

# Network Configuration Example

## Configuring Channelized IQ Interfaces



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*Network Configuration Example Configuring Channelized IQ Interfaces*

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## CHAPTER 1

# Configuring Channelized IQ Interfaces

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## About This Network Configuration Example

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This document provides an overview of channelized IQ interfaces and provides simple and complex step-by-step configuration examples that demonstrate how to configure channelized IQ interfaces.

## Channelized IQ Interfaces Overview

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Channelized interfaces allow service providers to customize bandwidth to satisfy the needs of their customers. Whether the subscriber needs DS0, T1, fractional T1, E1, fractional E1, E3, T3, STM1, OC3, or OC12 service, a channelized interface can provide the necessary bandwidth today and can be reconfigured to support the customer's expanding network tomorrow. Standard channelized interfaces have been available on Juniper Networks® routing platforms since Junos® OS Release 3.4.

The original channelized interfaces for Juniper Networks M Series routers are available in the following models:

- 1-port Channelized OC12 PIC
- 10-port Channelized E1 PIC

- 1-port Channelized STM1 PIC
- 4-port Channelized DS3 PIC
- 1-port and 2-port multichannel Channelized DS3 PIC

These channelized interfaces provide a single level of channelization and need to be configured at both the **[edit chassis]** and the **[edit interfaces]** hierarchy levels. Most configuration options must be set on channel 0 and apply to all channels on these channelized interfaces.

Channelized interfaces with intelligent queuing offer several advantages over the original channelized interfaces:

- Complete configuration tasks for channelized IQ interfaces are centralized at the **[edit interfaces]** hierarchy level.
- Multiple levels of channelization are possible with channelized IQ interfaces. For example, a channelized OC12 IQ interface can be divided into channelized OC1 interfaces, then subdivided into channelized T1 interfaces, and further split into NxDS0 channels.
- You can configure interface statements, such as **clocking**, on individual channels rather than configuring them on channel 0 for all channels at the same hierarchy level.
- Class-of-service (CoS) processing occurs on the PIC for channelized IQ interfaces rather than in the FPC.

The following M Series and T Series PICs support channelized interfaces with intelligent queuing:

- 1-port Channelized OC12 IQ PIC
- 1-port Channelized OC3 IQ PIC
- 4-port Channelized DS3 IQ PIC
- 10-port Channelized T1 IQ PIC
- 10-port Channelized E1 IQ PIC
- 1-port Channelized STM1 IQ PIC

You can configure each port of a channelized IQ PIC as a single interface that uses the entire available bandwidth, or partition each port into smaller data channels.

[Figure 1 on page 7](#) through [Figure 6 on page 9](#) show the structural organization of the channelized IQ PICs.

Figure 1: Channelized OC12 IQ PIC (in SDH Mode)

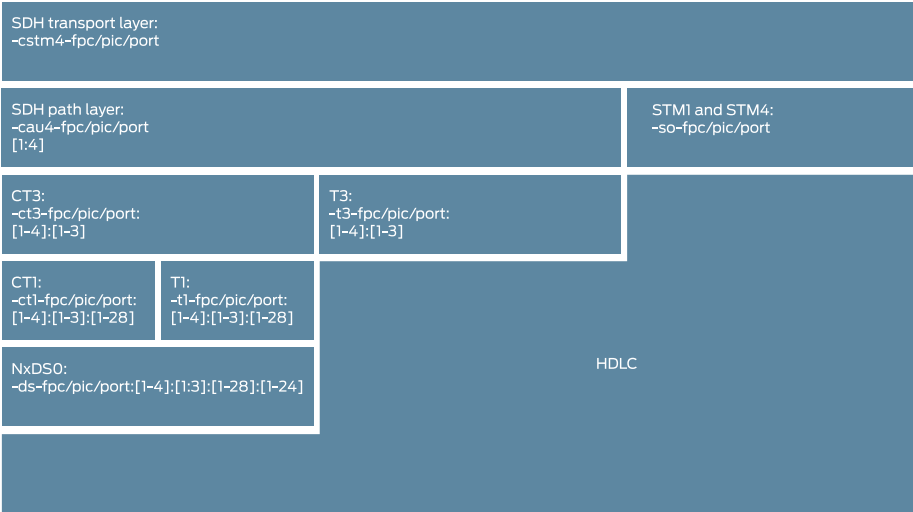


Figure 2: Channelized OC3 IQ PIC (in SONET Mode)

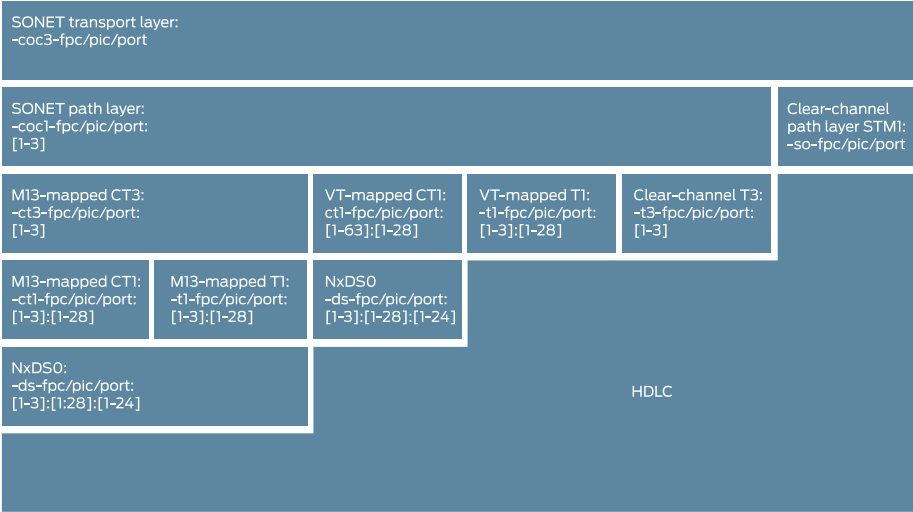


Figure 3: Channelized STM1 IQ PIC

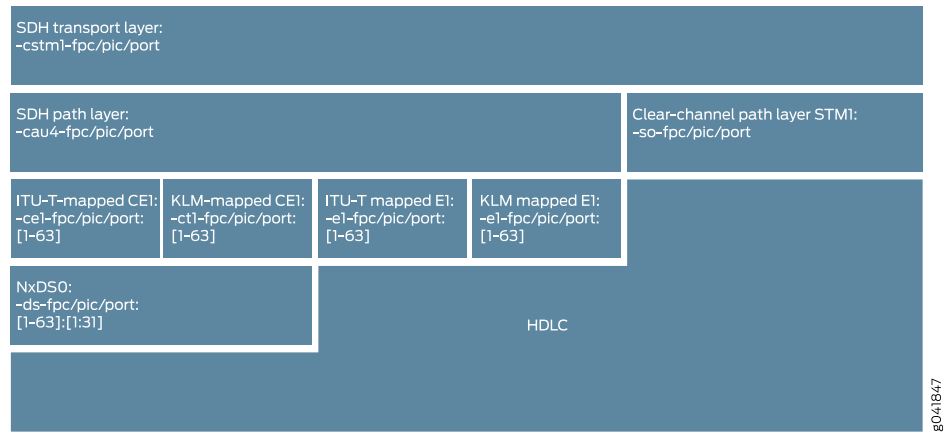


Figure 4: Channelized DS3 IQ PIC

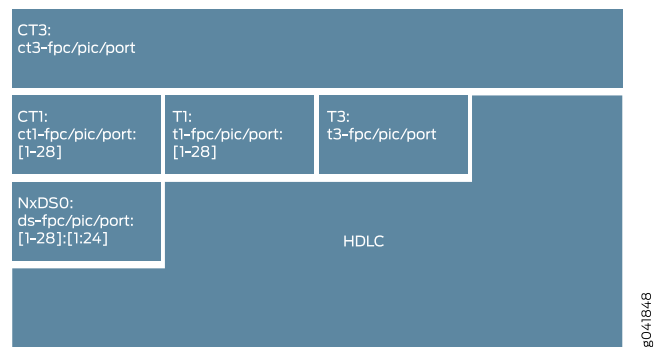


Figure 5: Channelized T1 IQ PIC

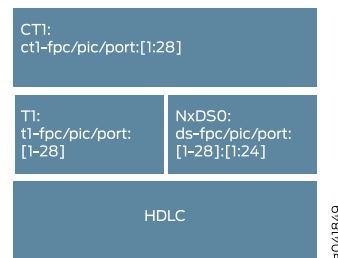
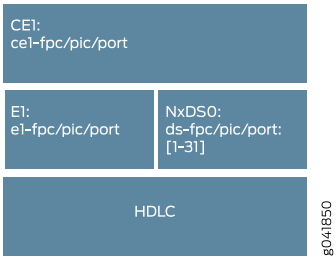




Figure 6: Channelized E1 IQ PIC



Example: Configuring an OC12 Clear Channel on a Channelized OC12 IQ Interface

This example shows how to configure an OC12 clear channel on a Channelized OC12 IQ PIC.

- [Requirements on page 9](#)
- [Overview on page 9](#)
- [Configuration on page 10](#)
- [Verification on page 11](#)

Requirements

This example can be configured using the following hardware and software components:

- Junos OS Release 8.0 or later
- Juniper Networks M Series Multiservice Edge Router or T Series Core Router with Channelized OC12 IQ PIC



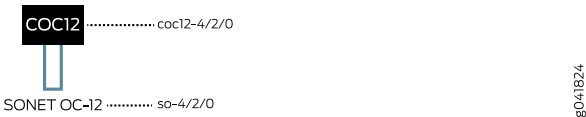
**NOTE:** This configuration example has been tested using the software release listed and is assumed to work on all later releases.

No special configuration beyond device initialization is required before you configure this example.

Overview

Figure 7 on page 9 depicts an OC12 clear channel on a Channelized OC12 IQ interface.

Figure 7: OC12 Clear Channel on a Channelized OC12 IQ Interface



The key to this simple example is to remove all partitions from the channelized interface. To configure a clear channel on a channelized IQ interface, include the **no-partition**

statement at the **[edit interfaces coc12-fpc/pic/0]** hierarchy level and specify the interface type. After you commit this part of the configuration, the clear channel is set and you can configure the resulting SONET interface normally.

## Configuration

**CLI Quick Configuration** To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the **[edit]** hierarchy level.

```
set interfaces coc12-4/2/0 no-partition interface type so
set interfaces so-4/2/0 unit 0 family inet address 10.245.1.1/30
```

---

### Configuring a Clear Channel on a Channelized IQ Interface

**Step-by-Step Procedure** The following example requires that you navigate various levels in the configuration hierarchy. For information about navigating the CLI, see *Using the CLI Editor in Configuration Mode* in the *CLI User Guide*.

To configure a clear channel on a channelized IQ interface of a router:

1. Include the **no-partition** statement at the **[edit interfaces coc12-fpc/pic/0]** hierarchy level.

```
[edit]
user@host# set interfaces coc12-4/2/0 no-partition interface type so
```

2. Configure an IP address for the SONET interface.

```
[edit]
user@host# set interfaces so-4/2/0 unit 0 family inet address 10.245.1.1/30
```

3. Commit the configuration.

```
[edit]
user@host# commit
```

---

## Results

From configuration mode, confirm your configuration by issuing the **show interfaces** command. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

```
[edit]
user@host# show interfaces
coc12-4/2/0 {
  no-partition interface-type so;
}
so-4/2/0 {
  unit 0 {
    family inet {
      address 10.245.1.1/30;
    }
  }
}
```

## Verification

Confirm that the configuration is working properly.

- [Verifying That the Interfaces Are Active on page 11](#)
- [View the Operational Details of the Interfaces on page 11](#)

### Verifying That the Interfaces Are Active

<b>Purpose</b>	View the interface names of the physical channelized OC12 IQ interface and the clear channel OC12 interface configured on the channelized IQ interface.
<b>Action</b>	<p>From operational mode, issue the <b>show interfaces controller</b> command.</p> <pre> user@host&gt; show interfaces controller Controller coc12-4/2/0 so-4/2/0 Admin Link up    up up    up </pre>
<b>Meaning</b>	The output shows that the physical channelized OC12 IQ interface and the clear channel OC12 interface configured on the channelized IQ interface are active. The <b>Admin</b> field and the <b>Link</b> field displaying <b>up</b> indicate that the interface is active.

