Configuring Serial Interface (X.21/V.35/RS-530/RS-449)

This chapter provides information about the serial interface using cable type x.21/v.35/rs-530/RS-449. The serial interface transports the respective x.21/v.35/rs-530/RS-449 traffic over a MPLS network. The Cisco ASR 903 Series Router supports the pseudowire that utilizes the Circuit Emulation Service over Packet-Switched Network in E1 mode to transport x.21/v.35/rs-530/RS-449 traffic.

Information About Serial Interface (X.21/V.35/RS-530/RS-449)

This following sections provide information about configuring serial interface (x.21/v.35/rs-530/RS-449) feature on the Cisco ASR 903 Series Router.

Overview of Configuring X.21/V.35/RS-530/RS-449

CESoPSN encapsulates structured signals as pseudowires over packet switched networks (PSNs). Emulation of signals saves PSN bandwidth and supports distributed cross-connect applications. It also enhances resilience of CE devices due to the effects of loss of packets in the PSN.

CESoPSN identifies framing and sends the payload. The number of TDM frames to be used within the CESoP is a factor of the serial data size. For Nx64 kbps serial line, the number of timeslots in a given TDM frame are inferred based on the line speed.

Circuit Emulation Overview

Circuit Emulation (CEM) is a technology that provides a protocol-independent transport over IP Networks. It enables proprietary or legacy applications to be carried transparently to the destination, similar to a leased line.

CEM provides a bridge between a time-division multiplexing (TDM) network and MPLS network. The router encapsulates the TDM data in the MPLS packets and sends the data over a CEM pseudowire to the remote provider edge (PE) router. Thus, CEM functions as a physical communication link across the packet network.

CEM dejitter buffer value can be configured to accommodate any delays in the MPLS network. Service policy can be applied to the CEM interface, only exp bit re-marking is supported in default class.

Configuring CEM Restriction

Not all combinations of payload size and dejitter buffer size are supported. If you apply an incompatible payload size or dejitter buffer size configuration, the router rejects it and reverts to the previous configuration.

Benefits

- The pseudowire utilizes Circuit Emulation Service over Packet-Switched Network (CESoPSN -RFC5086) in E1 mode to transport the x.21/v.35/rs-530/RS-449 traffic over MPLS network.

- Migration from legacy network to MPLS network supports hitless traffic switch from active RSP to standby RSP.

- It supports the serial data speed that are multiples of 64kbps. The maximum limit of speed can be 2048kbps.

Prerequisites

- Serial IM SPA must be installed.

- PEs must be reachable over MPLS network.

- Sync-E must be configured between pseudowire peers.

Restrictions

- Specific combinations of payload size and dejitter buffer size are supported. If incompatible values are applied, the router reverts to the previous configuration.

- Supported speeds are 64kbps, 128kbps, 256kbps, 512kbps, 1024kbps, and 2048kbps.

- Serial IM does *not* support to configure pseudowire between local and remote PE with different speeds on sync (x.21/v.35/rs-530/RS-449) ports.

- The transit of traffic is *not* supported from port 0 to 7. It is supported only from port 8 to 13.

How to Configure Serial Interface (X.21/V.35/RS-530/RS-449)

The folloiwng sections provide information about how to configure serial interface (x.21/v.35/rs-530/RS-449) on the Cisco ASR 903 Series Router.

Configuring Serial Interface (X.21/V.35/RS-530/RS-449)

Before you Begin

Before you configure x.21/v.35/rs-530/RS-449 on Cisco ASR 903 Series Router, check for the following:

- MPLS LDP neighbor relation must be established between the PE devices.

- The Ethernet interfaces on the provider edge routers towards the core must be configured with SyncE.

Follow these steps to configure x.21/v.35/rs-530/RS-449 on the Cisco ASR 903 Series Router:

```
enable
configure terminal
Controller serial 0/5/8
clock rate 64000
cem-group 0
exit
interface CEM0/5/8
cem 0
xconnect 10.10.10.2 305 encapsulation mpls
exit
end
```

Or,

```
enable
configure terminal
Controller serial 0/5/8
clock-rate 64000
cem-group 0
exit
interface CEM0/5/8
cem 0
xconnect 10.10.10.2 305 encapsulation mpls
exit
end
```

Verifying the Serial Interface (X.21/V.35/RS-530/RS-449) Configuration

You can use the **show controllers serial** command to verify the serial interface (x.21/v.35/rs-530/RS-449) configuration.

