

# X.25 over ISDN D Channel Connecting to X.25 Over Leased-Line ISDN B Channel

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## **Introduction**

This document provides a sample configuration for connecting X.25 over the ISDN D Channel to X.25 over a leased-line ISDN B Channel.

## **Prerequisites**

### **Requirements**

There are no specific requirements for this document.

### **Components Used**

This configuration was developed and tested using the software and hardware versions below:

- Cisco IOS® Software Release 12.0

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

### **Conventions**

For more information on document conventions, refer to Cisco Technical Tips Conventions.

# Configure

In this section, you are presented with the information to configure the features described in this document.

**Note:** To find additional information on the commands used in this document, use the Command Lookup Tool (registered customers only).

## Network Diagram

This document uses this network setup:



In this sample configuration, we are using X.25 over the ISDN D channel at the Remote site. This is a dedicated line. The ISDN switch recognizes that there is X.25 traffic in the packet, so it forwards this packet to the X.25 Cloud. The X.25 switch closest to the Central site has a dedicated connection to the Central router over the ISDN B channel.

The telephone company handles all switch configurations, such as the ISDN switches configured for handling packet-switched traffic.

## Configurations

In this section, you are presented with the information to configure the features described in this document.

This document uses these configurations:

- Remote router
- Central router

Remote
<pre>isdn switch-type basic-ni x25 routing ! interface BRI0  no ip address  isdn switch-type basic-ni  isdn x25 static-tei 1  isdn x25 dchannel  !--- This creates the BRI subinterface BRI0:0   no fair-queue ! interface BRI0:0  ip address 10.9.0.2 255.255.255.0</pre>

```
x25 address 18005551111
x25 htc 2
x25 idle 1
x25 map ip 10.9.0.1 18005552222
!
```

### Central

```
isdn switch-type basic-ni
isdn leased-line BRI0/0

!--- This makes the B channels show up in the configuration.

x25 routing
!
interface BRI0/0
 ip address 10.9.0.1 255.255.255.0
 no ip directed-broadcast
 no ip mroute-cache
 shutdown

!--- We cannot take this out of shutdown.
!--- It is not used for leased-line configurations.

!
interface BRI0/0:1
 ip address 10.9.0.1 255.255.255.0
 no ip directed-broadcast
 encapsulation x25
 x25 address 18005552222
 x25 htc 2
 x25 idle 1
 x25 map ip 10.9.0.2 18005551111
 interface BRI0/0:2

!--- Here, we are using one B channel as a leased line,
!--- but we can use both.

no ip address
no ip directed-broadcast
!
```

## Verify

This section provides information you can use to confirm your configuration is working properly.

Certain **show** commands are supported by the Output Interpreter Tool (registered customers only), which allows you to view an analysis of **show** command output.

- **show isdn status** ensures that the router is properly communicating with the ISDN switch.
- **show interface bri0** shows the statistics, such as packets sent and received, and the number of CRC's on the BRI interface. This is useful in seeing the amount of errors that the BRI interface is receiving.
- **show debug** enables you to display a variety of debug information, or to perform specific troubleshooting activities.
- **ping <device>** checks whether a device is operating, and if network connections are intact.

The output shown below is a result of entering these commands on the devices we are using in this sample configuration:

## Remote Router

Let us look at the Remote site, where we have ISDN configured over the D Channel:

```
Remote#show isdn status
Global ISDN Switchtype = basic-ni
ISDN BRI0 interface
dsl 0, interface ISDN Switchtype = basic-ni
Layer 1 Status:
ACTIVE
Layer 2 Status:
TEI = 1, Ces = 9, SAPI = 16, State = MULTIPLE_FRAME_ESTABLISHED
TEI = 112, Ces = 1, SAPI = 0, State = TEI_ASSIGNED
Layer 3 Status:
0 Active Layer 3 Call(s)
Activated dsl 0 CCBs = 0
The Free Channel Mask: 0x80000003
Total Allocated ISDN CCBs = 0

Remote#show interface bri0
BRI0 is up, line protocol is up (spoofing)
Hardware is PQUICC BRI with U interface
MTU 1500 bytes, BW 64 Kbit, DLY 20000 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation HDLC, loopback not set
Last input 00:00:15, output never, output hang never
Last clearing of "show interface" counters 00:51:19
Queueing strategy: fifo
Output queue 0/40, 0 drops; input queue 0/75, 0 drops
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
221 packets input, 2258 bytes, 0 no buffer
Received 6 broadcasts, 0 runts, 0 giants, 0 throttles
0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
220 packets output, 2313 bytes, 0 underruns
0 output errors, 0 collisions, 1 interface resets
0 output buffer failures, 0 output buffers swapped out
8 carrier transitions

Remote#show interface bri0:0
BRI0:0 is up, line protocol is up
Hardware is BRI
Internet address is 10.9.0.2/24
MTU 1500 bytes, BW 16 Kbit, DLY 20000 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation X25, loopback not set
X.25 DTE, address 18005551111, state R1, modulo 8, timer 0
Defaults: idle VC timeout 1
cisco encapsulation
input/output window sizes 2/2, packet sizes 128/128
Timers: T20 180, T21 200, T22 180, T23 180
Channels: Incoming-only none, Two-way 1-2, Outgoing-only none
RESTARTs 211/0 CALLs 1+147/0+16/0+0 DIAGs 0/0
Last input 00:03:50, output never, output hang never
Last clearing of "show interface" counters never
Queueing strategy: fifo
Output queue 0/40, 0 drops; input queue 0/75, 0 drops
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
0 packets input, 0 bytes, 0 no buffer
Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
0 packets output, 0 bytes, 0 underruns
0 output errors, 0 collisions, 0 interface resets
0 output buffer failures, 0 output buffers swapped out
```

