

no isdn voice-priority *local-directory-number*

Syntax Description

local-directory-number	Local ISDN directory number assigned by your telephone service provider.
in	Incoming voice call.
out	Outgoing voice call.
always	Always bump a data call for a voice call.
conditional	Bump a data call only if there is more than one call to the same destination.
off	Never bump a data call for a voice call.

Command Default

A data call is never bumped for an incoming or outgoing voice call.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(3)T	This command was introduced.

Usage Guidelines

If an ISDN circuit endpoint is busy with a data call or calls and either a voice call comes in (incoming) or you attempt to place a voice call (outgoing), the data call is handled according to the setting of **isdn voice-priority** command.

If you are in North America and have multiple ISDN directory numbers associated with a SPID, the outgoing voice priority that you set for any of these directory numbers applies to the other directory numbers. For example, if you enter the following commands, the outgoing voice priority for all directory numbers specified in the **isdn spid1** command is set to conditional:

```
isdn spid1 0 4085550111 4085550122 4085550133
isdn voice-priority 5550111 out conditional
```

The setting of the **pots dialing-method** command affects when you hear a busy signal in the following situation:

- A data call cannot be bumped.
- You are trying to make an outgoing call.

If the setting is **overlap**, you hear a busy signal when you pick up the handset. If the setting is **enblock**, you initially hear a dial tone and then a busy signal.

Examples

The following example specifies that a data call for the specified ISDN directory number never be bumped for an incoming or an outgoing voice call:

```
isdn voice-priority 5550111 in off
isdn voice-priority 5550111 out off
```

Related Commands

Command	Description
isdn spid1, isdn spid2	Defines the SPID number that has been assigned by the ISDN service provider for the B1 channel.
pots dialing-method	Specifies how the Cisco 800 series router collects and sends digits dialed on your connected telephones, fax machines, or modems.

isdn x25 dchannel

To create a configurable interface for X.25 traffic over the ISDN D channel, use the **isdn x25 dchannel** command in interface configuration mode. To remove the interface, use the **no** form of this command.

isdn x25 dchannel [**q931-broadcast**]

no isdn x25 dchannel [**q931-broadcast**]

Syntax Description

q931-broadcast	(Optional) Enables a gateway to share the same terminal endpoint identifier (TEI) for sending X.25 Set Asynchronous Balanced Mode Extended (SABME) and ITU Q.931 packet mode responses.

Command Default

Command is disabled

Command Modes

Interface configuration

Command History

Release	Modification
11.2F	This command was introduced.
12.4(6)T	This command was enhanced with the optional **q931-broadcast** keyword to enable the ITU Q.931 service access point identifier (SAPI) value 16 procedures for call setup that accepts X.25 calls on the BRI D channel on Japanese and some European telephone switches that require that procedure.

Usage Guidelines

This command creates a new, configurable interface, which can be specified as **interface bri***x***:0** in commands, where *x* is the original BRI interface number. For example, on a Cisco 4500 router with an MBRI, if the **isdn x25 dchannel** command is configured on interface BRI 5, the new interface is bri5:0 and can be used for configuring the other parameters for X.25 over the D channel. These parameters include the addresses and the map statements. To display the new interface, use the **more system:running-config** command.

The optional **q931-broadcast** keyword is supported only on the ISDN BRI interface user side. Although regular X.25 and ISDN configuration commands may be sufficient to enable this feature, the Japanese NTT ISDN switch types expect the same TEI to be shared. By default, Cisco gateways will try to use two different TEIs and expect the switch to establish an X.25 link on the TEI that responds. The Japanese NTT switch does not follow this procedure and expects the Cisco router to share the same TEI. Cisco recommends that deployments interworking with the Japanese NTT switch type use the optional **q931-broadcast** keyword to enable sharing of the TEI and avoid interworking incompatibilities. The optional **q931-broadcast** keyword can also be used in configurations for other switch types such as the European NET3 that require sharing of the TEIs.

You can verify the X.25 call accept procedure using the **debug isdn events**, **debug isdn** command with the optional **mgmnt** keyword, and **debug isdn q931** EXEC commands.