- The following is the sample output to verify that the controller is configured using X.21 cable type.

```
Router# show controllers serial0/5/8

CEM0/5/8 - (Circuit Emulation Interface) is up
Physical Layer : SYNC
Encapsulation  : CEM
mtu 1500, max_buffer_size 1524, max_pak_size 1524 enc 84
Cable type: X.21 DCE
loopback: Off,  crc: 16, invert_data: Off
nrzi: Off, idle char: Flag
dce_terminal_timing_enable: Off ignore_dtr: Off
serial_clockrate: 128000bps, serial_clock_index: 17

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

- The following is the sample output to verify that the controller is configured using V.35 cable type.

```
Router# show controllers serial0/5/8

CEM0/5/8 - (Circuit Emulation Interface) is up
Physical Layer : SYNC
Encapsulation  : CEM
mtu 1500, max_buffer_size 1524, max_pak_size 1524 enc 84
Cable type: V.35 DCE
loopback: Off,  crc: 16, invert_data: Off
nrzi: Off, idle char: Flag
dce_terminal_timing_enable: Off ignore_dtr: Off
serial_clockrate: 128000bps, serial_clock_index: 17
```

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

• The following is the sample output to verify that the controller is configured using RS-530 cable type.

```
Router# show controllers serial0/5/8

CEM0/5/8 - (Circuit Emulation Interface) is up
Physical Layer : SYNC
Encapsulation  : CEM
mtu 1500, max_buffer_size 1524, max_pak_size 1524 enc 84
Cable type: RS-530 DCE
loopback: Off,  crc: 16, invert_data: Off
nrzi: Off, idle char: Flag
dce_terminal_timing_enable: Off ignore_dtr: Off
serial_clockrate: 128000bps, serial_clock_index: 17

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

• The following is the sample output to verify that the controller is configured using RS-449 cable type.

```
Router# show controllers serial0/5/8

CEM0/5/8 - (Circuit Emulation Interface) is up
Physical Layer : SYNC
Encapsulation : CEM
mtu 1500, max_buffer_size 1524, max_pak_size 1524 enc 84
Cable type: RS-449 DCE
loopback: Off, crc: 16, invert_data: Off
nrzi: Off, idle char: Flag
dce_terminal_timing_enable: Off ignore_dtr: Off
serial_clockrate: 128000bps, serial_clock_index: 17

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

• Use the **show int cem 0/5/8** command to verify that the CEM is configured.

```
Router# show int cem0/5/8

Building configuration...
Current configuration : 97 bytes
!
interface CEM0/5/8
 no ip address
 cem 0
  xconnect 10.10.10.10 100 encapsulation mpls
 !
end
```

• Use the **show xconnect all** command to verify that the cross connection between controllers is configured.

```
Router# show xconnect all

Legend:    XC ST=Xconnect State  S1=Segment1 State  S2=Segment2 State
  UP=Up       DN=Down             AD=Admin Down      IA=Inactive
  SB=Standby  HS=Hot Standby      RV=Recovering      NH=No Hardware

XC ST  Segment 1                         S1 Segment 2                         S2
------+--------------------------------+--+--------------------------------+--
UP pri   ac CE0/5/8:0(CESoPSN Basic)      UP mpls 10.10.10.10:100           UP
```

Setting Payload-Size and Dejitter-Buffer

After the configuration of CEM circuit and xconnect, configure the appropriate values for payload-size and dejitter buffer in the CEM. Below table provides the ideal values payload-size and djitter buffer for different clock rates.

Clock Rate	Payload Size	Dejitter Buffer
64000	32	9
128000	64	16
	64	20
	64	32
	128	20
	256	20
512000	128	20
	128	5
	64	5
	256	20
	640	20
1024000	64	8
	64	5
	128	5
	128	8
	256	8
2048000	128	8
	128	5
	256	5
	256	8
	640	8
	1280	8

Configuring Payload Size and Dejitter Buffer

Before you configure payload size and dejitter buffer on CEM, ensure the CEM and xconnect are configured.

```
enable
configure terminal
interface cem 0/5/8
cem 0
payload-size 64
dejitter-buffer 20
end
```

Note
- Use **no payload-size** command to set the default values for payload-size.

- Use **no dejitter-buffer** command to set the default values for dejitter-buffer for a given clock rate.

Verifying the Payload Size and Dejitter Buffer Configuration

You can use the following commands to verify your pseudowire configuration:

Use **show interface cem** command to verify the CEM configuration.

```
Router# show interface cem 0/5/8
Building configuration...
Current configuration : 136 bytes
!
interface CEM0/5/8
no ip address
cem 0
  payload-size 64
  dejitter-buffer 20
  xconnect 10.10.2.2 204 encapsulation mpls
!
end
```