0 carrier transitions

## Central Router

Now let us look at the Central site, where we have configured an ISDN leased-line over the B Channel:

```
Central#show isdn status
```

```
!--- Not useful since doing leased-line B channel.
```

```
Global ISDN Switchtype = basic-ni
ISDN BRI0/0 interface
dsl 0, interface ISDN Switchtype = basic-ni
Layer 1 Status:
ACTIVE
Layer 2 Status:
Layer 2 NOT Activated
Layer 3 Status:
0 Active Layer 3 Call(s)
Activated dsl 0 CCBs = 0
The Free Channel Mask: 0x80000003
Total Allocated ISDN CCBs = 0
```

```
Central#show interface bri0/0:1
```

```
BRI0/0:1 is up, line protocol is up
Hardware is PQUICC BRI with U interface
Internet address is 10.9.0.1/24
MTU 1500 bytes, BW 64 Kbit, DLY 20000 usec, rely 255/255, load 1/255
Encapsulation X25, loopback not set
X.25 DTE, address 18005552222, state R1, modulo 8, timer 0
Defaults: idle VC timeout 1
cisco encapsulation
input/output window sizes 2/2, packet sizes 128/128
Timers: T20 180, T21 200, T22 180, T23 180
Channels: Incoming-only none, Two-way 1-2, Outgoing-only none
RESTARTs 4/0 CALLs 0+19/6+58/0+0 DIAGs 0/0
LAPB DTE, state CONNECT, modulo 8, k 7, N1 12056, N2 20
T1 3000, T2 0, interface outage (partial T3) 0, T4 0
VS 1, VR 6, tx NR 6, Remote VR 1, Retransmissions 0
Queues: U/S frames 0, I frames 0, unack. 0, reTx 0
IFRAMES 122/171 RNRs 0/0 REJs 0/0 SABM/Es 2/2 FRMRs 0/0 DISCs 0/0
Last input 00:03:12, output 00:02:12, output hang never
Last clearing of "show interface" counters never
Queueing strategy: fifo
Output queue 0/40, 0 drops; input queue 0/75, 0 drops
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
299 packets input, 3765 bytes, 0 no buffer
Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
247 packets output, 2751 bytes, 0 underruns
0 output errors, 0 collisions, 0 interface resets
0 output buffer failures, 0 output buffers swapped out
19 carrier transitions
```

```
Central#show interface bri0/0
```

```
!--- Unused for leased-line B channel.
```

```
BRI0/0 is administratively down, line protocol is down
Hardware is PQUICC BRI with U interface
Internet address is 10.9.0.1/24
MTU 1500 bytes, BW 64 Kbit, DLY 20000 usec, rely 255/255, load 1/255
Encapsulation HDLC, loopback not set, keepalive set (10 sec)
Last input 00:11:05, output never, output hang never
```

```
Last clearing of "show interface" counters never
Input queue: 0/75/0 (size/max/drops); Total output drops: 0
Queueing strategy: weighted fair
Output queue: 0/1000/64/0 (size/max total/threshold/drops)
Conversations 0/0/256 (active/max active/max total)
Reserved Conversations 0/0 (allocated/max allocated)
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
7 packets input, 105 bytes, 0 no buffer
Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
0 packets output, 0 bytes, 0 underruns
0 output errors, 0 collisions, 10 interface resets
0 output buffer failures, 0 output buffers swapped out
19 carrier transitions
```