Examples

The following example creates BRI interface 0 and configures it for X.25 over the ISDN D channel. This example uses dynamic TEIs, not a static TEI.

```
interface bri1
 isdn x25 dchannel
interface bri1:0
 ip address 10.1.1.2 255.255.255.0
 x25 address 31107000000100
 x25 htc 1
 x25 suppress-calling-address
 x25 facility windowsize 2 2
 x25 facility packetsize 256 256
 x25 facility throughput 9600 9600
 x25 map ip 10.1.1.3 31107000000200
 x25 map ip 10.1.1.4 31107000000800
```

The following is a typical configuration that enables SAPI 0 procedures that accept X.25 calls on the ISDN D channel, on ISDN BRI interface 0:

```
isdn switch-type basic-ntt
x25 routing
!
interface BRI0
 no ip address
 no ip directed-broadcast
 dialer load-threshold 1 either
 isdn switch-type basic-net3
 isdn x25 dchannel q931-broadcast
!
interface BRI0:0
 ip address 192.168.1.1 255.255.255.252
 no ip directed-broadcast
 no ip mroute-cache
 x25 address 12503372501
 x25 htc 2
 x25 map ip 192.168.1.2 2231146
!
```

Related Commands

Command	Description
debug isdn	Displays messages about what is occurring in the structure and operation of ISDN in the Cisco IOS software.
debug isdn events	Displays ISDN events occurring on the user (router) side of the ISDN interface.
debug isdn q931	Displays information about call setup and teardown of ISDN Layer 3 network connection between the user (router) side and the network side.
interface bri	Configures a BRI interface and enters interface configuration mode.
isdn switch-type	Specifies the central office switch type on the ISDN interface.

isdn x25 static-tei

To configure a static ISDN Layer 2 terminal endpoint identifier (TEI) for X.25 over the ISDN D channel, use the **isdn x25 static-tei** command in interface configuration mode. Use the **no** form of this command if dynamic TEIs will be used on the interface that is to carry X.25 traffic over the D channel.

isdn x25 static-tei *tei-number*

no isdn x25 static-tei *tei-number*

Syntax Description

tei-number	Terminal endpoint identifier, in the range from 0 to 63.

Command Default

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
11.2F	This command was introduced.

Usage Guidelines

This command applies to ISDN BRI interfaces only. Only one static TEI is allowed per BRI interface. If a second static TEI is configured, the first static TEI is overwritten.

Some switches require a static TEI be used for X.25 over the ISDN D channel.

When the **isdn x25 dchannel** command is invoked without the **isdn x25 static-tei** command, a dynamic TEI is chosen.

Examples

The following example creates static TEI 8 on the X.25-over-ISDN-D channel:

```
interface bri0
 isdn x25 dchannel
 isdn x25 static-tei 8
```

Because the **isdn x25 static-tei** command is missing, the following example configuration sets dynamic TEIs for the ISDN channel:

```
interface bri0
 isdn x25 dchannel
```

Related Commands

Command	Description
interface bri	Configures a BRI interface and enters interface configuration mode.
isdn x25 dchannel	Creates a configurable interface for X.25 traffic over the ISDN D channel.

lte failovertimer

To specify the failover timeout value before a switch-over occurs from the primary SIM to the secondary SIM, use the **lte failovertimer** command in cellular controller configuration mode. To return to the default value, use the **no** form of this command.

lte failovertimer *timeout-period*

no lte failovertimer *timeout-period*

Syntax Description

timeout-period	Specifies the failover timeout value between 1 and 7 minutes.

Defaults

By default, the failover time period is 2 minutes.

Command Modes

Cellular controller configuration mode (config-controller)

Command History

Release	Modification
Cisco IOS Release 15.3(3)M	This command was introduced.

Usage Guidelines

If the active SIM loses network connectivity, the active SIM waits for the configured failover time period before it starts the switch-over process to the secondary SIM.