### View the Operational Details of the Interfaces

<b>Purpose</b>	View the operational details of the interfaces to confirm that the interfaces are up and running.
<b>Action</b>	<p>From operational mode, issue the <b>show interfaces extensive cxx-fpc/pic/0</b> command.</p> <pre> user@host&gt; show interfaces extensive coc12-4/2/0 Physical interface: coc12-4/2/0, Enabled, Physical link is Up   Interface index: 74, SNMP ifIndex: 1269, Generation: 73   Link-level type: Controller, MTU: 4474, Clocking: Internal, SONET mode, Speed: OC12, Loopback: None,   FCS: 16, Payload scrambler: Disabled, Parent: None   Device flags   : Present Running   Interface flags: Point-To-Point SNMP-Traps   Link flags     : None   Hold-times    : Up 0 ms, Down 0 ms   Last flapped  : 2002-10-09 10:56:45 PDT (05:14:39 ago)   Statistics last cleared: Never   Input errors:     Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0, Bucket drops: 0, Policed discards: 0,     L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0, HS link CRC errors: 0,     HS link FIFO overflows: 0   Output errors:     Carrier transitions: 0, Errors: 0, Drops: 0, Aged packets: 0, HS link FIFO underflows: 0   SONET alarms   : None   SONET defects  : None   SONET PHY:     Seconds      Count  State     PLL Lock     0      0 OK     PHY Light    0      0 OK </pre>

```

SONET section:
  BIP-B1          10          55
  SEF             0          0 OK
  LOS            0          0 OK
  LOF            0          0 OK
  ES-S           10
  SES-S          0
  SEFS-S         0
SONET line:
  BIP-B2          10          144
  REI-L           0          0
  RDI-L           3          1 OK
  AIS-L           0          0 OK
  BERR-SF         0          0 OK
  BERR-SD         1          1 OK
  ES-L           10
  SES-L           0
  UAS-L           0
  ES-LFE          3
  SES-LFE         3
  UAS-LFE         0
Received SONET overhead:
  F1      : 0x00, J0      : 0x00, K1      : 0x00, K2      : 0x00
  S1      : 0x00
Transmitted SONET overhead:
  F1      : 0x00, J0      : 0x01, K1      : 0x00, K2      : 0x00
  S1      : 0x00

```

From operational mode, issue the **show interfaces extensive so-*fpc/pic*/0** command.

```

user@host> show interfaces extensive so-4/2/0
Physical interface: so-4/2/0, Enabled, Physical link is Up
  Interface index: 261, SNMP ifIndex: 2000, Generation: 260
  Link-level type: PPP, MTU: 4474, Clocking: Internal, SONET mode,
  Speed: OC12, Loopback: None, FCS: 16,
  Payload scrambler: Enabled, Parent: coc12-4/2/0 (Index 74)
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link flags     : Keepalives
  Hold-times    : Up 0 ms, Down 0 ms
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
  Keepalive statistics:
    Input : 37 (last seen 00:00:04 ago)
    Output: 36 (last sent 00:00:09 ago)
  LCP state: Opened
  NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured, mpls:
  Not-configured
  CHAP state: Not-configured
  Last flapped   : 2002-10-09 16:04:18 PDT (00:07:26 ago)
  Statistics last cleared: Never
  Traffic statistics:
    Input bytes   :          80461791          7435000 bps
    Output bytes  :          81637408          7502352 bps
    Input packets :          34017          275 pps
    Output packets:          34298          278 pps
  Input errors:
    Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0,
  Bucket drops: 0, Policed discards: 0,
    L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0, HS link CRC
  errors: 0,
    HS link FIFO overflows: 0
  Output errors:

```

Carrier transitions: 1, Errors: 0, Drops: 0, Aged packets: 0, HS link FIFO underflows: 0

Queue counters:	Queued packets	Transmitted packets	Dropped packets
0 best-effort	34129	34129	0
1 expedited-fo	0	0	0
2 assured-forw	0	0	0
3 network-cont	0	0	0

SONET alarms : None

SONET defects : None

SONET path:

BIP-B3	0	0
REI-P	0	0
LOP-P	0	0 OK
AIS-P	0	0 OK
RDI-P	0	0 OK
UNEQ-P	0	0 OK
PLM-P	0	0 OK
ES-P	0	
SES-P	0	
UAS-P	0	
ES-PFE	0	
SES-PFE	0	
UAS-PFE	0	

Received SONET overhead:

C2 : 0xcf, C2(cmp) : 0xcf, F2 : 0x00, Z3 : 0x00  
Z4 : 0x00, S1(cmp) : 0x00

Transmitted SONET overhead:

C2 : 0xcf, F2 : 0x00, Z3 : 0x00, Z4 : 0x00

Received path trace: RouterB so-2/2/0

61 72 6d 61 67 6e 61 63 20 73 6f 2d 32 2f 32 2f	RouterB so-2/2/0
30 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00 00 00 00 00 00 00 00 00 00 00 00 00 00 0d 0a	.....

Transmitted path trace: RouterA so-4/2/0

74 69 6d 6d 65 73 73 71 75 61 72 65 20 73 6f 2d	RouterA so-4/2/0
34 2f 32 2f 30 00 00 00 00 00 00 00 00 00 00 00	.....
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....

HDLC configuration:

Policing bucket: Disabled

Shaping bucket : Disabled

Giant threshold: 0, Runt threshold: 0

Packet Forwarding Engine configuration:

Destination slot: 4, PLP byte: 4 (0x00)

CoS transmit queue	Bandwidth	Buffer	Priority	Limit
%	bps	%	bytes	
0 best-effort	95 590976000	95	0 low	none
3 network-control	5 31104000	5	0 low	none

Logical interface so-4/2/0.0 (Index 7) (SNMP ifIndex 2001) (Generation 12)

Flags: Point-To-Point SNMP-Traps Encapsulation: PPP

Protocol inet, MTU: 4470, Generation: 18, Route table: 0

Flags: None

Addresses, Flags: Is-Preferred Is-Primary

Destination: 10.245.1.0/30, Local: 10.245.1.1, Broadcast: Unspecified,

Generation: 21

**Meaning** The physical channelized OC12 IQ interface and the clear channel OC12 interface configured on the channelized IQ interface are up and running.

## Example: Configuring a Complex Channelized OC12 IQ Interface

---

This example shows how to configure a complex channelization structure that you might encounter if you use the full capabilities of a channelized OC12 IQ interface.

- [Requirements on page 14](#)
- [Overview on page 14](#)
- [Configuration on page 16](#)
- [Verification on page 39](#)

### Requirements

This example can be configured using the following hardware and software components:

- Junos OS Release 8.0 or later
- Juniper Networks M Series Multiservice Edge Router or T Series Core Router with Channelized OC12 IQ PIC



**NOTE:** This configuration example has been tested using the software release listed and is assumed to work on all later releases.

No special configuration beyond device initialization is required before you configure this example.

### Overview

[Figure 8 on page 15](#) and [Table 1 on page 15](#) show a complex channelization structure that you might encounter if you use the full capabilities of a channelized OC12 IQ interface.

Figure 8: Complex Configuration for a Channelized OC12 IQ Interface

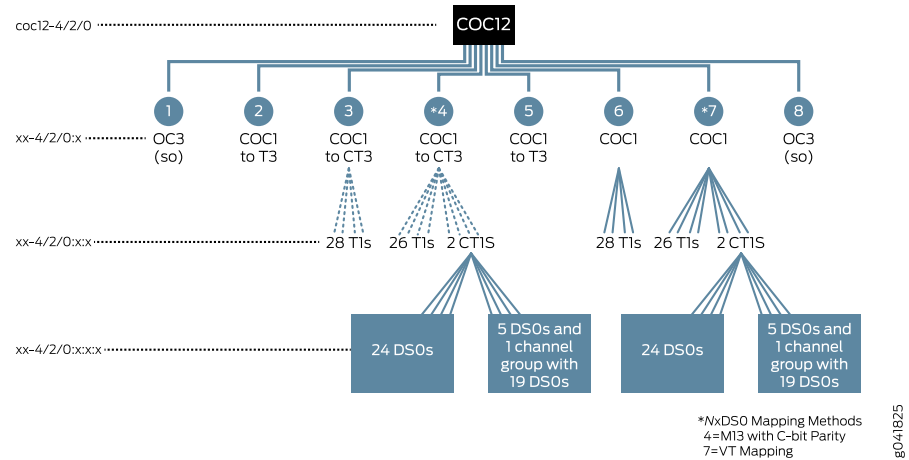


Table 1: Complex Channelization for a Channelized OC12 IQ Interface

Partition	Slices	Interface Type	Interface Level 2	Interface Level 3
1	1-3	OC3	—	—
2	4	Channelized OC1 converted to T3	—	—
3	5	Channelized OC1 converted to channelized T3	28 T1s	—
4	6	Channelized OC1 converted to channelized T3	26 T1s	—
—	—	—	2 CT1s	24 DS0s
—	—	—	—	5 DS0s and 1 channel group of 19 DS0s
5	7	Channelized OC1 converted to T3	—	—
6	8	Channelized OC1	28 T1s	—
7	9	Channelized OC1	26 T1s	—
—	—	—	2 CT1s	24 DS0s
—	—	—	—	5 DS0s and 1 channel group of 19 DS0s

**Table 1: Complex Channelization for a Channelized OC12 IQ Interface (*continued*)**

Partition	Slices	Interface Type	Interface Level 2	Interface Level 3
8	10–12	OC3	–	–

- Partitions 1 and 8 create an OC3 interface, while Partitions 2 and 5 create T3 interfaces out of channelized OC1 interfaces.
- Partition 3 (channelized OC1 converted to channelized T3) and Partition 6 (channelized OC1) are channelized interfaces that each subdivide into 28 T1 interfaces.
- Partition 4 (channelized OC1 converted to channelized T3) and Partition 7 (channelized OC1) are channelized interfaces that each split into 2 channelized T1 interfaces and 26 T1 interfaces. The first channelized T1 splits into 24 DS0 time slots, whereas the second channelized T1 subdivides into 5 DS0 channels and 1 channel group comprised of 19 DS0 channels.

This example shows two  $N \times DS0$  mapping methods. Partition 4 uses M13 mapping for North American T-carrier equipment and Partition 7 uses VT mapping for SONET/SDH equipment. This example also assumes corresponding interfaces. For example, for every sublevel T1 interface you configure on the router, assume you have configured a matching sublevel or physical T1 interface on a neighboring router.

