Packet Mode Services on D Channel

First Published: February 27, 2006
Last Updated: February 27, 2006

The Packet Mode Services on D Channel feature allows Japanese and European telephone switches to query Cisco routers for the availability of packet mode services on the ISDN D channel, in compliance with International Telecommunication Union (ITU) specification Q.931.

Finding Feature Information in This Module

Your Cisco IOS software release may not support all of the features documented in this module. To reach links to specific feature documentation in this module and to see a list of the releases in which each feature is supported, use the "Feature Information for Packet Mode Services on D Channel" section on page 9 and the "Related Documents" section on page 5.

Finding Support Information for Platforms and Cisco IOS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS software image support. Access Cisco Feature Navigator at http://www.cisco.com/go/fn. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions that appear.

Contents

CISCO SYSTEMS

Corporate Headquarters:
Cisco Systems, Inc., 170 West Tasman Drive, San Jose, CA 95134-1706 USA

Information About Packet Mode Services on D Channel

To configure the Packet Mode Services on D Channel feature, you should understand the following concepts:

ITU Q.931 Packet Mode Procedures

Cisco IOS software prior to Cisco IOS Release 12.4(6)T provides support for X.25 over the ISDN D channel using the ITU Q.931 service access point identifier (SAPI) value 16 procedures for call setup required by some switches, but this support does not adhere to the standard for packet mode communications for the ISDN D channel using SAPI value 0 procedures for call setup. The Packet Mode Services on D Channel feature complies with the SAPI value 0 connection procedures, and allows Japanese and some European telephone switch types to query Cisco routers for availability of packet mode services on the ISDN D channel, in compliance with ITU specification Q.931, section 6, which describes packet mode communications for the ISDN D channel.

Although regular X.25 and ISDN configuration commands may be sufficient to enable this feature, the Japanese NTT ISDN switch types expect the same terminal endpoint identifier (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 **isdn x25 dchannel** interface configuration command with the optional **q931-broadcast** keyword to enable sharing of the TEI and avoid interworking problems. 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. The optional **q931-broadcast** keyword is supported only on the ISDN BRI interface user side of the network.

Benefits of the Packet Mode Services on D Channel Feature

The benefit of installing the Packet Mode Services on D Channel feature is compliance with the Q.931 SAPI value 0 procedures for call setup, which allows Cisco routers to interoperate with Japanese and European (NTT and NET3) telephone switches.

How to Enable Packet Mode Services on D Channel Feature

This section contains the following procedure:

Enabling Packet Mode Services on D Channel Feature

The Japanese NTT (and some European NET3) ISDN switch types expect the same TEI to be shared across the ISDN interface. 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 NTT and NET3 switches do not follow this procedure and expect the Cisco router to share the same TEI. When this feature is installed as part

of Cisco IOS Release 12.4(6)T software, deployments interworking with the Japanese NTT switch type can use the Packet Mode Services on D Channel feature to enable sharing of the TEI and avoid interworking issues.

Following are the prerequisites, restrictions, and steps you need to follow on deployments interworking with the Japanese NTT switch type to enable sharing of the TEI and avoid interworking incompatibilities. These steps ensure that Q.931 SAPI value 0 procedures are enabled, and that X.25 calls can be accepted correctly on the ISDN D channel.

Prerequisites

Timer T320 must be disabled for this feature to work.

Restrictions

This feature is supported only on incoming calls, and only on BRI interfaces. All outgoing calls use SAPI value 16 procedures (X.25 on the D channel).

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **x25 routing**
4. **interface** *type number*
5. **isdn switch-type** *switch-type*
6. **isdn x25 dchannel q931-broadcast**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**x25 routing** **Example:** `Router(config)# x25 routing`	Enables X.25 routing.
Step 4	**interface** *type number* **Example:** `Router(config)# interface BRI 0`	Enters interface configuration mode and, in this example, begins configuring ISDN interface BRI 0.

	Command or Action	Purpose
Step 5	**isdn switch-type** *switch-type* **Example:** `Router(config-if)# isdn switch-type basic-ntt`	Specifies the Japanese NTT or European NET3 central office switch type on the ISDN interface.
Step 6	**isdn x25 dchannel q931-broadcast** **Example:** `Router(config-if)# isdn x25 dchannel q931-broadcast`	Key ISDN interface command that enables Q.931 SAPI 0 procedures so that the ISDN D channel will correctly accept X.25 calls. See the examples in the following section for other commands that are typically entered to configure the BRI interface.