Examples

The following example shows that the failover time period has been configured for 6 minutes:

```
Device(config-controller)# lte failovertimer 6
```

Related Commands

Command	Description
cellular lte profile	Creates, modifies, or deletes a modem data profile.
lte sim authenticate	Configures an encrypted or unencrypted PIN used to activate the CHV1 code that authenticates a modem.
lte sim max-retry	Specifies the maximum number of failover retries.
lte sim primary	Specifies the slot number for the primary SIM.
lte sim profile	Applies the configured profile number to a SIM.
lte sim profile 3gpp 3gpp2	Applies the configured 3GPP and 3GPP2 profile numbers to a SIM.

lte gps mode standalone

To enable standalone GPS mode, use the **lte gps mode standalone** command in controller cellular configuration mode.

lte gps mode standalone

Syntax Description This command has no arguments or keywords.

Defaults None.

Command Modes Controller cellular configuration mode (config-controller)#

Command History

Release	Modification
Cisco IOS Release 15.3(3)M	This command was introduced.

Usage Guidelines GPS standalone mode (satellite-based GPS) is supported on the EHWIC-4G-LTE-V, EHWIC-4G-LTE-A, and EHWIC-4G-LTE-G4G modem SKUs and the Cisco 819HG-4G and Cisco 819G-4G LTE ISRs. Once standalone GPS mode is entered, National Marine Electronics Association (NMEA) interface streaming options can be configured with the **lte gps nmea** command.

Examples The following example shows how to enable standalone GPS mode and configure NMEA streaming over an IP interface:

```
Device(config-controller)# gsm gps mode standalone
Device(config-controller)# gsm gps nmea ip
```

Related Commands

Command	Description
cellular lte sms view summary	Displays the message contents of incoming texts received by a modem.
debug cellular messages nmea	Debug GPS and NMEA management messages.
lte gps nmea	Enables NMEA streaming.
show cellular gps	Displays a summary of GPS data.

lte gps nmea

To enable National Marine Electronics Association (NMEA) streaming, use the **lte gps nmea** command in controller cellular configuration mode. To disable NMEA streaming, use the **no** form of this command.

For the Cisco 819 ISR, the following command syntax is supported:

lte gps nmea {**ip** | **serial**}

For the 4G EHWIC, the following command syntax is supported:

lte gps nmea

no lte gps nmea

Syntax Description

ip	Specifies NMEA over an IP interface on the Cisco 819 ISR.
serial	Specifies NMEA over an asynchronous serial interface on the Cisco 819 ISR.

Defaults

None.

Command Modes

Controller cellular configuration mode (config-controller)#

Command History

Release	Modification
Cisco IOS Release 15.3(3)M	This command was introduced.

Usage Guidelines

GPS standalone mode (satellite-based GPS) is supported on the EHWIC-4G-LTE-V, EHWIC-4G-LTE-A, and EHWIC-4G-LTE-G4G modem SKUs and the Cisco 819HG-4G and Cisco 819G-4G LTE ISRs. Once standalone GPS mode is entered, NMEA streaming options can be configured with the **lte gps nmea** command.

Note IP NMEA streaming is supported only on the EHWIC platforms. Both IP and Serial NMEA streaming is supported on the Cisco 819 ISRs.

Examples

The following example shows how to enable standalone GPS mode and configure NMEA streaming over an IP interface on the Cisco 819 ISR:

```
Device(config-controller)# gsm gps mode standalone
Device(config-controller)# gsm gps nmea serial
```

Related Commands

Command	Description
cellular lte sms view summary	Displays the message contents of incoming texts received by a modem.
debug cellular messages nmea	Debug GPS and NMEA management messages.
lte gps mode standalone	Enables standalone GPS mode.
show cellular gps	Displays a summary of GPS data.

lte sim authenticate

To configure an encrypted or unencrypted Personal Identification Number (PIN) used to activate the Card Holder Verification (CHV1) code that authenticates a modem, use the **lte sim authenticate** command in cellular controller configuration mode. To remove the PIN, use the **no** form of this command.

lte sim authenticate [**0** | **7**] *pin*

no lte sim authenticate [**0** | **7**] *pin*

Syntax Description

0	Specifies that the following PIN is not encrypted (clear text).
7	Specifies that the following PIN is encrypted.
pin	Specifies a PIN. **Note** The PIN must be four to eight digits if it is encrypted.

Defaults

SIM authentication is not enabled.

Command Modes

Cellular controller configuration (config-controller)

Command History

Release	Modification
Cisco IOS Release 15.3(3)M	This command was introduced.