## Configuration

### CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the **[edit]** hierarchy level.

```
set interfaces coc12-4/2/0 partition 1 oc-slice 1-3 interface-type so
set interfaces coc12-4/2/0 partition 2 oc-slice 4 interface-type coc1
set interfaces coc12-4/2/0 partition 3 oc-slice 5 interface-type coc1
set interfaces coc12-4/2/0 partition 4 oc-slice 6 interface-type coc1
set interfaces coc12-4/2/0 partition 5 oc-slice 7 interface-type coc1
set interfaces coc12-4/2/0 partition 6 oc-slice 8 interface-type coc1
set interfaces coc12-4/2/0 partition 7 oc-slice 9 interface-type coc1
set interfaces coc12-4/2/0 partition 8 oc-slice 10-12 interface-type so
set interfaces so-4/2/0:1 encapsulation ppp
set interfaces so-4/2/0:1 unit 0 family inet address 10.255.0.2/30
set interfaces coc1-4/2/0:2 no-partition interface-type t3
set interfaces t3-4/2/0:2 encapsulation ppp
set interfaces t3-4/2/0:2 unit 0 family inet address 10.255.0.6/30
set interfaces coc1-4/2/0:3 no-partition interface-type ct3
set interfaces ct3-4/2/0:3 partition 1-28 interface-type t1
set interfaces coc1-4/2/0:4 no-partition interface-type ct3
set interfaces ct3-4/2/0:4 partition 1-2 interface-type ct1
set interfaces ct3-4/2/0:4 partition 3-28 interface-type t1
set interfaces coc1-4/2/0:5 no-partition interface-type t3
set interfaces t3-4/2/0:5 encapsulation ppp
set interfaces t3-4/2/0:5 unit 0 family inet address 10.255.1.90/30
```



```
set interfaces coc1-4/2/0:6 partition 1-28 interface-type t1
set interfaces coc1-4/2/0:7 partition 1-2 interface-type ct1
set interfaces coc1-4/2/0:7 partition 3-28 interface-type t1
set interfaces so-4/2/0:8 encapsulation ppp
set interfaces so-4/2/0:8 unit 0 family inet address 10.255.2.174/30
set interfaces t1-4/2/0:3:1 encapsulation ppp
set interfaces t1-4/2/0:3:1 unit 0 family inet address 10.255.0.10/30
set interfaces t1-4/2/0:3:2 encapsulation ppp
set interfaces t1-4/2/0:3:2 unit 0 family inet address 10.255.0.14/30
set interfaces t1-4/2/0:3:3 encapsulation ppp
set interfaces t1-4/2/0:3:3 unit 0 family inet address 10.255.0.18/30
set interfaces t1-4/2/0:3:4 encapsulation ppp
set interfaces t1-4/2/0:3:4 unit 0 family inet address 10.255.0.22/30
set interfaces t1-4/2/0:3:5 encapsulation ppp
set interfaces t1-4/2/0:3:5 unit 0 family inet address 10.255.0.26/30
set interfaces t1-4/2/0:3:6 encapsulation ppp
set interfaces t1-4/2/0:3:6 unit 0 family inet address 10.255.0.30/30
set interfaces t1-4/2/0:3:7 encapsulation ppp
set interfaces t1-4/2/0:3:7 unit 0 family inet address 10.255.0.34/30
set interfaces t1-4/2/0:3:8 encapsulation ppp
set interfaces t1-4/2/0:3:8 unit 0 family inet address 10.255.0.38/30
set interfaces t1-4/2/0:3:9 encapsulation ppp
set interfaces t1-4/2/0:3:9 unit 0 family inet address 10.255.0.42/30
set interfaces t1-4/2/0:3:10 encapsulation ppp
set interfaces t1-4/2/0:3:10 unit 0 family inet address 10.255.0.46/30
set interfaces t1-4/2/0:3:11 encapsulation ppp
set interfaces t1-4/2/0:3:11 unit 0 family inet address 10.255.0.50/30
set interfaces t1-4/2/0:3:12 encapsulation ppp
set interfaces t1-4/2/0:3:12 unit 0 family inet address 10.255.0.54/30
set interfaces t1-4/2/0:3:13 encapsulation ppp
set interfaces t1-4/2/0:3:13 unit 0 family inet address 10.255.0.58/30
set interfaces t1-4/2/0:3:14 encapsulation ppp
set interfaces t1-4/2/0:3:14 unit 0 family inet address 10.255.0.62/30
set interfaces t1-4/2/0:3:15 encapsulation ppp
set interfaces t1-4/2/0:3:15 unit 0 family inet address 10.255.0.66/30
set interfaces t1-4/2/0:3:16 encapsulation ppp
set interfaces t1-4/2/0:3:16 unit 0 family inet address 10.255.0.70/30
set interfaces t1-4/2/0:3:17 encapsulation ppp
set interfaces t1-4/2/0:3:17 unit 0 family inet address 10.255.0.74/30
set interfaces t1-4/2/0:3:18 encapsulation ppp
set interfaces t1-4/2/0:3:18 unit 0 family inet address 10.255.0.78/30
set interfaces t1-4/2/0:3:19 encapsulation ppp
set interfaces t1-4/2/0:3:19 unit 0 family inet address 10.255.0.82/30
set interfaces t1-4/2/0:3:20 encapsulation ppp
set interfaces t1-4/2/0:3:20 unit 0 family inet address 10.255.0.86/30
set interfaces t1-4/2/0:3:21 encapsulation ppp
set interfaces t1-4/2/0:3:21 unit 0 family inet address 10.255.0.90/30
set interfaces t1-4/2/0:3:22 encapsulation ppp
set interfaces t1-4/2/0:3:22 unit 0 family inet address 10.255.0.94/30
set interfaces t1-4/2/0:3:23 encapsulation ppp
set interfaces t1-4/2/0:3:23 unit 0 family inet address 10.255.0.98/30
set interfaces t1-4/2/0:3:24 encapsulation ppp
set interfaces t1-4/2/0:3:24 unit 0 family inet address 10.255.0.102/30
set interfaces t1-4/2/0:3:25 encapsulation ppp
set interfaces t1-4/2/0:3:25 unit 0 family inet address 10.255.0.106/30
set interfaces t1-4/2/0:3:26 encapsulation ppp
```

```
set interfaces t1-4/2/0:3:26 unit 0 family inet address 10.255.0.110/30
set interfaces t1-4/2/0:3:27 encapsulation ppp
set interfaces t1-4/2/0:3:27 unit 0 family inet address 10.255.0.114/30
set interfaces t1-4/2/0:3:28 encapsulation ppp
set interfaces t1-4/2/0:3:28 unit 0 family inet address 10.255.0.118/30
set interfaces ct1-4/2/0:4:1 partition 1 timeslots 1 interface-type ds
set interfaces ct1-4/2/0:4:1 partition 2 timeslots 2 interface-type ds
set interfaces ct1-4/2/0:4:1 partition 3 timeslots 3 interface-type ds
set interfaces ct1-4/2/0:4:1 partition 4 timeslots 4 interface-type ds
set interfaces ct1-4/2/0:4:1 partition 5 timeslots 5 interface-type ds
set interfaces ct1-4/2/0:4:1 partition 6 timeslots 6 interface-type ds
set interfaces ct1-4/2/0:4:1 partition 7 timeslots 7 interface-type ds
set interfaces ct1-4/2/0:4:1 partition 8 timeslots 8 interface-type ds
set interfaces ct1-4/2/0:4:1 partition 9 timeslots 9 interface-type ds
set interfaces ct1-4/2/0:4:1 partition 10 timeslots 10 interface-type ds
set interfaces ct1-4/2/0:4:1 partition 11 timeslots 11 interface-type ds
set interfaces ct1-4/2/0:4:1 partition 12 timeslots 12 interface-type ds
set interfaces ct1-4/2/0:4:1 partition 13 timeslots 13 interface-type ds
set interfaces ct1-4/2/0:4:1 partition 14 timeslots 14 interface-type ds
set interfaces ct1-4/2/0:4:1 partition 15 timeslots 15 interface-type ds
set interfaces ct1-4/2/0:4:1 partition 16 timeslots 16 interface-type ds
set interfaces ct1-4/2/0:4:1 partition 17 timeslots 17 interface-type ds
set interfaces ct1-4/2/0:4:1 partition 18 timeslots 18 interface-type ds
set interfaces ct1-4/2/0:4:1 partition 19 timeslots 19 interface-type ds
set interfaces ct1-4/2/0:4:1 partition 20 timeslots 20 interface-type ds
set interfaces ct1-4/2/0:4:1 partition 21 timeslots 21 interface-type ds
set interfaces ct1-4/2/0:4:1 partition 22 timeslots 22 interface-type ds
set interfaces ct1-4/2/0:4:1 partition 23 timeslots 23 interface-type ds
set interfaces ct1-4/2/0:4:1 partition 24 timeslots 24 interface-type ds
set interfaces ds-4/2/0:4:1 encapsulation ppp
set interfaces ds-4/2/0:4:1:1 unit 0 family inet address 10.255.0.122/30
set interfaces ds-4/2/0:4:1:2 encapsulation ppp
set interfaces ds-4/2/0:4:1:2 unit 0 family inet address 10.255.0.126/30
set interfaces ds-4/2/0:4:1:3 encapsulation ppp
set interfaces ds-4/2/0:4:1:3 unit 0 family inet address 10.255.0.130/30
set interfaces ds-4/2/0:4:1:4 encapsulation ppp
set interfaces ds-4/2/0:4:1:4 unit 0 family inet address 10.255.0.134/30
set interfaces ds-4/2/0:4:1:5 encapsulation ppp
set interfaces ds-4/2/0:4:1:5 unit 0 family inet address 10.255.0.138/30
set interfaces ds-4/2/0:4:1:6 encapsulation ppp
set interfaces ds-4/2/0:4:1:6 unit 0 family inet address 10.255.0.142/30
set interfaces ds-4/2/0:4:1:7 encapsulation ppp
set interfaces ds-4/2/0:4:1:7 unit 0 family inet address 10.255.0.146/30
set interfaces ds-4/2/0:4:1:8 encapsulation ppp
set interfaces ds-4/2/0:4:1:8 unit 0 family inet address 10.255.0.150/30
set interfaces ds-4/2/0:4:1:9 encapsulation ppp
set interfaces ds-4/2/0:4:1:9 unit 0 family inet address 10.255.0.154/30
set interfaces ds-4/2/0:4:1:10 encapsulation ppp
set interfaces ds-4/2/0:4:1:10 unit 0 family inet address 10.255.0.158/30
set interfaces ds-4/2/0:4:1:11 encapsulation ppp
set interfaces ds-4/2/0:4:1:11 unit 0 family inet address 10.255.0.162/30
set interfaces ds-4/2/0:4:1:12 encapsulation ppp
set interfaces ds-4/2/0:4:1:12 unit 0 family inet address 10.255.0.166/30
set interfaces ds-4/2/0:4:1:13 encapsulation ppp
set interfaces ds-4/2/0:4:1:13 unit 0 family inet address 10.255.0.170/30
set interfaces ds-4/2/0:4:1:14 encapsulation ppp
```

```
set interfaces ds-4/2/0:4:1:14 unit 0 family inet address 10.255.0.174/30
set interfaces ds-4/2/0:4:1:15 encapsulation ppp
set interfaces ds-4/2/0:4:1:15 unit 0 family inet address 10.255.0.178/30
set interfaces ds-4/2/0:4:1:16 encapsulation ppp
set interfaces ds-4/2/0:4:1:16 unit 0 family inet address 10.255.0.182/30
set interfaces ds-4/2/0:4:1:17 encapsulation ppp
set interfaces ds-4/2/0:4:1:17 unit 0 family inet address 10.255.0.186/30
set interfaces ds-4/2/0:4:1:18 encapsulation ppp
set interfaces ds-4/2/0:4:1:18 unit 0 family inet address 10.255.0.190/30
set interfaces ds-4/2/0:4:1:19 encapsulation ppp
set interfaces ds-4/2/0:4:1:19 unit 0 family inet address 10.255.0.194/30
set interfaces ds-4/2/0:4:1:20 encapsulation ppp
set interfaces ds-4/2/0:4:1:20 unit 0 family inet address 10.255.0.198/30
set interfaces ds-4/2/0:4:1:21 encapsulation ppp
set interfaces ds-4/2/0:4:1:21 unit 0 family inet address 10.255.0.202/30
set interfaces ds-4/2/0:4:1:22 encapsulation ppp
set interfaces ds-4/2/0:4:1:22 unit 0 family inet address 10.255.0.206/30
set interfaces ds-4/2/0:4:1:23 encapsulation ppp
set interfaces ds-4/2/0:4:1:23 unit 0 family inet address 10.255.0.210/30
set interfaces ds-4/2/0:4:1:24 encapsulation ppp
set interfaces ds-4/2/0:4:1:24 unit 0 family inet address 10.255.0.214/30
set interfaces ct1-4/2/0:4:2 partition 1 timeslots 1-19 interface-type ds
set interfaces ct1-4/2/0:4:2 partition 2 timeslots 20 interface-type ds
set interfaces ct1-4/2/0:4:2 partition 3 timeslots 21 interface-type ds
set interfaces ct1-4/2/0:4:2 partition 4 timeslots 22 interface-type ds
set interfaces ct1-4/2/0:4:2 partition 5 timeslots 23 interface-type ds
set interfaces ct1-4/2/0:4:2 partition 6 timeslots 24 interface-type ds
set interfaces ds-4/2/0:4:2:1 encapsulation ppp
set interfaces ds-4/2/0:4:2:1 unit 0 family inet address 10.255.0.218/30
set interfaces ds-4/2/0:4:2:2 encapsulation ppp
set interfaces ds-4/2/0:4:2:2 unit 0 family inet address 10.120.0.222/30
set interfaces ds-4/2/0:4:2:3 encapsulation ppp
set interfaces ds-4/2/0:4:2:3 unit 0 family inet address 10.120.0.226/30
set interfaces ds-4/2/0:4:2:4 encapsulation ppp
set interfaces ds-4/2/0:4:2:4 unit 0 family inet address 10.120.0.230/30
set interfaces ds-4/2/0:4:2:5 encapsulation ppp
set interfaces ds-4/2/0:4:2:5 unit 0 family inet address 10.120.0.234/30
set interfaces ds-4/2/0:4:2:6 encapsulation ppp
set interfaces ds-4/2/0:4:2:6 unit 0 family inet address 10.120.0.238/30
set interfaces t1-4/2/0:4:3 encapsulation ppp
set interfaces t1-4/2/0:4:3 unit 0 family inet address 10.120.0.242/30
set interfaces t1-4/2/0:4:4 encapsulation ppp
set interfaces t1-4/2/0:4:4 unit 0 family inet address 10.120.0.246/30
set interfaces t1-4/2/0:4:5 encapsulation ppp
set interfaces t1-4/2/0:4:5 unit 0 family inet address 10.120.0.250/30
set interfaces t1-4/2/0:4:6 encapsulation ppp
set interfaces t1-4/2/0:4:6 unit 0 family inet address 10.120.0.254/30
set interfaces t1-4/2/0:4:7 encapsulation ppp
set interfaces t1-4/2/0:4:7 unit 0 family inet address 10.255.1.2/30
set interfaces t1-4/2/0:4:8 encapsulation ppp
set interfaces t1-4/2/0:4:8 unit 0 family inet address 10.255.1.6/30
set interfaces t1-4/2/0:4:9 encapsulation ppp
set interfaces t1-4/2/0:4:9 unit 0 family inet address 10.255.1.10/30
set interfaces t1-4/2/0:4:10 encapsulation ppp
set interfaces t1-4/2/0:4:10 unit 0 family inet address 10.255.1.14/30
set interfaces t1-4/2/0:4:11 encapsulation ppp
```

```
set interfaces t1-4/2/0:4:11 unit 0 family inet address 10.255.1.18/30
set interfaces t1-4/2/0:4:12 encapsulation ppp
set interfaces t1-4/2/0:4:12 unit 0 family inet address 10.255.1.22/30
set interfaces t1-4/2/0:4:13 encapsulation ppp
set interfaces t1-4/2/0:4:13 unit 0 family inet address 10.255.1.26/30
set interfaces t1-4/2/0:4:14 encapsulation ppp
set interfaces t1-4/2/0:4:14 unit 0 family inet address 10.255.1.30/30
set interfaces t1-4/2/0:4:15 encapsulation ppp
set interfaces t1-4/2/0:4:15 unit 0 family inet address 10.255.1.34/30
set interfaces t1-4/2/0:4:16 encapsulation ppp
set interfaces t1-4/2/0:4:16 unit 0 family inet address 10.255.1.38/30
set interfaces t1-4/2/0:4:17 encapsulation ppp
set interfaces t1-4/2/0:4:17 unit 0 family inet address 10.255.1.42/30
set interfaces t1-4/2/0:4:18 encapsulation ppp
set interfaces t1-4/2/0:4:18 unit 0 family inet address 10.255.1.46/30
set interfaces t1-4/2/0:4:19 encapsulation ppp
set interfaces t1-4/2/0:4:19 unit 0 family inet address 10.255.1.50/30
set interfaces t1-4/2/0:4:20 encapsulation ppp
set interfaces t1-4/2/0:4:20 unit 0 family inet address 10.255.1.54/30
set interfaces t1-4/2/0:4:21 encapsulation ppp
set interfaces t1-4/2/0:4:21 unit 0 family inet address 10.255.1.58/30
