

Multiple ISDN Switch Types

Feature Summary

The Multiple ISDN Switch Types feature allows you to configure more than one ISDN switch type per router. You can apply an ISDN switch type on a per interface basis, thus extending the existing global **isdn switch-type** command to the interface level. This allows Basic Rate Interfaces (BRI) and Primary Rate Interfaces (PRI) to run simultaneously on platforms that support both interface types.

The **isdn tei** command is also extended to the interface level. Terminal endpoint negotiation (TEI) determines when Layer 2 is activated (powerup or first-call).

This document does not include information about basic configuration and set up of BRI and PRI interfaces for ISDN services. Refer to the Cisco IOS Release 11.3 *Dial Solutions Configuration Guide* for information on how to configure ISDN services for these interface types.

Note ISDN switch types for BRI interfaces are modified, and a new ISDN switch type is added per the *National ISDN Switch Types for Basic Rate and Primary Rate Interfaces* feature released in Cisco IOS Release 11.3(3)T. Refer to this feature document for details about these switch types.

Benefits

Multiple ISDN Switch Types provides the following advantages:

- Allows you to use ISDN BRI and PRI simultaneously on the same Cisco platform.
- Allows you to add ISDN switch types per interface.
- Allows you to change the ISDN switch type without reloading the router.
- Allows you to use existing ISDN global configuration commands. The first time a switch type is added to an interface, the new value is read in and propagated to the interface level. If you change the global ISDN switch type after initial configuration, the new value is not propagated to the interface level.

Autoconfigure, leased line, X.25 over D-Channel, PRI NFAS, and PRI D channel backup service offerings are not affected by this feature.

List of Terms

Basic Rate Interface (BRI)—An ISDN interface composed of two B channels and one D channel for circuit-switched communication of voice, video, and data.

bearer channel (B Channel)—A channel that carries data on the ISDN interface.

Integrated Services Digital Network (ISDN)—Communication protocols offered by telephone companies that permit telephone networks to carry data, voice, and other source traffic.

Non-Facility Associated Signaling (NFAS)—An ISDN service that allows a single D channel to control multiple PRI interfaces. Use of a single D channel to control multiple PRI interfaces can free one B channel on each interface to carry other traffic.

Primary Rate Interface (PRI)—An ISDN interface to primary rate access. Primary rate access consists of a single 64-kpbs D channel plus 23 (T1) or 30 (E1) B channels.

signaling channel (D Channel)—A channel used to carry control signals on the ISDN interface.

Restrictions

The following restrictions apply to Multiple ISDN Switch Types:

- You must configure a global ISDN switch type using the existing **isdn switch-type** global configuration command before you can configure the ISDN switch type on an interface. Since global commands are processed before interface level commands, the command parser will not accept the **isdn switch-type** command on an interface unless a switch type is first added globally. Using the **isdn switch-type** global command allows for backward compatibility.
- If an ISDN switch type is configured globally, but not at the interface level, then the global switch type value is applied to all ISDN interfaces.
- If an ISDN switch type is configured globally and on an interface, then the interface level switch type supersedes the global switch type at initial configuration. For example, if the global BRI switch type defined is basic-net3, and the interface level BRI switch type is basic-ni, then the basic-ni switch type is the value applied to that BRI interface.
- The ISDN global switch type value is only propagated to the interface level on initial configuration or router reload. If you reconfigure the global ISDN switch type, the new value is not applied to subsequent interfaces. Therefore, if you require a new switch type for a specific interface, you must configure that interface with the desired ISDN switch type.
- If an ISDN global switch type is not compatible with the interface type you are using, or you change the global switch type and it is not propagated to the interface level, as a safety mechanism, the router will apply a default value to the interface level as follows:

Global Switch Type	BRI Interface	PRI Interface
basic-net3	basic-net3	primary-net5
primary-ts014	basic-ts013	primary-ts014
primary-ni	basic-ni	primary-ni

If, for example, you reconfigure the router to use global switch type basic-net3, the router will apply a primary-net5 switch type to PRI interfaces and basic-net3 to any BRI interfaces. You can override the default switch assignment by configuring a different ISDN switch type on the associated interface.