Usage Guidelines

The configured encrypted or unencrypted PIN is sent to the modem for authentication with each subsequent LTE connection. If authentication passes based on the configured PIN, the data call is allowed. If authentication fails, the modem does not initiate the data call.

Examples

The following example shows the configuration of an encrypted PIN. The username and password is created by configuring password encryption, defining the username and associated password, copying the resulting scrambled password, and using this scrambled password in the SIM authentication command.

Note After the scrambled PIN is obtained and used in SIM authentication, the username created can optionally be deleted from the Cisco IOS configuration.

```
Device# configure terminal
Device(config)# service password-encryption
Device(config)# username SIM privilege 0 password 1111
Device(config)# do show run | i SIM
Device(config)# controller cellular 0/0
Device(config-controller)# lte sim authenticate 7 055A575E70
```

```
Device(config-controller)# exit
Device(config)# no username SIM
Device(config)# no service password-encryption
```

Related Commands

Command	Description
cellular lte profile	Creates, modifies, or deletes a modem data profile.
lte failovertimer	Specifies the failover timeout value before a switch-over occurs from the primary SIM to the secondary SIM.
lte sim max-retry	Specifies the maximum number of failover retries.
lte sim primary	Specifies the slot number for the primary SIM.
lte sim profile	Applies the configured profile number to a SIM card.
lte sim profile 3gpp 3gpp2	Applies the configured 3GPP and 3GPP2 profile numbers to a SIM card.

lte sim max-retry

To specify the maximum number of failover retries, use the **lte sim max-retry** command in controller configuration mode. To return to the default value, use the **no** form of this command.

lte sim max-retry *number*

no lte sim max-retry *argument*

Syntax Description

number	Specifies the maximum number of failover retries from 1 to 65535.

Defaults

Ten failover retries.

Command Modes

Controller configuration (config-controller)

Command History

Release	Modification
Cisco IOS Release 15.3(3)M	This command was introduced.

Usage Guidelines

The **lte sim max-retry** command is used in a Dual SIM configuration and functions if a failover situation persists on Cisco 819HG-4G and Cisco 819G-4G LTE ISRs that support 4G LTE cellular and 3G cellular networks.

Examples

The following example configures the ISR for 20 retries:

```
Device(config-controller)# lte sim max-retry 20
```

Related Commands

Command	Description
cellular lte profile	Creates, modifies, or deletes a modem data profile.
lte failovertimer	Specifies the failover timeout value before a switch-over occurs from the primary SIM to the secondary SIM.
lte sim authenticate	Configures an encrypted or unencrypted PIN used to activate the CHV1 code that authenticates a modem.
lte sim primary	Specifies the slot number for the primary SIM.
lte sim profile	Applies the configured profile number to a SIM.
lte sim profile 3gpp 3gpp2	Applies the configured 3GPP and 3GPP2 profile numbers to a SIM.

lte sim primary

To specify the slot number for the primary SIM, use the **lte sim primary** command in controller configuration mode. To return to the default value, use the **no** form of this command.

lte sim primary *slot*

no lte sim primary *slot*

Syntax Description

slot	Specifies the slot number (0 or 1) for the primary SIM.

Defaults

The default slot number is zero.

Command Modes

Controller configuration (config-controller)

Command History

Release	Modification
Cisco IOS Release 15.3(3)M	This command was introduced.

Usage Guidelines

The **lte sim primary** command is used with the Dual SIM, auto-switch and failover functions on Cisco 819HG-4G and Cisco 819G-4G LTE ISRs that support 4G LTE cellular and 3G cellular networks. This feature is enabled by default with SIM slot 0 being the primary slot and slot 1 being the secondary (failover) slot.

Examples

The following example specifies slot 1 for the primary SIM:

```
Device(config)# controller cellular 1/0
Device(config-controller)# lte sim primary 1
```

Related Commands

Command	Description
cellular lte profile	Creates, modifies, or deletes a modem data profile.
lte failovertimer	Specifies the failover timeout value before a switch-over occurs from the primary SIM to the secondary SIM.
lte sim authenticate	Configures an encrypted or unencrypted PIN used to activate the CHV1 code that authenticates a modem.
lte sim max-retry	Specifies the maximum number of failover retries.