set interfaces t1-4/2/0:4:22 encapsulation ppp
set interfaces t1-4/2/0:4:22 unit 0 family inet address 10.255.1.62/30
set interfaces t1-4/2/0:4:23 encapsulation ppp
set interfaces t1-4/2/0:4:23 unit 0 family inet address 10.255.1.66/30
set interfaces t1-4/2/0:4:24 encapsulation ppp
set interfaces t1-4/2/0:4:24 unit 0 family inet address 10.255.1.70/30
set interfaces t1-4/2/0:4:25 encapsulation ppp
set interfaces t1-4/2/0:4:25 unit 0 family inet address 10.255.1.74/30
set interfaces t1-4/2/0:4:26 encapsulation ppp
set interfaces t1-4/2/0:4:26 unit 0 family inet address 10.255.1.78/30
set interfaces t1-4/2/0:4:27 encapsulation ppp
set interfaces t1-4/2/0:4:27 unit 0 family inet address 10.255.1.82/30
set interfaces t1-4/2/0:4:28 encapsulation ppp
set interfaces t1-4/2/0:4:28 unit 0 family inet address 10.255.1.86/30
set interfaces t1-4/2/0:6:1 encapsulation ppp
set interfaces t1-4/2/0:6:1 unit 0 family inet address 10.255.1.94/30
set interfaces t1-4/2/0:6:2 encapsulation ppp
set interfaces t1-4/2/0:6:2 unit 0 family inet address 10.255.1.98/30
set interfaces t1-4/2/0:6:3 encapsulation ppp
set interfaces t1-4/2/0:6:3 unit 0 family inet address 10.255.1.102/30
set interfaces t1-4/2/0:6:4 encapsulation ppp
set interfaces t1-4/2/0:6:4 unit 0 family inet address 10.255.1.106/30
set interfaces t1-4/2/0:6:5 encapsulation ppp
set interfaces t1-4/2/0:6:5 unit 0 family inet address 10.255.1.110/30
set interfaces t1-4/2/0:6:6 encapsulation ppp
set interfaces t1-4/2/0:6:6 unit 0 family inet address 10.255.1.114/30
set interfaces t1-4/2/0:6:7 encapsulation ppp
set interfaces t1-4/2/0:6:7 unit 0 family inet address 10.255.1.118/30
set interfaces t1-4/2/0:6:8 encapsulation ppp
set interfaces t1-4/2/0:6:8 unit 0 family inet address 10.255.1.122/30
set interfaces t1-4/2/0:6:9 encapsulation ppp
set interfaces t1-4/2/0:6:9 unit 0 family inet address 10.255.1.126/30
set interfaces t1-4/2/0:6:10 encapsulation ppp
set interfaces t1-4/2/0:6:10 unit 0 family inet address 10.255.1.130/30
set interfaces t1-4/2/0:6:11 encapsulation ppp
```

```
set interfaces t1-4/2/0:6:11 unit 0 family inet address 10.255.1.134/30
set interfaces t1-4/2/0:6:12 encapsulation ppp
set interfaces t1-4/2/0:6:12 unit 0 family inet address 10.255.1.138/30
set interfaces t1-4/2/0:6:13 encapsulation ppp
set interfaces t1-4/2/0:6:13 unit 0 family inet address 10.255.1.142/30
set interfaces t1-4/2/0:6:14 encapsulation ppp
set interfaces t1-4/2/0:6:14 unit 0 family inet address 10.255.1.146/30
set interfaces t1-4/2/0:6:15 encapsulation ppp
set interfaces t1-4/2/0:6:15 unit 0 family inet address 10.255.1.150/30
set interfaces t1-4/2/0:6:16 encapsulation ppp
set interfaces t1-4/2/0:6:16 unit 0 family inet address 10.255.1.154/30
set interfaces t1-4/2/0:6:17 encapsulation ppp
set interfaces t1-4/2/0:6:17 unit 0 family inet address 10.255.1.158/30
set interfaces t1-4/2/0:6:18 encapsulation ppp
set interfaces t1-4/2/0:6:18 unit 0 family inet address 10.255.1.162/30
set interfaces t1-4/2/0:6:19 encapsulation ppp
set interfaces t1-4/2/0:6:19 unit 0 family inet address 10.255.1.166/30
set interfaces t1-4/2/0:6:20 encapsulation ppp
set interfaces t1-4/2/0:6:20 unit 0 family inet address 10.255.1.170/30
set interfaces t1-4/2/0:6:21 encapsulation ppp
set interfaces t1-4/2/0:6:21 unit 0 family inet address 10.255.1.174/30
set interfaces t1-4/2/0:6:22 encapsulation ppp
set interfaces t1-4/2/0:6:22 unit 0 family inet address 10.255.1.178/30
set interfaces t1-4/2/0:6:23 encapsulation ppp
set interfaces t1-4/2/0:6:23 unit 0 family inet address 10.255.1.182/30
set interfaces t1-4/2/0:6:24 encapsulation ppp
set interfaces t1-4/2/0:6:24 unit 0 family inet address 10.255.1.186/30
set interfaces t1-4/2/0:6:25 encapsulation ppp
set interfaces t1-4/2/0:6:25 unit 0 family inet address 10.255.1.190/30
set interfaces t1-4/2/0:6:26 encapsulation ppp
set interfaces t1-4/2/0:6:26 unit 0 family inet address 10.255.1.194/30
set interfaces t1-4/2/0:6:27 encapsulation ppp
set interfaces t1-4/2/0:6:27 unit 0 family inet address 10.255.1.198/30
set interfaces t1-4/2/0:6:28 encapsulation ppp
set interfaces t1-4/2/0:6:28 unit 0 family inet address 10.255.1.202/30
set interfaces ct1-4/2/0:7:1 partition 1 timeslots 1 interface-type ds
set interfaces ct1-4/2/0:7:1 partition 2 timeslots 2 interface-type ds
set interfaces ct1-4/2/0:7:1 partition 3 timeslots 3 interface-type ds
set interfaces ct1-4/2/0:7:1 partition 4 timeslots 4 interface-type ds
set interfaces ct1-4/2/0:7:1 partition 5 timeslots 5 interface-type ds
set interfaces ct1-4/2/0:7:1 partition 6 timeslots 6 interface-type ds
set interfaces ct1-4/2/0:7:1 partition 7 timeslots 7 interface-type ds
set interfaces ct1-4/2/0:7:1 partition 8 timeslots 8 interface-type ds
set interfaces ct1-4/2/0:7:1 partition 9 timeslots 9 interface-type ds
set interfaces ct1-4/2/0:7:1 partition 10 timeslots 10 interface-type ds
set interfaces ct1-4/2/0:7:1 partition 11 timeslots 11 interface-type ds
set interfaces ct1-4/2/0:7:1 partition 12 timeslots 12 interface-type ds
set interfaces ct1-4/2/0:7:1 partition 13 timeslots 13 interface-type ds
set interfaces ct1-4/2/0:7:1 partition 14 timeslots 14 interface-type ds
set interfaces ct1-4/2/0:7:1 partition 15 timeslots 15 interface-type ds
set interfaces ct1-4/2/0:7:1 partition 16 timeslots 16 interface-type ds
set interfaces ct1-4/2/0:7:1 partition 17 timeslots 17 interface-type ds
set interfaces ct1-4/2/0:7:1 partition 18 timeslots 18 interface-type ds
set interfaces ct1-4/2/0:7:1 partition 19 timeslots 19 interface-type ds
set interfaces ct1-4/2/0:7:1 partition 20 timeslots 20 interface-type ds
set interfaces ct1-4/2/0:7:1 partition 21 timeslots 21 interface-type ds
```

```
set interfaces ct1-4/2/0:7:1 partition 22 timeslots 22 interface-type ds
set interfaces ct1-4/2/0:7:1 partition 23 timeslots 23 interface-type ds
set interfaces ct1-4/2/0:7:1 partition 24 timeslots 24 interface-type ds
set interfaces ds-4/2/0:7:1:1 encapsulation ppp
set interfaces ds-4/2/0:7:1:1 unit 0 family inet address 10.255.1.206/30
set interfaces ds-4/2/0:7:1:2 encapsulation ppp
set interfaces ds-4/2/0:7:1:2 unit 0 family inet address 10.255.1.210/30
set interfaces ds-4/2/0:7:1:3 encapsulation ppp
set interfaces ds-4/2/0:7:1:3 unit 0 family inet address 10.255.1.214/30
set interfaces ds-4/2/0:7:1:4 encapsulation ppp
set interfaces ds-4/2/0:7:1:4 unit 0 family inet address 10.255.1.218/30
set interfaces ds-4/2/0:7:1:5 encapsulation ppp
set interfaces ds-4/2/0:7:1:5 unit 0 family inet address 10.255.1.222/30
set interfaces ds-4/2/0:7:1:6 encapsulation ppp
set interfaces ds-4/2/0:7:1:6 unit 0 family inet address 10.255.1.226/30
set interfaces ds-4/2/0:7:1:7 encapsulation ppp
set interfaces ds-4/2/0:7:1:7 unit 0 family inet address 10.255.1.230/30
set interfaces ds-4/2/0:7:1:8 encapsulation ppp
set interfaces ds-4/2/0:7:1:8 unit 0 family inet address 10.255.1.234/30
set interfaces ds-4/2/0:7:1:9 encapsulation ppp
set interfaces ds-4/2/0:7:1:9 unit 0 family inet address 10.255.1.238/30
set interfaces ds-4/2/0:7:1:10 encapsulation ppp
set interfaces ds-4/2/0:7:1:10 unit 0 family inet address 10.255.1.242/30
set interfaces ds-4/2/0:7:1:11 encapsulation ppp
set interfaces ds-4/2/0:7:1:11 unit 0 family inet address 10.255.1.246/30
set interfaces ds-4/2/0:7:1:12 encapsulation ppp
set interfaces ds-4/2/0:7:1:12 unit 0 family inet address 10.255.1.250/30
set interfaces ds-4/2/0:7:1:13 encapsulation ppp
set interfaces ds-4/2/0:7:1:13 unit 0 family inet address 10.255.1.254/30
set interfaces ds-4/2/0:7:1:14 encapsulation ppp
set interfaces ds-4/2/0:7:1:14 unit 0 family inet address 10.255.2.2/30
set interfaces ds-4/2/0:7:1:15 encapsulation ppp
set interfaces ds-4/2/0:7:1:15 unit 0 family inet address 10.255.2.6/30
set interfaces ds-4/2/0:7:1:16 encapsulation ppp
set interfaces ds-4/2/0:7:1:16 unit 0 family inet address 10.255.2.10/30
set interfaces ds-4/2/0:7:1:17 encapsulation ppp
set interfaces ds-4/2/0:7:1:17 unit 0 family inet address 10.255.2.14/30
set interfaces ds-4/2/0:7:1:18 encapsulation ppp
set interfaces ds-4/2/0:7:1:18 unit 0 family inet address 10.255.2.18/30
set interfaces ds-4/2/0:7:1:19 encapsulation ppp
set interfaces ds-4/2/0:7:1:19 unit 0 family inet address 10.255.2.22/30
set interfaces ds-4/2/0:7:1:20 encapsulation ppp
set interfaces ds-4/2/0:7:1:20 unit 0 family inet address 10.255.2.26/30
set interfaces ds-4/2/0:7:1:21 encapsulation ppp
set interfaces ds-4/2/0:7:1:21 unit 0 family inet address 10.255.2.30/30
set interfaces ds-4/2/0:7:1:22 encapsulation ppp
set interfaces ds-4/2/0:7:1:22 unit 0 family inet address 10.255.2.34/30
set interfaces ds-4/2/0:7:1:23 encapsulation ppp
set interfaces ds-4/2/0:7:1:23 unit 0 family inet address 10.255.2.38/30
set interfaces ds-4/2/0:7:1:24 encapsulation ppp
set interfaces ds-4/2/0:7:1:24 unit 0 family inet address 10.255.2.42/30
set interfaces ct1-4/2/0:7:2 partition 1 timeslots 1-19 interface-type ds
set interfaces ct1-4/2/0:7:2 partition 2 timeslots 20 interface-type ds
set interfaces ct1-4/2/0:7:2 partition 3 timeslots 21 interface-type ds
set interfaces ct1-4/2/0:7:2 partition 4 timeslots 22 interface-type ds
set interfaces ct1-4/2/0:7:2 partition 5 timeslots 23 interface-type ds
```

```
set interfaces ct1-4/2/0:7:2 partition 6 timeslots 24 interface-type ds
set interfaces ds-4/2/0:7:2:1 encapsulation ppp
set interfaces ds-4/2/0:7:2:1 unit 0 family inet address 10.255.2.46/30
set interfaces ds-4/2/0:7:2:2 encapsulation ppp
set interfaces ds-4/2/0:7:2:2 unit 0 family inet address 10.255.2.50/30
set interfaces ds-4/2/0:7:2:3 encapsulation ppp
set interfaces ds-4/2/0:7:2:3 unit 0 family inet address 10.255.2.54/30
set interfaces ds-4/2/0:7:2:4 encapsulation ppp
set interfaces ds-4/2/0:7:2:4 unit 0 family inet address 10.255.2.58/30
set interfaces ds-4/2/0:7:2:5 encapsulation ppp
set interfaces ds-4/2/0:7:2:5 unit 0 family inet address 10.255.2.62/30
set interfaces ds-4/2/0:7:2:6 encapsulation ppp
set interfaces ds-4/2/0:7:2:6 unit 0 family inet address 10.255.2.66/30
set interfaces t1-4/2/0:7:3 encapsulation ppp
set interfaces t1-4/2/0:7:3 unit 0 family inet address 10.255.2.70/30
set interfaces t1-4/2/0:7:4 encapsulation ppp
set interfaces t1-4/2/0:7:4 unit 0 family inet address 10.255.2.74/30
set interfaces t1-4/2/0:7:5 encapsulation ppp
set interfaces t1-4/2/0:7:5 unit 0 family inet address 10.255.2.78/30
set interfaces t1-4/2/0:7:6 encapsulation ppp
set interfaces t1-4/2/0:7:6 unit 0 family inet address 10.255.2.82/30
set interfaces t1-4/2/0:7:7 encapsulation ppp
set interfaces t1-4/2/0:7:7 unit 0 family inet address 10.255.2.86/30
set interfaces t1-4/2/0:7:8 encapsulation ppp
set interfaces t1-4/2/0:7:8 unit 0 family inet address 10.255.2.90/30
set interfaces t1-4/2/0:7:9 encapsulation ppp
set interfaces t1-4/2/0:7:9 unit 0 family inet address 10.255.2.94/30
set interfaces t1-4/2/0:7:10 encapsulation ppp
set interfaces t1-4/2/0:7:10 unit 0 family inet address 10.255.2.98/30
set interfaces t1-4/2/0:7:11 encapsulation ppp
set interfaces t1-4/2/0:7:11 unit 0 family inet address 10.255.2.102/30
set interfaces t1-4/2/0:7:12 encapsulation ppp
set interfaces t1-4/2/0:7:12 unit 0 family inet address 10.255.2.106/30
set interfaces t1-4/2/0:7:13 encapsulation ppp
set interfaces t1-4/2/0:7:13 unit 0 family inet address 10.255.2.110/30
set interfaces t1-4/2/0:7:14 encapsulation ppp
set interfaces t1-4/2/0:7:14 unit 0 family inet address 10.255.2.114/30
set interfaces t1-4/2/0:7:15 encapsulation ppp
set interfaces t1-4/2/0:7:15 unit 0 family inet address 10.255.2.118/30
set interfaces t1-4/2/0:7:16 encapsulation ppp
set interfaces t1-4/2/0:7:16 unit 0 family inet address 10.255.2.122/30
set interfaces t1-4/2/0:7:17 encapsulation ppp
set interfaces t1-4/2/0:7:17 unit 0 family inet address 10.255.2.126/30
set interfaces t1-4/2/0:7:18 encapsulation ppp
set interfaces t1-4/2/0:7:18 unit 0 family inet address 10.255.2.130/30
set interfaces t1-4/2/0:7:19 encapsulation ppp
set interfaces t1-4/2/0:7:19 unit 0 family inet address 10.255.2.134/30
set interfaces t1-4/2/0:7:20 encapsulation ppp
set interfaces t1-4/2/0:7:20 unit 0 family inet address 10.255.2.138/30
set interfaces t1-4/2/0:7:21 encapsulation ppp
set interfaces t1-4/2/0:7:21 unit 0 family inet address 10.255.2.142/30
set interfaces t1-4/2/0:7:22 encapsulation ppp
set interfaces t1-4/2/0:7:22 unit 0 family inet address 10.255.2.146/30
set interfaces t1-4/2/0:7:23 encapsulation ppp
set interfaces t1-4/2/0:7:23 unit 0 family inet address 10.255.2.150/30
set interfaces t1-4/2/0:7:24 encapsulation ppp
```

```
set interfaces t1-4/2/0:7:24 unit 0 family inet address 10.255.2.154/30
set interfaces t1-4/2/0:7:25 encapsulation ppp
set interfaces t1-4/2/0:7:25 unit 0 family inet address 10.255.2.158/30
set interfaces t1-4/2/0:7:26 encapsulation ppp
set interfaces t1-4/2/0:7:26 unit 0 family inet address 10.255.2.162/30
set interfaces t1-4/2/0:7:27 encapsulation ppp
set interfaces t1-4/2/0:7:27 unit 0 family inet address 10.255.2.166/30
set interfaces t1-4/2/0:7:28 encapsulation ppp
set interfaces t1-4/2/0:7:28 unit 0 family inet address 10.255.2.170/30
```