## Remote Router

Now try to ping the Central site from the Remote site:

```
Remote#show debug
X.25 (filtered for X.25 on BRI0:0):
X.25 packet debugging is on

Remote#ping 10.9.0.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.9.0.1, timeout is 2 seconds:
!!
11:47:37: BRI0:0-D: X.25 O R1 Call (20) 8 lci 2
11:47:37: From (11): 18005551111 To (11): 18005552222
11:47:37: Facilities: (0)
11:47:37: Call User Data (4): 0xCC000000 (ip)
11:47:158913789952: BRI0:0-D: X.25 I R1 Call Confirm (16) 8 lci 2
11:47:158913789952: From (11): 18005551111 To (11): 18005552222
11:47:158913789952: Facilities: (0)
11:47:158913789952: BRI0:0-D: X.25 O D1 Data (103) 8 lci 2 PS 0 PR 0
11:47:158913789952: BRI0:0-D: X.25 I D1 RR (3) 8 lci 2 PR 1
11:47:158913789952: BRI0:0-D: X.25 I D1 Data (103) 8 lci 2 PS 0 PR 1
11:47:37: BRI0:0-D: X.25 O D1 Data (103) 8 lci 2 PS 1 PR 1
11:47:163208757248: BRI0:0-D: X.25 I D1 RR (3) 8 lci 2 PR 2!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 204/254/448 ms
Remote#
11:47:163208757248: BRI0:0-D: X.25 I D1 Data (103) 8 lci 2 PS 1 PR 2
11:47:38: BRI0:0-D: X.25 O D1 Data (103) 8 lci 2 PS 2 PR 2
11:47:163208757248: BRI0:0-D: X.25 I D1 RR (3) 8 lci 2 PR 3
11:47:163208757248: BRI0:0-D: X.25 I D1 Data (103) 8 lci 2 PS 2 PR 3
11:47:38: BRI0:0-D: X.25 O D1 Data (103) 8 lci 2 PS 3 PR 3
11:47:163208757248: BRI0:0-D: X.25 I D1 RR (3) 8 lci 2 PR 4
11:47:163208757248: BRI0:0-D: X.25 I D1 Data (103) 8 lci 2 PS 3 PR 4
11:47:38: BRI0:0-D: X.25 O D1 Data (103) 8 lci 2 PS 4 PR 4
11:47:163208757248: BRI0:0-D: X.25 I D1 RR (3) 8 lci 2 PR 5
11:47:163208757248: BRI0:0-D: X.25 I D1 Data (103) 8 lci 2 PS 4 PR 5
```

## Central Router

When we ping the Central site from Remote side, as we have done above, we can see the following output on the Central site:

```
Central#show debug
X.25 (filtered for X.25 on BRI0/0:1):
X.25 packet debugging is on

Central#
```

```
01:48:13: BRI0/0:1: X.25 I R1 Call (28) 8 lci 1
01:48:13: From (11): 18005551111 To (11): 18005552222
01:48:13: Facilities: (8)
01:48:13: Packet sizes: 128 128
01:48:13: Window sizes: 3 3
01:48:13: Throughputs: 9600 9600
01:48:13: Call User Data (4): 0xCC000000 (ip)
01:48:13: BRI0/0:1: X.25 O R1 Call Confirm (3) 8 lci 1
01:48:14: BRI0/0:1: X.25 I D1 Data (103) 8 lci 1 PS 0 PR 0
01:48:14: BRI0/0:1: X.25 O D1 Data (103) 8 lci 1 PS 0 PR 1
01:48:14: BRI0/0:1: X.25 I D1 RR (3) 8 lci 1 PR 1
01:48:14: BRI0/0:1: X.25 I D1 Data (103) 8 lci 1 PS 1 PR 1
01:48:14: BRI0/0:1: X.25 O D1 Data (103) 8 lci 1 PS 1 PR 2
01:48:14: BRI0/0:1: X.25 I D1 RR (3) 8 lci 1 PR 2
01:48:14: BRI0/0:1: X.25 I D1 Data (103) 8 lci 1 PS 2 PR 2
01:48:14: BRI0/0:1: X.25 O D1 Data (103) 8 lci 1 PS 2 PR 3
01:48:14: BRI0/0:1: X.25 I D1 RR (3) 8 lci 1 PR 3
01:48:14: BRI0/0:1: X.25 I D1 Data (103) 8 lci 1 PS 3 PR 3
01:48:14: BRI0/0:1: X.25 O D1 Data (103) 8 lci 1 PS 3 PR 4
01:48:14: BRI0/0:1: X.25 I D1 RR (3) 8 lci 1 PR 4
01:48:14: BRI0/0:1: X.25 I D1 Data (103) 8 lci 1 PS 4 PR 4
01:48:14: BRI0/0:1: X.25 O D1 Data (103) 8 lci 1 PS 4 PR 5
01:48:14: BRI0/0:1: X.25 I D1 RR (3) 8 lci 1 PR 5
```

## Troubleshoot

There is currently no specific troubleshooting information available for this configuration.

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