Command	Description
lte sim profile	Applies the configured profile number to a Subscriber Identity Module (SIM) card.
lte sim profile 3gpp 3gpp2	Applies the configured 3GPP and 3GPP2 profile numbers to a SIM card.

lte sim profile

To apply the configured profile number to a Subscriber Identity Module (SIM) card, use the **lte sim profile** command in cellular controller configuration mode. To remove the profile number, use the **no** form of this command.

lte sim profile *number* [**ims** *number* **slot** {**0** | **1**}]

no lte sim profile *number* [**ims** *number* **slot** {**0** | **1**}]

Syntax Description

number	The configured profile number to the SIM.
ims *number*	The IP Multimedia Subsystem (IMS) profile number used to establish a session.
slot {**0** | **1**}	The primary or secondary SIM slot number.

Defaults

None.

Command Modes

Controller configuration (config-controller)

Command History

Release	Modification
Cisco IOS Release 15.3(3)M	This command was introduced.

Usage Guidelines

This command with the **ims** keyword and *number* argument is required if dual SIMs are used. An IMS profile number is configured for each SIM from 1 to 6 if you have a MC7750 modem, and 1 to 16 if you have a MC7710 or MC7700 modem.

IMS profiles are used to establish a session, and are part of the modem configuration that is stored in the modem's NVRAM. An IMS network is access-independent and standard-based IP connectivity service that enables different types of multimedia services to end-users using common Internet-based protocols.

Examples

The following example applies the configured profile 2 and IMS profile number 4 to the primary and secondary SIM slots:

```
Device# cellular 0/0/0 lte profile create 2 apn.com ipv4
Device# configure terminal
Device(config)# controller cellular 0/0
Device#(config-controller)# lte sim profile 2 ims 4 slot 0
Device#(config-controller)# lte sim profile 2 ims 4 slot 1
```

Related Commands

Command	Description
cellular lte profile	Creates, modifies, or deletes a modem data profile.
lte failovertimer	Specifies the failover timeout value before a switch-over occurs from the primary SIM to the secondary SIM.
lte sim authenticate	Configures an encrypted or unencrypted PIN used to activate the CHV1 code that authenticates a modem.
lte sim max-retry	Specifies the maximum number of failover retries.
lte sim primary	Specifies the slot number for the primary SIM.
lte sim profile 3gpp 3gpp2	Applies the configured 3GPP and 3GPP2 profile numbers to a SIM card.

lte sim profile 3gpp 3gpp2

To apply the configured 3rd Generation Partnership Project (3GPP) and 3GPP2 profile numbers to a Subscriber Identity Module (SIM) card, use the **lte sim profile 3gpp 3gpp2** command in cellular controller configuration mode. To remove the profile number, use the **no** form of this command.

lte sim profile 3gpp *number* **3gpp2** *number* **slot** {**0** | **1**}

no lte sim profile 3gpp *number* **3gpp2** *number* **slot** {**0** | **1**}

Syntax Description

number	The configured profile number to the SIM.
3gpp *number*	The 3GPP profile number used to establish a session.
3gpp2 *number*	The 3GPP2 profile number used to establish a session.
slot {**0** | **1**}	The primary or secondary SIM slot number.

Defaults

None.

Command Modes

Controller configuration (config-controller)

Command History

Release	Modification
Cisco IOS Release 15.3(3)M	This command was introduced.

Usage Guidelines

This step is required if dual SIMs are used with the 3rd Generation Partnership Project (3GPP) and 3GPP2 authentication technologies. The profile numbers for 3GPP and 3GPP2 are applied to the primary and secondary SIM slot in a dual SIM configuration.

For the MC7750 modem, a maximum of 16 profiles can be supported in 3GPP technology mode (for example, LTE). However, in 3GPP2 technology mode (for example EVDO), the modem is only capable of supporting a maximum of 6 profiles.