### Configuring the Complex Channelization Structure on a Channelized OC12 IQ Interface

---

#### Step-by-Step Procedure

The following example requires that you navigate various levels in the configuration hierarchy. For information about navigating the CLI, see *Using the CLI Editor in Configuration Mode* in the *CLI User Guide*.

To configure the complex channelization structure on a channelized OC12 IQ interface of a router:

1. Partition the coc12-4/2/0 interface to create the OC3 SONET so-4/2/0:1 interface.  

```
[edit]
user@host# set interfaces coc12-4/2/0 partition 1 oc-slice 1-3 interface-type so
```
2. Partition the coc12-4/2/0 interface to create the interfaces coc1-4/2/0:2 through coc1-4/2/0:7.  

```
[edit]
user@host# set interfaces coc12-4/2/0 partition 2 oc-slice 4 interface-type coc1
user@host# set interfaces coc12-4/2/0 partition 3 oc-slice 5 interface-type coc1
user@host# set interfaces coc12-4/2/0 partition 4 oc-slice 6 interface-type coc1
user@host# set interfaces coc12-4/2/0 partition 5 oc-slice 7 interface-type coc1
user@host# set interfaces coc12-4/2/0 partition 6 oc-slice 8 interface-type coc1
user@host# set interfaces coc12-4/2/0 partition 7 oc-slice 9 interface-type coc1
```
3. Partition the coc12-4/2/0 interface to create the OC3 SONET so-4/2/0:8 interface.  

```
[edit]
user@host# set interfaces coc12-4/2/0 partition 8 oc-slice 10-12 interface-type so
```
4. Configure the so-4/2/0:1 interface.  

```
[edit]
user@host# set interfaces encapsulation ppp
user@host# set interfaces unit 0 family inet address 10.255.0.2/30
```
5. Convert the coc1-4/2/0:2 interface into a T3 interface.  

```
[edit]
user@host# set interfaces coc1-4/2/0:2 no-partition interface-type t3
```
6. Configure the t3-4/2/0:2 interface.  

```
[edit]
user@host# set interfaces t3-4/2/0:2 encapsulation ppp
user@host# set interfaces t3-4/2/0:2 unit 0 family inet address 10.255.0.6/30
```
7. Convert the coc1-4/2/0:3 interface into a channelized T3 interface.



- ```
[edit]
user@host# set interfaces coc1-4/2/0:3 no-partition interface-type ct3
```
8. Convert the channelized T3 interface ct3-4/2/0:3 into 28 T1 channels, t1-4/2/0:3:1 through t1-4/2/0:3:28.
 

```
[edit]
user@host# set interfaces ct3-4/2/0:3 partition 1-28 interface-type t1
```
  9. Convert the coc1-4/2/0:4 interface into a channelized T3 interface.
 

```
[edit]
user@host# set interfaces coc1-4/2/0:4 no-partition interface-type ct3
```
  10. Partition the ct3-4/2/0:4 interface to create the ct1-4/2/0:4:1 and ct1-4/2/0:4:1 interfaces.
 

```
[edit]
user@host# set interfaces ct3-4/2/0:4 partition 1-2 interface-type ct1
```
  11. Partition the ct3-4/2/0:4 interface to create the t1-4/2/0:4:3 through t1-4/2/0:4:28 T1 interfaces.
 

```
[edit]
user@host# set interfaces ct3-4/2/0:4 partition 3-28 interface-type t1
```
  12. Convert the coc1-4/2/0:5 interface into a T3 interface.
 

```
[edit]
user@host# set interfaces coc1-4/2/0:5 no-partition interface-type t3
```
  13. Configure the t3-4/2/0:5 interface.
 

```
[edit]
user@host# set interfaces t3-4/2/0:5 encapsulation ppp
user@host# set interfaces t3-4/2/0:5 unit 0 family inet address 10.255.1.90/30
```
  14. Convert the coc1-4/2/0:6 interface into 28 T1 interfaces, t1-4/2/0:6:1 through t1-4/2/0:6:28.
 

```
[edit]
user@host# set interfaces coc1-4/2/0:6 partition 1-28 interface-type t1
```
  15. Partition the coc1-4/2/0:7 interface to create channelized T1 interfaces.
 

```
[edit]
user@host# set interfaces coc1-4/2/0:7 partition 1-2 interface-type ct1
```
  16. Partition the coc1-4/2/0:7 interface to create the t1-4/2/0:7:3 through t1-4/2/0:7:28 T1 interfaces.
 

```
[edit]
user@host# set interfaces coc1-4/2/0:7 partition 3-28 interface-type t1
```
  17. Configure the so-4/2/0:8 interface.
 

```
[edit]
user@host# set interfaces so-4/2/0:8 encapsulation ppp
user@host# set interfaces so-4/2/0:8 unit 0 family inet address 10.255.2.174/30
```
  18. Configure the t1-4/2/0:3:1 through t1-4/2/0:3:28 interfaces.
 

```
[edit]
```