Platforms

This feature is supported on these platforms:

- Cisco 3600 series

- Cisco 4000 series
- Cisco 5200
- Cisco 5300
- Cisco 7200 series
- Cisco 7500 series

Supported MIBs and RFCs

None

Configuration Tasks

Perform the following tasks to configure Multiple ISDN Switch Types. All tasks are required except the last task to configure TEI negotiation.

- Configure a Global ISDN Switch Type
- Configure an ISDN Switch Type on the Interface
- Configure TEI Negotiation Timing on the Interface

Configure a Global ISDN Switch Type

A global ISDN switch type is required and must be configured on the router before you can configure a switch type on an interface. To configure a global ISDN switch type, perform the following task in global configuration mode:

Task	Command
Apply a global ISDN switch type.	isdn switch-type <i>switch-type</i>

You must ensure that both global and interface level ISDN switch types are valid for the ISDN interfaces on the router. Table 1 lists valid ISDN switch types for BRI and PRI interfaces.

Configure an ISDN Switch Type on the Interface

To configure the ISDN switch type on a BRI or PRI interface, perform the following task in interface configuration mode:

Task	Command
Apply the ISDN switch type to the interface.	isdn switch-type <i>switch-type</i>

Table 1 lists valid ISDN switch types for BRI and PRI interfaces.

Table 1 ISDN Switch Types for BRI and PRI Interfaces

Keyword	Switch Type
ISDN BRI	
basic-ts013	Australian TS013 switches
basic-1tr6	German 1TR6 ISDN switches
basic-net3	NET3 ISDN, Norway NET3, and New Zealand NET3 switches (covers the Euro-ISDN E-DSS1 signaling system and is ETSI-compliant)
vn3	French VN3 and VN4 ISDN BRI switches
ntt	Japanese NTT ISDN switches
basic-5ess	AT&T basic rate switches
basic-dms100	NT DMS-100 basic rate switches
basic-ni	National ISDN switches
ISDN PRI	
primary-net5	European, New Zealand and Asia ISDN PRI switches (covers the Euro-ISDN E-DSS1 signaling system and is ETSI-compliant)
primary-ntt	Japanese ISDN PRI switches
primary-4ess	AT&T 4ESS switch type for the U.S.
primary-5ess	AT&T 5ESS switch type for the U.S.
primary-dms100	NT DMS-100 switch type for the U.S.
primary-ni	AT&T National ISDN switch type
primary-ts014	Australia PRI switches

Note Changes to BRI and PRI ISDN switch types are documented in the *National ISDN Switch Types for Basic Rate and Primary Rate Interfaces* feature in Cisco IOS Release 11.3(3)T. Refer to this feature document for details about ISDN switch types for BRI and PRI interfaces.

Configure TEI Negotiation Timing on the Interface

You can configure ISDN terminal endpoint identifier (TEI) negotiation on individual ISDN interfaces. TEI negotiation is useful for switches that may deactivate Layers 1 or 2 when there are no active calls. Typically, this setting is used for ISDN service offerings in Europe and connections to dms100 switches that are designed to initiate TEI negotiation.

By default, TEI negotiation occurs when the router is powered on. The TEI negotiation value configured on an interface overrides the default or global TEI value. For example, if you configure **isdn tei first-call** globally and **isdn tei powerup** on BRI interface 0, then TEI negotiation powerup is the value applied to BRI interface 0. It is not necessary to configure TEI negotiation unless you

wish to override the default value (**isdn tei powerup**). On PRI interfaces connecting to dms100 switches, the router will change the default TEI setting to **isdn tei first-call**. To apply TEI negotiation to a specific BRI interface, perform the following task in interface configuration mode:

Task	Command
Determine when ISDN TEI negotiation occurs.	isdn tei [first-call powerup]

Configuration Examples

This section provides the following ISDN switch configuration examples:

- Global ISDN and BRI Interface Switch Example
- Global ISDN and PRI Interface Switch Example
- Global ISDN and Multiple BRI and PRI Switch Using TEI Negotiation Example

Global ISDN and BRI Interface Switch Example

The following example shows the global ISDN switch type of basic-ni and an interface level switch type of basic-net3. 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
```

Global ISDN and PRI Interface Switch Example

The following example shows the global ISDN switch type of basic-ni that is applied to BRI interface 0. The PRI interface (channelized T1 controller), is configured for ISDN switch type primary-net5 and is applied only to the PRI interface.