Examples

The following example applies the configured 3GPP profile 2 and 3GPP2 profile number 4 to the primary and secondary SIM slots:

```
Device# cellular 0/0/0 lte profile create 2 apn.com ipv4
Device# configure terminal
Device(config)# controller cellular 0/0
Device#(config-controller)# lte sim profile 3gpp 2 3gpp2 4 slot 0
Device#(config-controller)# lte sim profile 3gpp 2 3gpp2 4 slot 1
```

Related Commands

Command	Description
cellular lte profile	Creates, modifies, or deletes a modem data profile.
lte failovertimer	Specifies the failover timeout value before a switch-over occurs from the primary SIM to the secondary SIM.
lte sim authenticate	Configures an encrypted or unencrypted PIN used to activate the CHV1 code that authenticates a modem.
lte sim max-retry	Specifies the maximum number of failover retries.
lte sim primary	Specifies the slot number for the primary SIM.
lte sim profile	Applies the configured profile number to a SIM.

lte sms archive

To specify an FTP server folder path to send all incoming and outgoing SMS messages, use the **lte sms archive** command in global configuration mode. To remove the FTP server folder path, use the **no** form of this command.

lte sms archive *FTP-URL*

no lte sms archive *FTP-URL*

Syntax Description

FTP-URL	FTP server folder path.

Defaults

None.

Command Modes

Global configuration (config)

Command History

Release	Modification
Cisco IOS Release 15.3(3)M	This command was introduced.

Usage Guidelines

Once the folder path is identified, it is appended automatically with an outbox and inbox folder for the path to which SMS messages are sent and received. For example:

```
ftp://172.25.211.175/SMS-LTE/outbox
ftp://172.25.211.175/SMS-LTE/inbox
```

Examples

The following example shows the configuration of the SMS FTP server folder path and success messages for the automatic setup of an outbox and inbox for SMS messages:

```
Device(config)# lte sms archive ftp://172.25.211.175/SMS-LTE
*Jun 30 22:39:15.947: %CELLWAN-5-SMS_OUTBOX_ARCH_DONE:Cellular 0/1/0 archived an outgoing
SMS to FTP server successfully
*Jun 30 22:39:15.947: %CELLWAN-5-OUTGOING_SMS_SENT: Cellular 0/1/0 sent an outgoing SMS
successfully.
Writing outbox !
```

Related Commands

Command	Description
cellular lte sms delete	Deletes one or all message IDs from memory.
cellular lte sms send	Enables a user to send a 4G LTE band SMS message to other valid recipients.
cellular lte sms view summary	Displays the message contents of incoming texts received by a modem.
debug cellular messages sms	Debug SMS data path errors received on the modem.
show cellular sms	Displays all information from SMS text messages that are sent and received on the modem.

l2tp tunnel retransmit initial retries

To configure the number of times that the router will attempt to send out the initial Layer 2 Tunnel Protocol (L2TP) control packet for tunnel establishment before considering a peer busy, use the **l2tp tunnel retransmit initial retries** command in VPDN group or VPDN template configuration mode. To restore the default value, use the **no** form of this command.

l2tp tunnel retransmit initial retries *number*

no l2tp tunnel retransmit initial retries

Syntax Description

number	Number of retransmission attempts. Valid values range from 1 to 1000. The default value is 2.

Command Default

The router will resend the initial L2TP control packet twice.

Command Modes

VPDN group configuration
VPDN template configuration

Command History

Release	Modification
12.2(4)T	This command was introduced.
12.2(11)T	This command was implemented on the Cisco 1760, Cisco AS5300, Cisco AS5400, and Cisco AS5800 platforms.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.

Usage Guidelines

Use the **l2tp tunnel retransmist initial retries** command to configure the number of times a device will attempt to resend the initial control packet used to establish an L2TP tunnel.

Examples

The following example configures the router to attempt to send the initial L2TP control packet five times for tunnels associated with the virtual private dialup network (VPDN) group named group1:

```
vpdn-group group1
 l2tp tunnel retransmit initial retries 5
```

Related Commands

Command	Description
l2tp tunnel busy timeout	Configures the amount of time that the router will wait before attempting to recontact a router that was previously busy.
l2tp tunnel retransmit initial timeout	Configures the amount of time that the router will wait before resending an initial L2TP control packet out to establish a tunnel.
l2tp tunnel retransmit retries	Configures the number of retransmission attempts made for a L2TP control packet.