[illegible]

19. Partition the ct1-4/2/0:4:1 interface into 24 DS0 channels, ds-4/2/0:4:1 through ds-4/2/0:4:1:24.

```
[edit]
user@host# set interfaces ct1-4/2/0:4:1 partition 1 timeslots 1 interface-type ds
user@host# set interfaces ct1-4/2/0:4:1 partition 2 timeslots 2 interface-type ds
user@host# set interfaces ct1-4/2/0:4:1 partition 3 timeslots 3 interface-type ds
user@host# set interfaces ct1-4/2/0:4:1 partition 4 timeslots 4 interface-type ds
user@host# set interfaces ct1-4/2/0:4:1 partition 5 timeslots 5 interface-type ds
user@host# set interfaces ct1-4/2/0:4:1 partition 6 timeslots 6 interface-type ds
user@host# set interfaces ct1-4/2/0:4:1 partition 7 timeslots 7 interface-type ds
user@host# set interfaces ct1-4/2/0:4:1 partition 8 timeslots 8 interface-type ds
user@host# set interfaces ct1-4/2/0:4:1 partition 9 timeslots 9 interface-type ds
user@host# set interfaces ct1-4/2/0:4:1 partition 10 timeslots 10 interface-type ds
user@host# set interfaces ct1-4/2/0:4:1 partition 11 timeslots 11 interface-type ds
user@host# set interfaces ct1-4/2/0:4:1 partition 12 timeslots 12 interface-type ds
user@host# set interfaces ct1-4/2/0:4:1 partition 13 timeslots 13 interface-type ds
user@host# set interfaces ct1-4/2/0:4:1 partition 14 timeslots 14 interface-type ds
user@host# set interfaces ct1-4/2/0:4:1 partition 15 timeslots 15 interface-type ds
user@host# set interfaces ct1-4/2/0:4:1 partition 16 timeslots 16 interface-type ds
user@host# set interfaces ct1-4/2/0:4:1 partition 17 timeslots 17 interface-type ds
user@host# set interfaces ct1-4/2/0:4:1 partition 18 timeslots 18 interface-type ds
user@host# set interfaces ct1-4/2/0:4:1 partition 19 timeslots 19 interface-type ds
user@host# set interfaces ct1-4/2/0:4:1 partition 20 timeslots 20 interface-type ds
user@host# set interfaces ct1-4/2/0:4:1 partition 21 timeslots 21 interface-type ds
user@host# set interfaces ct1-4/2/0:4:1 partition 22 timeslots 22 interface-type ds
user@host# set interfaces ct1-4/2/0:4:1 partition 23 timeslots 23 interface-type ds
user@host# set interfaces ct1-4/2/0:4:1 partition 24 timeslots 24 interface-type ds
```

20. Configure the ds-4/2/0:4:1 through ds-4/2/0:4:1:24 interfaces.

```
[edit]
user@host# set interfaces ds-4/2/0:4:1:1 encapsulation ppp
user@host# set interfaces ds-4/2/0:4:1:1 unit 0 family inet address 10.255.0.122/30
user@host# set interfaces ds-4/2/0:4:1:2 encapsulation ppp
user@host# set interfaces ds-4/2/0:4:1:2 unit 0 family inet address 10.255.0.126/30
user@host# set interfaces ds-4/2/0:4:1:3 encapsulation ppp
user@host# set interfaces ds-4/2/0:4:1:3 unit 0 family inet address 10.255.0.130/30
user@host# set interfaces ds-4/2/0:4:1:4 encapsulation ppp
user@host# set interfaces ds-4/2/0:4:1:4 unit 0 family inet address 10.255.0.134/30
user@host# set interfaces ds-4/2/0:4:1:5 encapsulation ppp
user@host# set interfaces ds-4/2/0:4:1:5 unit 0 family inet address 10.255.0.138/30
user@host# set interfaces ds-4/2/0:4:1:6 encapsulation ppp
user@host# set interfaces ds-4/2/0:4:1:6 unit 0 family inet address 10.255.0.142/30
user@host# set interfaces ds-4/2/0:4:1:7 encapsulation ppp
user@host# set interfaces ds-4/2/0:4:1:7 unit 0 family inet address 10.255.0.146/30
user@host# set interfaces ds-4/2/0:4:1:8 encapsulation ppp
user@host# set interfaces ds-4/2/0:4:1:8 unit 0 family inet address 10.255.0.150/30
user@host# set interfaces ds-4/2/0:4:1:9 encapsulation ppp
user@host# set interfaces ds-4/2/0:4:1:9 unit 0 family inet address 10.255.0.154/30
user@host# set interfaces ds-4/2/0:4:1:10 encapsulation ppp
user@host# set interfaces ds-4/2/0:4:1:10 unit 0 family inet address 10.255.0.158/30
user@host# set interfaces ds-4/2/0:4:1:11 encapsulation ppp
user@host# set interfaces ds-4/2/0:4:1:11 unit 0 family inet address 10.255.0.162/30
user@host# set interfaces ds-4/2/0:4:1:12 encapsulation ppp
user@host# set interfaces ds-4/2/0:4:1:12 unit 0 family inet address 10.255.0.166/30
user@host# set interfaces ds-4/2/0:4:1:13 encapsulation ppp
```

```

user@host# set interfaces ds-4/2/0:4:1:13 unit 0 family inet address 10.255.0.170/30
user@host# set interfaces ds-4/2/0:4:1:14 encapsulation ppp
user@host# set interfaces ds-4/2/0:4:1:14 unit 0 family inet address 10.255.0.174/30
user@host# set interfaces ds-4/2/0:4:1:15 encapsulation ppp
user@host# set interfaces ds-4/2/0:4:1:15 unit 0 family inet address 10.255.0.178/30
user@host# set interfaces ds-4/2/0:4:1:16 encapsulation ppp
user@host# set interfaces ds-4/2/0:4:1:16 unit 0 family inet address 10.255.0.182/30
user@host# set interfaces ds-4/2/0:4:1:17 encapsulation ppp
user@host# set interfaces ds-4/2/0:4:1:17 unit 0 family inet address 10.255.0.186/30
user@host# set interfaces ds-4/2/0:4:1:18 encapsulation ppp
user@host# set interfaces ds-4/2/0:4:1:18 unit 0 family inet address 10.255.0.190/30
user@host# set interfaces ds-4/2/0:4:1:19 encapsulation ppp
user@host# set interfaces ds-4/2/0:4:1:19 unit 0 family inet address 10.255.0.194/30
user@host# set interfaces ds-4/2/0:4:1:20 encapsulation ppp
user@host# set interfaces ds-4/2/0:4:1:20 unit 0 family inet address 10.255.0.198/30
user@host# set interfaces ds-4/2/0:4:1:21 encapsulation ppp
user@host# set interfaces ds-4/2/0:4:1:21 unit 0 family inet address 10.255.0.202/30
user@host# set interfaces ds-4/2/0:4:1:22 encapsulation ppp
user@host# set interfaces ds-4/2/0:4:1:22 unit 0 family inet address 10.255.0.206/30
user@host# set interfaces ds-4/2/0:4:1:23 encapsulation ppp
user@host# set interfaces ds-4/2/0:4:1:23 unit 0 family inet address 10.255.0.210/30
user@host# set interfaces ds-4/2/0:4:1:24 encapsulation ppp
user@host# set interfaces ds-4/2/0:4:1:24 unit 0 family inet address 10.255.0.214/30

```

21. Partition the ct1-4/2/0:4:2 interface to create a channel group of 19 DS0s.

```

[edit]
user@host# set interfaces ct1-4/2/0:4:2 partition 1 timeslots 1-19 interface-type ds

```

22. Partition the ct1-4/2/0:4:2 interface to create the ds-4/2/0:4:2:2 through ds-4/2/0:4:2:6 interfaces (64-Kbps single NxDS0 channels).

```

[edit]
user@host# set interfaces ct1-4/2/0:4:2 partition 2 timeslots 20 interface-type ds
user@host# set interfaces ct1-4/2/0:4:2 partition 3 timeslots 21 interface-type ds
user@host# set interfaces ct1-4/2/0:4:2 partition 4 timeslots 22 interface-type ds
user@host# set interfaces ct1-4/2/0:4:2 partition 5 timeslots 23 interface-type ds
user@host# set interfaces ct1-4/2/0:4:2 partition 6 timeslots 24 interface-type ds

```

23. Configure the ds-4/2/0:4:2:1 interface (channel group of 19 DS0s).

```

[edit]
user@host# set interfaces ds-4/2/0:4:2:1 encapsulation ppp
user@host# set interfaces ds-4/2/0:4:2:1 unit 0 family inet address 10.255.0.218/30

```

24. Configure the ds-4/2/0:4:2:2 through ds-4/2/0:4:2:6 interfaces (64-Kbps single NxDS0 channels).

```

[edit]
user@host# set interfaces ds-4/2/0:4:2:2 encapsulation ppp
user@host# set interfaces ds-4/2/0:4:2:2 unit 0 family inet address 10.120.0.222/30
user@host# set interfaces ds-4/2/0:4:2:3 encapsulation ppp
user@host# set interfaces ds-4/2/0:4:2:3 unit 0 family inet address 10.120.0.226/30
user@host# set interfaces ds-4/2/0:4:2:4 encapsulation ppp
user@host# set interfaces ds-4/2/0:4:2:4 unit 0 family inet address 10.120.0.230/30
user@host# set interfaces ds-4/2/0:4:2:5 encapsulation ppp
user@host# set interfaces ds-4/2/0:4:2:5 unit 0 family inet address 10.120.0.234/30
user@host# set interfaces ds-4/2/0:4:2:6 encapsulation ppp

```

```
user@host# set interfaces ds-4/2/0:4:2:6 unit 0 family inet address 10.120.0.238/30
```