```
isdn switch-type basic-ni
!
interface serial0:23
! Apply the primary-net5 switch to this interface only
 isdn switch-type primary-net5
```

Global ISDN and Multiple BRI and PRI Switch Using TEI Negotiation Example

In this example, the global ISDN switch type setting is basic-net3. The PRI interface (channelized T1 controller), is configured to use **isdn switch-type primary-net5**. BRI interface 0 is configured for **isdn switch-type basic-ni** and **isdn tei first-call**. TEI first-call negotiation configured on BRI interface 0 overrides the default value (**isdn tei powerup**).

```
isdn switch-type basic-net
!
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
  isdn tei first-call
```

Command Reference

This section documents existing global configuration commands that are now configurable at the interface level for ISDN interfaces. All other commands used with this feature are documented in the Cisco IOS Release 11.3 command references.

- **isdn switch-type**
- **isdn tei**

isdn switch-type

To add an ISDN switch type to a BRI or PRI interface, use the **isdn switch-type** interface configuration and global configuration command. To disable the switch on an ISDN interface, use the **no** form of this command.

isdn switch-type *switch-type*
no isdn switch-type *switch-type*

Syntax Description

switch-type Central office or ISDN service provider switch type. See Table 1 for valid ISDN switch types for BRI and PRI interfaces.

Default
Disabled

Command Mode

Interface configuration and global configuration

Usage Guidelines

This command first appeared as an interface configuration command in Cisco IOS Release 11.3 T.

This command first appeared as a global configuration command in Cisco IOS Release 9.1.

This command allows the **isdn switch-type** to be applied either globally or at the interface level for BRI and PRI interfaces.

A global ISDN switch type should be added before you apply a switch type to a BRI or PRI interface.

You may change the interface level ISDN switch type by typing in the new switch type value. If you change the global ISDN switch type, the new value is not propagated to the interface level. You must therefore, change the ISDN switch type on all applicable interfaces.

You do not need to reload the router if you change the ISDN switch type.

If you disable the switch type from the ISDN interface using the **no isdn switch-type** command, and you do not add a new switch type value, you should shut down that interface using the **shut** command until you reconfigure the interface with a new ISDN switch type. Global ISDN switch type values are not propagated to the interface level if they are changed or removed; therefore, shutting down the interface prevents the interface being in an unconfigured state.

Note Changes to BRI and PRI ISDN switch types are documented in the *National ISDN Switch Types for Basic Rate and Primary Rate Interfaces* feature in Cisco IOS Release 11.3(3)T. Refer to this feature document for details about ISDN switch types for BRI and PRI interfaces.

Example

The following example applies global **isdn switch-type basic-ni** and **isdn switch-type primary-ni** to the PRI interface (channelized T1 controller):

```
isdn switch-type basic-ni
!
interface serial0:23
 isdn switch-type primary-ni
```

isdn tei

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

isdn tei [**first-call** | **powerup**]
no isdn tei

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.

Default

powerup

Command Mode

Interface configuration and global configuration

Usage Guidelines

This command first appeared as an interface level configuration command in Cisco IOS Release 11.3 T.

This command first appeared as a global configuration command in Cisco IOS Release 9.21.

This command determines when Layer 2 is activated on ISDN interfaces.

The default value is TEI powerup; however, the router will change the value to first-call on PRI interfaces using a primary-dms100 switch type.

This command is useful for switches that may deactivate Layers 1 and 2 when there are no active calls, or primary-dms100 switches which activate TEI when the first ISDN call is placed or received.

Example

The following example applies **isdn tei first-call** to BRI interface 0. BRI interface 1 will use **isdn tei negotiation powerup**, which is the default setting. Default 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 first-call
! BRI interface 1 uses the default TEI negotiation value
interface bri1
```