Command	Description
l2tp tunnel retransmit timeout	Configures the amount of time that the router will wait before resending an L2TP control packet.
vpdn-group	Creates a VPDN group and enters VPDN group configuration mode.
vpdn-template	Creates a VPDN template and enters VPDN template configuration mode.

limit base-size

To define the base number of simultaneous connections that can be done in a single customer or virtual private dialup network (VPDN) profile, use the **limit base-size** command in customer profile configuration or VPDN profile configuration mode. To remove the limitation, use the **no** form of this command.

limit base-size {*base-number* | **all**}

no limit base-size {*base-number* | **all**}

Syntax Description

base-number	Maximum number of simultaneous connections or sessions that can be used in a specified customer or VPDN profile, in the range from 0 to 1000.
all	Accept all calls (default). Use this keyword if you do not want to limit or apply overflow session counting to a customer or VPDN profile.

Command Default

The base size is set to **all**.

Command Modes

Customer profile configuration
VPDN profile configuration

Command History

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

Usage Guidelines

Use the **limit base-size** command to define the base number of simultaneous connections in a single customer or VPDN profile. The session limit applies to all the physical resource groups and pools configured in a single customer profile. If you want to define the number of overflow calls granted to a customer profile by using the **limit overflow-size** command, do *not* use the **all** keyword in the **limit base-size** command; instead, specify a base number.

Examples

The following example shows the total number of simultaneous connections limited to a base size of 48:

```
resource-pool profile customer customer1_isp
 limit base-size 48
```

Related Commands

Command	Description
limit overflow-size	Defines the number of overflow calls granted to one customer or VPDN profile.
resource-pool profile customer	Creates a customer profile.

limit overflow-size

To define the number of overflow calls granted to one customer or virtual private dialup network (VPDN) profile, use the **limit overflow-size** command in customer profile configuration or VPDN profile configuration mode. To remove the overflow configuration, use the **no** form of this command.

limit overflow-size {*overflow-calls* | **all**}

no limit overflow-size {*overflow-calls* | **all**}

Syntax Description

overflow-calls	Number of overflow calls to grant, in the range from 0 to 1000. Default is 0.
all	Accept all overflow calls.

Command Default

The overflow size is set to 0.

Command Modes

Customer profile configuration
VPDN profile configuration

Command History

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

Usage Guidelines

Use the **limit overflow-size** customer or VPDN profile configuration command to define the number of overflow calls granted to one customer or VPDN profile. The overflow is not applied if the **limit base-size** command is set using the **all** keyword.

Examples

The following example shows 20 overflow calls granted to the customer profile called customer1_isp:

```
resource-pool profile customer customer1_isp
 limit overflow-size 20
```

Related Commands

Command	Description
limit base-size	Defines the base number of simultaneous connections that can be done in a single customer or VPDN profile.
resource-pool profile customer	Creates a customer profile.

line-power

To configure an ISDN BRI port to supply line power to the terminal equipment (TE), use the **line-power** command in interface configuration mode. To disable the line power supply, use the **no** form of this command.

line-power

no line-power

Syntax Description This command has no arguments or keywords.

Command Default The BRI port does not supply line power.

Command Modes Interface configuration

Command History

Release	Modification
12.0(3)XG	This command was introduced on the Cisco MC3810 access concentrator.
12.0(4)T	This command was integrated into Cisco IOS Release 12.0(4)T.
12.1(3)XI	This command was implemented on the Cisco 2600 and Cisco 3600 series.

Usage Guidelines This command is supported only if an installed BRI voice module (BVM) or BRI VIC is equipped to supply line power (phantom power).

This command is used only on a BRI port operating in NT mode. A BRI port operating in TE mode is automatically disabled as a source of line power, and the **line-power** command is rejected.

When you use the **line-power** command, the line power provision is activated on a BRI port if the port is equipped with the hardware to supply line power. When you enter the **no line-power command**, the line power provision is deactivated on a BRI port.

Note If the BRI port is operating in NT mode, the **line-power** command will be accepted, but will have no effect if a BVM is not equipped to supply line power.