25. Configure the t1-4/2/0:4:3 through t1-4/2/0:4:28 interfaces.

```
[edit]
user@host# set interfaces t1-4/2/0:4:3 encapsulation ppp
user@host# set interfaces t1-4/2/0:4:3 unit 0 family inet address 10.120.0.242/30
user@host# set interfaces t1-4/2/0:4:4 encapsulation ppp
user@host# set interfaces t1-4/2/0:4:4 unit 0 family inet address 10.120.0.246/30
user@host# set interfaces t1-4/2/0:4:5 encapsulation ppp
user@host# set interfaces t1-4/2/0:4:5 unit 0 family inet address 10.120.0.250/30
user@host# set interfaces t1-4/2/0:4:6 encapsulation ppp
user@host# set interfaces t1-4/2/0:4:6 unit 0 family inet address 10.120.0.254/30
user@host# set interfaces t1-4/2/0:4:7 encapsulation ppp
user@host# set interfaces t1-4/2/0:4:7 unit 0 family inet address 10.255.1.2/30
user@host# set interfaces t1-4/2/0:4:8 encapsulation ppp
user@host# set interfaces t1-4/2/0:4:8 unit 0 family inet address 10.255.1.6/30
user@host# set interfaces t1-4/2/0:4:9 encapsulation ppp
user@host# set interfaces t1-4/2/0:4:9 unit 0 family inet address 10.255.1.10/30
user@host# set interfaces t1-4/2/0:4:10 encapsulation ppp
user@host# set interfaces t1-4/2/0:4:10 unit 0 family inet address 10.255.1.14/30
user@host# set interfaces t1-4/2/0:4:11 encapsulation ppp
user@host# set interfaces t1-4/2/0:4:11 unit 0 family inet address 10.255.1.18/30
user@host# set interfaces t1-4/2/0:4:12 encapsulation ppp
user@host# set interfaces t1-4/2/0:4:12 unit 0 family inet address 10.255.1.22/30
user@host# set interfaces t1-4/2/0:4:13 encapsulation ppp
user@host# set interfaces t1-4/2/0:4:13 unit 0 family inet address 10.255.1.26/30
user@host# set interfaces t1-4/2/0:4:14 encapsulation ppp
user@host# set interfaces t1-4/2/0:4:14 unit 0 family inet address 10.255.1.30/30
user@host# set interfaces t1-4/2/0:4:15 encapsulation ppp
user@host# set interfaces t1-4/2/0:4:15 unit 0 family inet address 10.255.1.34/30
user@host# set interfaces t1-4/2/0:4:16 encapsulation ppp
user@host# set interfaces t1-4/2/0:4:16 unit 0 family inet address 10.255.1.38/30
user@host# set interfaces t1-4/2/0:4:17 encapsulation ppp
user@host# set interfaces t1-4/2/0:4:17 unit 0 family inet address 10.255.1.42/30
user@host# set interfaces t1-4/2/0:4:18 encapsulation ppp
user@host# set interfaces t1-4/2/0:4:18 unit 0 family inet address 10.255.1.46/30
user@host# set interfaces t1-4/2/0:4:19 encapsulation ppp
user@host# set interfaces t1-4/2/0:4:19 unit 0 family inet address 10.255.1.50/30
user@host# set interfaces t1-4/2/0:4:20 encapsulation ppp
user@host# set interfaces t1-4/2/0:4:20 unit 0 family inet address 10.255.1.54/30
user@host# set interfaces t1-4/2/0:4:21 encapsulation ppp
user@host# set interfaces t1-4/2/0:4:21 unit 0 family inet address 10.255.1.58/30
user@host# set interfaces t1-4/2/0:4:22 encapsulation ppp
user@host# set interfaces t1-4/2/0:4:22 unit 0 family inet address 10.255.1.62/30
user@host# set interfaces t1-4/2/0:4:23 encapsulation ppp
user@host# set interfaces t1-4/2/0:4:23 unit 0 family inet address 10.255.1.66/30
user@host# set interfaces t1-4/2/0:4:24 encapsulation ppp
user@host# set interfaces t1-4/2/0:4:24 unit 0 family inet address 10.255.1.70/30
user@host# set interfaces t1-4/2/0:4:25 encapsulation ppp
user@host# set interfaces t1-4/2/0:4:25 unit 0 family inet address 10.255.1.74/30
user@host# set interfaces t1-4/2/0:4:26 encapsulation ppp
user@host# set interfaces t1-4/2/0:4:26 unit 0 family inet address 10.255.1.78/30
user@host# set interfaces t1-4/2/0:4:27 encapsulation ppp
user@host# set interfaces t1-4/2/0:4:27 unit 0 family inet address 10.255.1.82/30
user@host# set interfaces t1-4/2/0:4:28 encapsulation ppp
```

```
user@host# set interfaces t1-4/2/0:4:28 unit 0 family inet address 10.255.1.86/30
```

26. Configure the t1-4/2/0:6:1 through t1-4/2/0:6:28 interfaces.

```
[edit]
```

```
user@host# set interfaces t1-4/2/0:6:1 encapsulation ppp
user@host# set interfaces t1-4/2/0:6:1 unit 0 family inet address 10.255.1.94/30
user@host# set interfaces t1-4/2/0:6:2 encapsulation ppp
user@host# set interfaces t1-4/2/0:6:2 unit 0 family inet address 10.255.1.98/30
user@host# set interfaces t1-4/2/0:6:3 encapsulation ppp
user@host# set interfaces t1-4/2/0:6:3 unit 0 family inet address 10.255.1.102/30
user@host# set interfaces t1-4/2/0:6:4 encapsulation ppp
user@host# set interfaces t1-4/2/0:6:4 unit 0 family inet address 10.255.1.106/30
user@host# set interfaces t1-4/2/0:6:5 encapsulation ppp
user@host# set interfaces t1-4/2/0:6:5 unit 0 family inet address 10.255.1.110/30
user@host# set interfaces t1-4/2/0:6:6 encapsulation ppp
user@host# set interfaces t1-4/2/0:6:6 unit 0 family inet address 10.255.1.114/30
user@host# set interfaces t1-4/2/0:6:7 encapsulation ppp
user@host# set interfaces t1-4/2/0:6:7 unit 0 family inet address 10.255.1.118/30
user@host# set interfaces t1-4/2/0:6:8 encapsulation ppp
user@host# set interfaces t1-4/2/0:6:8 unit 0 family inet address 10.255.1.122/30
user@host# set interfaces t1-4/2/0:6:9 encapsulation ppp
user@host# set interfaces t1-4/2/0:6:9 unit 0 family inet address 10.255.1.126/30
user@host# set interfaces t1-4/2/0:6:10 encapsulation ppp
user@host# set interfaces t1-4/2/0:6:10 unit 0 family inet address 10.255.1.130/30
user@host# set interfaces t1-4/2/0:6:11 encapsulation ppp
user@host# set interfaces t1-4/2/0:6:11 unit 0 family inet address 10.255.1.134/30
user@host# set interfaces t1-4/2/0:6:12 encapsulation ppp
user@host# set interfaces t1-4/2/0:6:12 unit 0 family inet address 10.255.1.138/30
user@host# set interfaces t1-4/2/0:6:13 encapsulation ppp
user@host# set interfaces t1-4/2/0:6:13 unit 0 family inet address 10.255.1.142/30
user@host# set interfaces t1-4/2/0:6:14 encapsulation ppp
user@host# set interfaces t1-4/2/0:6:14 unit 0 family inet address 10.255.1.146/30
user@host# set interfaces t1-4/2/0:6:15 encapsulation ppp
user@host# set interfaces t1-4/2/0:6:15 unit 0 family inet address 10.255.1.150/30
user@host# set interfaces t1-4/2/0:6:16 encapsulation ppp
user@host# set interfaces t1-4/2/0:6:16 unit 0 family inet address 10.255.1.154/30
user@host# set interfaces t1-4/2/0:6:17 encapsulation ppp
user@host# set interfaces t1-4/2/0:6:17 unit 0 family inet address 10.255.1.158/30
user@host# set interfaces t1-4/2/0:6:18 encapsulation ppp
user@host# set interfaces t1-4/2/0:6:18 unit 0 family inet address 10.255.1.162/30
user@host# set interfaces t1-4/2/0:6:19 encapsulation ppp
user@host# set interfaces t1-4/2/0:6:19 unit 0 family inet address 10.255.1.166/30
user@host# set interfaces t1-4/2/0:6:20 encapsulation ppp
user@host# set interfaces t1-4/2/0:6:20 unit 0 family inet address 10.255.1.170/30
user@host# set interfaces t1-4/2/0:6:21 encapsulation ppp
user@host# set interfaces t1-4/2/0:6:21 unit 0 family inet address 10.255.1.174/30
user@host# set interfaces t1-4/2/0:6:22 encapsulation ppp
user@host# set interfaces t1-4/2/0:6:22 unit 0 family inet address 10.255.1.178/30
user@host# set interfaces t1-4/2/0:6:23 encapsulation ppp
user@host# set interfaces t1-4/2/0:6:23 unit 0 family inet address 10.255.1.182/30
user@host# set interfaces t1-4/2/0:6:24 encapsulation ppp
user@host# set interfaces t1-4/2/0:6:24 unit 0 family inet address 10.255.1.186/30
user@host# set interfaces t1-4/2/0:6:25 encapsulation ppp
user@host# set interfaces t1-4/2/0:6:25 unit 0 family inet address 10.255.1.190/30
user@host# set interfaces t1-4/2/0:6:26 encapsulation ppp
```

```

user@host# set interfaces t1-4/2/0:6:26 unit 0 family inet address 10.255.1.194/30
user@host# set interfaces t1-4/2/0:6:27 encapsulation ppp
user@host# set interfaces t1-4/2/0:6:27 unit 0 family inet address 10.255.1.198/30
user@host# set interfaces t1-4/2/0:6:28 encapsulation ppp
user@host# set interfaces t1-4/2/0:6:28 unit 0 family inet address 10.255.1.202/30

```

27. Partition the ct1-4/2/0:7:1 interface to create the ds-4/2/0:7:1:1 through ds-4/2/0:7:1:24 interfaces (24 DSO channels).

```

[edit]
user@host# set interfaces ct1-4/2/0:7:1 partition 1 timeslots 1 interface-type ds
user@host# set interfaces ct1-4/2/0:7:1 partition 2 timeslots 2 interface-type ds
user@host# set interfaces ct1-4/2/0:7:1 partition 3 timeslots 3 interface-type ds
user@host# set interfaces ct1-4/2/0:7:1 partition 4 timeslots 4 interface-type ds
user@host# set interfaces ct1-4/2/0:7:1 partition 5 timeslots 5 interface-type ds
user@host# set interfaces ct1-4/2/0:7:1 partition 6 timeslots 6 interface-type ds
user@host# set interfaces ct1-4/2/0:7:1 partition 7 timeslots 7 interface-type ds
user@host# set interfaces ct1-4/2/0:7:1 partition 8 timeslots 8 interface-type ds
user@host# set interfaces ct1-4/2/0:7:1 partition 9 timeslots 9 interface-type ds
user@host# set interfaces ct1-4/2/0:7:1 partition 10 timeslots 10 interface-type ds
user@host# set interfaces ct1-4/2/0:7:1 partition 11 timeslots 11 interface-type ds
user@host# set interfaces ct1-4/2/0:7:1 partition 12 timeslots 12 interface-type ds
user@host# set interfaces ct1-4/2/0:7:1 partition 13 timeslots 13 interface-type ds
user@host# set interfaces ct1-4/2/0:7:1 partition 14 timeslots 14 interface-type ds
user@host# set interfaces ct1-4/2/0:7:1 partition 15 timeslots 15 interface-type ds
user@host# set interfaces ct1-4/2/0:7:1 partition 16 timeslots 16 interface-type ds
user@host# set interfaces ct1-4/2/0:7:1 partition 17 timeslots 17 interface-type ds
user@host# set interfaces ct1-4/2/0:7:1 partition 18 timeslots 18 interface-type ds
user@host# set interfaces ct1-4/2/0:7:1 partition 19 timeslots 19 interface-type ds
user@host# set interfaces ct1-4/2/0:7:1 partition 20 timeslots 20 interface-type ds
user@host# set interfaces ct1-4/2/0:7:1 partition 21 timeslots 21 interface-type ds
user@host# set interfaces ct1-4/2/0:7:1 partition 22 timeslots 22 interface-type ds
user@host# set interfaces ct1-4/2/0:7:1 partition 23 timeslots 23 interface-type ds
user@host# set interfaces ct1-4/2/0:7:1 partition 24 timeslots 24 interface-type ds