Configuration Examples for Packet Mode Services on D Channel

This section provides the following example:

- Enable Packet Mode Services on D Channel: Example, page 4

Enable Packet Mode Services on D Channel: Example

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
!
```

The **debug isdn q931**, **debug isdn events detail**, and **debug isdn mgmnt** EXEC commands have been enhanced for Cisco IOS Release 12.4(6)T, to provide information about accepting X.25 calls on the ISDN D channel. For purpose of example, bold type in the following output indicates reports seen when the **isdn x25 dchannel** interface configuration command with the optional **q931-broadcast** keyword is enabled:

```
Router# debug isdn q931

*Sep 28 12:34:29.739: ISDN BR1/1 Q931: RX <- SETUP pd = 8  callref = 0x5C (re-assembled)
        Bearer Capability i = 0x88C0C2E6
                Standard = CCITT
                Transfer Capability = Unrestricted Digital
                Transfer Mode = Packet
                Transfer Rate = Packet - not specified
```

```
                User Info L2 Protocol = Recommendation Q921/I.441
                User Info L3 Protocol = Recommendation X.25, Packet Layer
        Channel ID i = 0x8C
                Exclusive, No B-channel
        Information Rate i = 0x8888
        Packet Layer Binary Params i = 0x80
        Packet Layer Window Size i = 0x8282
        Packet Size i = 0x8888
        Calling Party Number i = 0x0083, '144014384106'
                Plan:Unknown, Type:Unknown
        User-User i = 0x02CC000000

Router# debug isdn events detail

*Sep 28 12:34:29.747: ISDN BR1/1 EVENTd: isdn_host_packet_mode_events: Host packet call
received  call id 0xB
Router# debug isdn mgmnt

*Jun  8 22:38:56.535: ISDN BR0 Q921: User TX -> IDREQ ri=29609 ai=127
*Jun  8 22:38:56.595: ISDN BR0 Q921: User RX <- IDASSN ri=29609 ai=86
*Jun  8 22:38:56.595: ISDN BR0 SERROR: L2_Go: at bailout DLCB is NULL
        L2: sapi 63 tei 127 ces 0 ev 0x3
*Jun  8 22:38:56.595: ISDN BR0 MGMNT: LM_MDL_UI_DATA_IND: message 2 ri 29609 ai
86 switch type 9
*Jun  8 22:38:56.595: ISDN BR0 MGMNT: LM_MDL_UI_DATA_IND: OVERLAP REQUEST: ces 9
 using lmtr tei 85 tei 85
```

Additional References

The following sections provide references related to the Packet Mode Services on D Channel feature.

Related Documents

Related Topic	Document Title
ISDN and BRI switch configuration procedures	• "Part 3: ISDN Configuration" in the *Cisco IOS Dial Technologies Configuration Guide*, Release 12.4 • *Cisco IOS Dial Technologies Command Reference*, Release 12.4
X.25 routing configuration	• "Configuring X.25 and LAPB" in the *Cisco IOS Wide-Area Networking Configuration Guide*, Release 12.4 • *Cisco IOS Wide-Area Networking Command Reference*, Release 12.4

Standards

Standard	Title
ITU-T Q.931	*ISDN USER-NETWORK INTERFACE LAYER 3 SPECIFICATION FOR BASIC CALL CONTROL*

MIBs

MIB	MIBs Link
None	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use the Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFC	Title
None	—

Technical Assistance

Description	Link
The Cisco Technical Support and Documentation website contains thousands of pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content.	http://www.cisco.com/techsupport

Command Reference

This section documents the following modified command:

- **isdn x25 dchannel**

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.

Defaults

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.

Feature Information for Packet Mode Services on D Channel

Table 1 lists the release history for this feature.

Not all commands may be available in your Cisco IOS software release. For release information about a specific command, see the command reference documentation.

Cisco IOS software images are specific to a Cisco IOS software release, a feature set, and a platform. Use Cisco Feature Navigator to find information about platform support and Cisco IOS software image support. Access Cisco Feature Navigator at http://www.cisco.com/go/fn. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions that appear.

Note Table 1 lists only the Cisco IOS software release that introduced support for a given feature in a given Cisco IOS software release train. Unless noted otherwise, subsequent releases of that Cisco IOS software release train also support that feature.

Table 1 Feature Information for Packet Mode Services on D Channel

Feature Name	Releases	Feature Information
Packet Mode Services on D Channel	12.4(6)T	This feature allows Japanese and European telephone switches to query Cisco routers for the availability of packet mode services on the ISDN D channel, in compliance with International Telecommunication Union (ITU) specification Q.931. The following sections provide information about this feature: • Information About Packet Mode Services on D Channel • How to Enable Packet Mode Services on D Channel Feature The following command was modified by this feature: **isdn x25 dchannel**.