Examples The following example configures a BRI port to supply power to an attached TE device (only if the BVM is equipped to supply line power):

```
interface bri 1
 line-power
```

logging event nfas-status

To enable the production of log messages when ISDN layer 2 changes occur on NFAS D-channels. (Primary or Backup D-channels up/down, and active/alternate D-channel changes), use the **logging event nfas-status** command in interface configuration mode. To disable notification, use the no form of this command.

logging event nfas-status

no logging event nfas-status

Syntax Description

This command has no arguments or keywords.

Command Default

Disabled (does not produce reports).

Command Modes

Interface configuration

Command History

Release	Modification
12.2(13)T	This command was introduced.

Usage Guidelines

This configuration command should be entered on each ISDN serial interface.

This configuration command should be entered when the user wishes to see the NFAS D-channel status changes. Should “logging event link-status” not be configured, no indication may be provided when the NFAS D-channel status changes.

Examples

The following example shows how to enable the production of log messages when ISDN layer 2 changes occur on NFAS D-channels using the logging event nfas-status command.

```
Router(config-if)# logging event nfas-status
```

loopback (controller el)

To loop an entire E1 line (including all channel groups defined on the controller) toward the line and back toward the router or access server, use the **loopback** command in controller configuration mode. To remove the loop, use the **no** form of this command.

loopback

no loopback

Syntax Description

This command has no arguments or keywords.

Command Default

Loopback function is disabled.

Command Modes

Controller configuration

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

This command is useful for testing the DCE channel service unit/data service unit (CSU/DSU) itself.

To display interfaces currently in loopback operation, use the **show interfaces loopback** EXEC command.

Examples

The following example configures the loopback test on the E1 line:

```
controller e1 0
 loopback
```

Related Commands

Command	Description
show interfaces loopback	Displays information about the loopback interface.

loopback local (controller)

To loop an entire T1 line (including all channel groups defined on the controller) toward the line and the router or access server, use the **loopback local** command in controller configuration mode. To remove the loop, use the **no** form of this command.

loopback local

no loopback local

Syntax Description

This command has no arguments or keywords.

Command Default

Loopback function is disabled.

Command Modes

Controller configuration

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

This command is useful for testing the DCE channel service unit/data service unit (CSU/DSU) itself.

To display interfaces currently in loopback operation, use the **show interfaces loopback** EXEC command.

Examples

The following example configures the loopback test on the T1 line:

```
controller t1 0
 loopback local
```

Related Commands

Command	Description
show interfaces loopback	Displays information about the loopback interface.

loopback local (interface)

To loop a channelized T1 or channelized E1 channel group, use the **loopback local** command in interface configuration mode. To remove the loop, use the **no** form of this command.

loopback local

no loopback local

Syntax Description

This command has no arguments or keywords.

Command Default

Loopback function is disabled.

Command Modes

Interface configuration

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

This command is useful for looping a single channel group in a channelized environment without disrupting the other channel groups.

To display interfaces currently in loopback operation, use the **show interfaces loopback** EXEC command.

Examples

The following example configures the loopback test on the T1 line:

```
interface serial 1/0:22
 loopback local
```

Related Commands

Command	Description
show interfaces loopback	Displays information about the loopback interface.

loopback remote (controller)

To loop packets from a MultiChannel Interface Processor (MIP) through the channel service unit/data service unit (CSU/DSU), over a dedicated T1 link, to the remote CSU at the single destination for this T1 link and back, use the **loopback remote** command in controller configuration mode. To remove the loop, use the **no** form of this command.

loopback remote

no loopback remote

Syntax Description

This command has no arguments or keywords.

Command Default

Command is disabled.

Command Modes

Controller configuration

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

This command applies only when the device supports the remote function. It is used for testing the data communication channels.

For MIP cards, this controller configuration command applies if *only one* destination exists at the remote end of the cloud, the entire T1 line is dedicated to it, and the device at the remote end is a CSU (not a CSU/DSU). This is an uncommon case; MIPs are not usually used in this way.

To display interfaces currently in loopback operation, use the **show interfaces loopback** EXEC command.

Examples

The following example configures a remote loopback test:

```
interface serial 0
 loopback remote
```

Related Commands

Command	Description
show interfaces loopback	Displays information about the loopback interface.