

X.25 Back-to-Back Connections

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Introduction

This document provides a sample configuration for X.25 back-to-back connections. You can use it to verify that your connections and hardware are working properly.

Prerequisites

Requirements

Readers of this document should have a basic understanding of the following:

- X.25
- TCP/IP

Components Used

The information in this document is based on the software and hardware versions below.

- This configuration is applicable to all Cisco IOS® Software Releases. All the routers (Cisco 2500 Router) in this document use Cisco IOS Software Release **12.2(10b)**.
- The DCE side of the X.25 connection is connected with a WAN DCE cable.
- The DTE side of the X.25 connection is connected with a WAN DTE cable.

For more information on WAN DCE and DTE cables, refer to Serial Cables.

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, see the Cisco Technical Tips Conventions.

Configure

In this section, you are presented with the information to configure the scenario 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 the network setup shown in the diagram below.



The default serial encapsulation is Cisco High-Level Data Link Control (HDLC). You must explicitly configure the X.25 encapsulation method using the **encapsulation x25** command. The **dce** option specifies operation as a logical X.25 DCE device.

On a back-to-back serial connection, the router with the DCE end of the cable acts as the physical layer DCE and provides the clocking signal for the line. The **clock rate** command in the interface configuration mode enables the router at the DCE end of the cable (Prasit, in this example) to provide the clocking signal to the line.

Note: Any of the above two routers can act as logical X.25 DCE device, irrespective of which end of the cable is connected to the router. In other words, the **encapsulation x25 dce** command can be placed in either one of the above two routers.

Configurations

This document uses the configuration shown below. In this configuration, Prasit acts as both physical layer and X.25 DCE, and Spicey is the physical layer and X.25 DTE.

- Prasit
- Spicey

Prasit
<pre>interface Serial0 ip address 5.0.2.1 255.255.255.0 encapsulation x25 dce !--- Specifies a serial interface's !--- operation as an X.25 DCE device. x25 address 7890 !--- Sets the X.121 address. x25 map ip 5.0.2.2 1234</pre>

```

!--- Sets up the LAN protocols-to-remote
!--- host mapping.

clockrate 64000

!--- Specifies a serial interface's operation
!--- as a physical layer DCE device.

no cdp enable

```

Spicey

```

interface Serial1
 ip address 5.0.2.2 255.255.255.0
 encapsulation x25

!--- Specifies a serial interface's operation
!--- as an X.25 device. Default X.25
!--- encapsulation mode is "dte".

x25 address 1234
x25 map ip 5.0.2.1 7890
no cdp enable

```

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 controllers serial** Displays information about the interface hardware and the attached cable. Refer to the Command Reference for more details.
- **ping** Checks host reachability and network connectivity. Refer to the Command Reference for more details.
- **show x25 vc** Displays information about X.25 SVCs and PVCs. Refer to the Command Reference for more details.
- **show interfaces serial** Displays information about the interface characteristics, such as encapsulation, bandwidth and other details. Refer to the Command Reference for more details.

The output shown below is a result of entering these commands on the devices in this sample configuration.

Use the **show controllers** command to check that Prasit is the physical layer DCE and Spicey is the physical layer DTE. This command gives you information on whether or not the physical layer is working and what type of cable is connected.

```

prasit# show controllers serial 0
HD unit 0, idb = 0x1D3A2C, driver structure at 0x1DAFE8
buffer size 1524 HD unit 0, V.35 DCE cable, clockrate 64000

```

!---Output suppressed.

```

spicey# show controllers serial 1
HD unit 1, idb = 0x153E94, driver structure at 0x15A1F8
buffer size 1524 HD unit 1, V.35 DTE cable

```

!---Output suppressed.

To verify the X.25 back-to-back configuration, use the following steps.

1. Ping from the X.25 DCE (in this example, Prasit) to the X.25 DTE (Spicey).

In this case, SVC1 is used, the lowest one configured by default.

```
prasit# ping 5.0.2.2
```

```
Type escape sequence to abort.
```

```
Sending 5, 100-byte ICMP Echos to 5.0.2.2, timeout is 2 seconds:
```

```
!!!!!
```

```
Success rate is 100 percent (5/5), round-trip min/avg/max = 36/38/48 ms
```

```
prasit# show x25 vc
```

```
SVC 1, State: D1, Interface: Serial0
```

```
Started 00:00:07, last input 00:00:07, output 00:00:07
```

```
Connects 1234 <-> ip 5.0.2.2
```

```
Call PID cisco, Data PID none
```

```
Window size input: 2, output: 2
```

```
Packet size input: 128, output: 128
```

```
PS: 5 PR: 5 ACK: 4 Remote PR: 5 RCNT: 1 RNR: no
```

```
P/D state timeouts: 0 timer (secs): 0
```

```
data bytes 500/500 packets 5/5 Resets 0/0 RNRs 0/0 REJs 0/0 INTs 0/0
```

```
prasit# show interfaces serial 0
```

```
Serial0 is up, line protocol is up
```

```
Hardware is HD64570
```

```
Internet address is 5.0.2.1/24
```

```
MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec,
```

```
reliability 255/255, txload 1/255, rxload 1/255
```

```
Encapsulation X25, loopback not set
```

```
X.25 DCE, address 7890, state R1, modulo 8, timer 0
```

```
Defaults: idle VC timeout 0
```

```
cisco encapsulation
```

```
input/output window sizes 2/2, packet sizes 128/128
```

```
Timers: T10 60, T11 180, T12 60, T13 60
```

```
Channels: Incoming-only none, Two-way 1-1024, Outgoing-only none
```

```
RESTARTs 1/0 CALLs 2+0/0+0/0+0 DIAGs 0/0
```

```
LAPB DCE, state CONNECT, modulo 8, k 7, N1 12056, N2 20
```

```
T1 3000, T2 0, interface outage (partial T3) 0, T4 0
```

```
VS 5, VR 5, tx NR 5, Remote VR 5, Retransmissions 0
```

```
Queues: U/S frames 0, I frames 0, unack. 0, reTx 0
```

```
IFRAMEs 29/29 RNRs 0/0 REJs 0/0 SABM/Es 0/1 FRMRs 0/0 DISCs 0/0
```

```
Last input 00:00:13, output 00:00:13, output hang never
```

```
Last clearing of "show interface" counters 00:22:38
```

```
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
```

```
33 packets input, 2679 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
```

```
42 packets output, 2693 bytes, 0 underruns
```

```
0 output errors, 0 collisions, 0 interface resets
```

```
0 output buffer failures, 0 output buffers swapped out
```

```
0 carrier transitions
```

```
DCD=up DSR=up DTR=up RTS=up CTS=up
```

```
prasit#
```

2. Then ping from the X.25 DTE (Spicey) to the X.25 DCE (Prasit).

```
spicey# ping 5.0.2.1
```

```
Type escape sequence to abort.
```

```
Sending 5, 100-byte ICMP Echos to 5.0.2.1, timeout is 2 seconds:
```

```
!!!!!
```

Success rate is 100 percent (5/5), round-trip min/avg/max = 32/32/36 ms
spicey#

spicey# **show x25 vc**

SVC 1, State: D1, Interface: Serial1
Started 00:01:03, last input 00:01:03, output 00:01:03
Connects 7890 <-> **ip 5.0.2.1**
Call PID ietf, Data PID none
Window size input: 2, output: 2
Packet size input: 128, output: 128
PS: 5 PR: 5 ACK: 5 Remote PR: 4 RCNT: 0 RNR: no
P/D state timeouts: 0 timer (secs): 0
data bytes 500/500 packets 5/5 Resets 0/0 RNRs 0/0 REJs 0/0 INTs 0/0

spicey# **show interfaces serial 1**

Serial1 is up, line protocol is up
Hardware is HD64570
Internet address is 5.0.2.2/24
MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation X25, loopback not set
X.25 DTE, address 1234, state R1, modulo 8, timer 0
Defaults: idle VC timeout 0
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 1-1024, Outgoing-only none
RESTARTs 1/1 CALLs 0+0/2+0/0+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 5, VR 5, tx NR 5, Remote VR 5, Retransmissions 0
Queues: U/S frames 0, I frames 0, unack. 0, reTx 0
IFRAMEs 29/29 RNRs 0/0 REJs 0/0 SABM/Es 1/0 FRMRs 0/0 DISCs 0/0
Last input 00:01:10, output 00:01:10, output hang never
Last clearing of "show interface" counters 00:23:59
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
42 packets input, 2693 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
32 packets output, 2657 bytes, 0 underruns
0 output errors, 0 collisions, 0 interface resets
0 output buffer failures, 0 output buffers swapped out
2 carrier transitions
DCD=up DSR=up DTR=up RTS=up CTS=up

3. Use the following command to clear the X.25 connection on Serial1 of Spicey:

```
spicey# clear x25 serial 1  
Force Restart [confirm]
```

4. After clearing the X.25 connection, try to ping from the DTE (in this example, Spicey) to the DCE (Prasit).

In this case, SVC1024 is used (the highest one configured).

spicey# **ping 5.0.2.1**

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 5.0.2.1, timeout is 2 seconds:

!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 32/36/44 ms

spicey# **show x25 vc**

SVC 1024, State: D1, Interface: Serial1

```
Started 00:00:04, last input 00:00:04, output 00:00:04
Connects 7890 <-> ip 5.0.2.1
Call PID cisco, Data PID none
Window size input: 2, output: 2
Packet size input: 128, output: 128
PS: 5 PR: 5 ACK: 4 Remote PR: 5 RCNT: 1 RNR: no
P/D state timeouts: 0 timer (secs): 0
data bytes 500/500 packets 5/5 Resets 0/0 RNRs 0/0 REJs 0/0 INTs 0/0
```

5. Use the same commands again on Prasit.

```
prasit# ping 5.0.2.2
```

```
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 5.0.2.2, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 32/34/36 ms
```

```
prasit# show x25 vc
```

```
SVC 1024, State: D1, Interface: Serial0
Started 00:01:34, last input 00:01:34, output 00:01:34
Connects 1234 <-> ip 5.0.2.2
Call PID ietf, Data PID none
Window size input: 2, output: 2
Packet size input: 128, output: 128
PS: 5 PR: 5 ACK: 5 Remote PR: 4 RCNT: 0 RNR: no
P/D state timeouts: 0 timer (secs): 0
data bytes 500/500 packets 5/5 Resets 0/0 RNRs 0/0 REJs 0/0 INTs 0/0
```

Troubleshoot

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

Related Information

- [X.25 Background](#)
- [Configuring X.25 and LAPB](#)
- [X.25 Technology Support Page](#)
- [Technical Support – Cisco Systems](#)

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