```

28. Configure the ds-4/2/0:7:1:1 through ds-4/2/0:7:1:24 interfaces.

```

[edit]
user@host# set interfaces ds-4/2/0:7:1:1 encapsulation ppp
user@host# set interfaces ds-4/2/0:7:1:1 unit 0 family inet address 10.255.1.206/30
user@host# set interfaces ds-4/2/0:7:1:2 encapsulation ppp
user@host# set interfaces ds-4/2/0:7:1:2 unit 0 family inet address 10.255.1.210/30
user@host# set interfaces ds-4/2/0:7:1:3 encapsulation ppp
user@host# set interfaces ds-4/2/0:7:1:3 unit 0 family inet address 10.255.1.214/30
user@host# set interfaces ds-4/2/0:7:1:4 encapsulation ppp
user@host# set interfaces ds-4/2/0:7:1:4 unit 0 family inet address 10.255.1.218/30
user@host# set interfaces ds-4/2/0:7:1:5 encapsulation ppp
user@host# set interfaces ds-4/2/0:7:1:5 unit 0 family inet address 10.255.1.222/30
user@host# set interfaces ds-4/2/0:7:1:6 encapsulation ppp
user@host# set interfaces ds-4/2/0:7:1:6 unit 0 family inet address 10.255.1.226/30
user@host# set interfaces ds-4/2/0:7:1:7 encapsulation ppp
user@host# set interfaces ds-4/2/0:7:1:7 unit 0 family inet address 10.255.1.230/30
user@host# set interfaces ds-4/2/0:7:1:8 encapsulation ppp
user@host# set interfaces ds-4/2/0:7:1:8 unit 0 family inet address 10.255.1.234/30
user@host# set interfaces ds-4/2/0:7:1:9 encapsulation ppp
user@host# set interfaces ds-4/2/0:7:1:9 unit 0 family inet address 10.255.1.238/30
user@host# set interfaces ds-4/2/0:7:1:10 encapsulation ppp

```

```

user@host# set interfaces ds-4/2/0:7:1:10 unit 0 family inet address 10.255.1.242/30
user@host# set interfaces ds-4/2/0:7:1:11 encapsulation ppp
user@host# set interfaces ds-4/2/0:7:1:11 unit 0 family inet address 10.255.1.246/30
user@host# set interfaces ds-4/2/0:7:1:12 encapsulation ppp
user@host# set interfaces ds-4/2/0:7:1:12 unit 0 family inet address 10.255.1.250/30
user@host# set interfaces ds-4/2/0:7:1:13 encapsulation ppp
user@host# set interfaces ds-4/2/0:7:1:13 unit 0 family inet address 10.255.1.254/30
user@host# set interfaces ds-4/2/0:7:1:14 encapsulation ppp
user@host# set interfaces ds-4/2/0:7:1:14 unit 0 family inet address 10.255.2.2/30
user@host# set interfaces ds-4/2/0:7:1:15 encapsulation ppp
user@host# set interfaces ds-4/2/0:7:1:15 unit 0 family inet address 10.255.2.6/30
user@host# set interfaces ds-4/2/0:7:1:16 encapsulation ppp
user@host# set interfaces ds-4/2/0:7:1:16 unit 0 family inet address 10.255.2.10/30
user@host# set interfaces ds-4/2/0:7:1:17 encapsulation ppp
user@host# set interfaces ds-4/2/0:7:1:17 unit 0 family inet address 10.255.2.14/30
user@host# set interfaces ds-4/2/0:7:1:18 encapsulation ppp
user@host# set interfaces ds-4/2/0:7:1:18 unit 0 family inet address 10.255.2.18/30
user@host# set interfaces ds-4/2/0:7:1:19 encapsulation ppp
user@host# set interfaces ds-4/2/0:7:1:19 unit 0 family inet address 10.255.2.22/30
user@host# set interfaces ds-4/2/0:7:1:20 encapsulation ppp
user@host# set interfaces ds-4/2/0:7:1:20 unit 0 family inet address 10.255.2.26/30
user@host# set interfaces ds-4/2/0:7:1:21 encapsulation ppp
user@host# set interfaces ds-4/2/0:7:1:21 unit 0 family inet address 10.255.2.30/30
user@host# set interfaces ds-4/2/0:7:1:22 encapsulation ppp
user@host# set interfaces ds-4/2/0:7:1:22 unit 0 family inet address 10.255.2.34/30
user@host# set interfaces ds-4/2/0:7:1:23 encapsulation ppp
user@host# set interfaces ds-4/2/0:7:1:23 unit 0 family inet address 10.255.2.38/30
user@host# set interfaces ds-4/2/0:7:1:24 encapsulation ppp
user@host# set interfaces ds-4/2/0:7:1:24 unit 0 family inet address 10.255.2.42/30

```

29. Partition the ct1-4/2/0:7:2 interface to create a channel group of 19 DS0s.

```

[edit]
user@host# set interfaces ct1-4/2/0:7:2 partition 1 timeslots 1-19 interface-type ds

```

30. Partition the ct1-4/2/0:7:2 interface to create the ds-4/2/0:7:2:2 through ds-4/2/0:7:2:6 interfaces (64-Kbps single NxDS0 channels).

```

[edit]
user@host# set interfaces ct1-4/2/0:7:2 partition 2 timeslots 20 interface-type ds
user@host# set interfaces ct1-4/2/0:7:2 partition 3 timeslots 21 interface-type ds
user@host# set interfaces ct1-4/2/0:7:2 partition 4 timeslots 22 interface-type ds
user@host# set interfaces ct1-4/2/0:7:2 partition 5 timeslots 23 interface-type ds
user@host# set interfaces ct1-4/2/0:7:2 partition 6 timeslots 24 interface-type ds

```

31. Configure the ds-4/2/0:7:2:1 interface (channel group with 19 DS0s).

```

[edit]
user@host# set interfaces ds-4/2/0:7:2:1 encapsulation ppp
user@host# set interfaces ds-4/2/0:7:2:1 unit 0 family inet address 10.255.2.46/30

```

32. Configure the ds-4/2/0:7:2:2 through ds-4/2/0:7:2:6 interfaces.

```

[edit]
user@host# set interfaces ds-4/2/0:7:2:2 encapsulation ppp
user@host# set interfaces ds-4/2/0:7:2:2 unit 0 family inet address 10.255.2.50/30
user@host# set interfaces ds-4/2/0:7:2:3 encapsulation ppp
user@host# set interfaces ds-4/2/0:7:2:3 unit 0 family inet address 10.255.2.54/30
user@host# set interfaces ds-4/2/0:7:2:4 encapsulation ppp

```



```

user@host# set interfaces ds-4/2/0:7:2:4 unit 0 family inet address 10.255.2.58/30
user@host# set interfaces ds-4/2/0:7:2:5 encapsulation ppp
user@host# set interfaces ds-4/2/0:7:2:5 unit 0 family inet address 10.255.2.62/30
user@host# set interfaces ds-4/2/0:7:2:6 encapsulation ppp
user@host# set interfaces ds-4/2/0:7:2:6 unit 0 family inet address 10.255.2.66/30

```

33. Configure the t1-4/2/0:7:3 through t1-4/2/0:7:28 interfaces.

```

[edit]
user@host# set interfaces t1-4/2/0:7:3 encapsulation ppp
user@host# set interfaces t1-4/2/0:7:3 unit 0 family inet address 10.255.2.70/30
user@host# set interfaces t1-4/2/0:7:4 encapsulation ppp
user@host# set interfaces t1-4/2/0:7:4 unit 0 family inet address 10.255.2.74/30
user@host# set interfaces t1-4/2/0:7:5 encapsulation ppp
user@host# set interfaces t1-4/2/0:7:5 unit 0 family inet address 10.255.2.78/30
user@host# set interfaces t1-4/2/0:7:6 encapsulation ppp
user@host# set interfaces t1-4/2/0:7:6 unit 0 family inet address 10.255.2.82/30
user@host# set interfaces t1-4/2/0:7:7 encapsulation ppp
user@host# set interfaces t1-4/2/0:7:7 unit 0 family inet address 10.255.2.86/30
user@host# set interfaces t1-4/2/0:7:8 encapsulation ppp
user@host# set interfaces t1-4/2/0:7:8 unit 0 family inet address 10.255.2.90/30
user@host# set interfaces t1-4/2/0:7:9 encapsulation ppp
user@host# set interfaces t1-4/2/0:7:9 unit 0 family inet address 10.255.2.94/30
user@host# set interfaces t1-4/2/0:7:10 encapsulation ppp
user@host# set interfaces t1-4/2/0:7:10 unit 0 family inet address 10.255.2.98/30
user@host# set interfaces t1-4/2/0:7:11 encapsulation ppp
user@host# set interfaces t1-4/2/0:7:11 unit 0 family inet address 10.255.2.102/30
user@host# set interfaces t1-4/2/0:7:12 encapsulation ppp
user@host# set interfaces t1-4/2/0:7:12 unit 0 family inet address 10.255.2.106/30
user@host# set interfaces t1-4/2/0:7:13 encapsulation ppp
user@host# set interfaces t1-4/2/0:7:13 unit 0 family inet address 10.255.2.110/30
user@host# set interfaces t1-4/2/0:7:14 encapsulation ppp
user@host# set interfaces t1-4/2/0:7:14 unit 0 family inet address 10.255.2.114/30
user@host# set interfaces t1-4/2/0:7:15 encapsulation ppp
user@host# set interfaces t1-4/2/0:7:15 unit 0 family inet address 10.255.2.118/30
user@host# set interfaces t1-4/2/0:7:16 encapsulation ppp
user@host# set interfaces t1-4/2/0:7:16 unit 0 family inet address 10.255.2.122/30
user@host# set interfaces t1-4/2/0:7:17 encapsulation ppp
user@host# set interfaces t1-4/2/0:7:17 unit 0 family inet address 10.255.2.126/30
user@host# set interfaces t1-4/2/0:7:18 encapsulation ppp
user@host# set interfaces t1-4/2/0:7:18 unit 0 family inet address 10.255.2.130/30
user@host# set interfaces t1-4/2/0:7:19 encapsulation ppp
user@host# set interfaces t1-4/2/0:7:19 unit 0 family inet address 10.255.2.134/30
user@host# set interfaces t1-4/2/0:7:20 encapsulation ppp
user@host# set interfaces t1-4/2/0:7:20 unit 0 family inet address 10.255.2.138/30
user@host# set interfaces t1-4/2/0:7:21 encapsulation ppp
user@host# set interfaces t1-4/2/0:7:21 unit 0 family inet address 10.255.2.142/30
user@host# set interfaces t1-4/2/0:7:22 encapsulation ppp
user@host# set interfaces t1-4/2/0:7:22 unit 0 family inet address 10.255.2.146/30
user@host# set interfaces t1-4/2/0:7:23 encapsulation ppp
user@host# set interfaces t1-4/2/0:7:23 unit 0 family inet address 10.255.2.150/30
user@host# set interfaces t1-4/2/0:7:24 encapsulation ppp
user@host# set interfaces t1-4/2/0:7:24 unit 0 family inet address 10.255.2.154/30
user@host# set interfaces t1-4/2/0:7:25 encapsulation ppp
user@host# set interfaces t1-4/2/0:7:25 unit 0 family inet address 10.255.2.158/30
user@host# set interfaces t1-4/2/0:7:26 encapsulation ppp

```

```

user@host# set interfaces t1-4/2/0:7:26 unit 0 family inet address 10.255.2.162/30
user@host# set interfaces t1-4/2/0:7:27 encapsulation ppp
user@host# set interfaces t1-4/2/0:7:27 unit 0 family inet address 10.255.2.166/30
user@host# set interfaces t1-4/2/0:7:28 encapsulation ppp
user@host# set interfaces t1-4/2/0:7:28 unit 0 family inet address 10.255.2.170/30

```

34. Commit the configuration.

```

[edit]
user@host# commit

```

## Results

From configuration mode, confirm your configuration by issuing the **show interfaces** command. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.



**NOTE:** The output of the **show interfaces** command has been truncated for brevity.

```

[edit]
user@host# show interfaces
coc12-4/2/0 {
    partition 1 oc-slice 1-3 interface-type so;
    partition 2 oc-slice 4 interface-type coc1;
    partition 3 oc-slice 5 interface-type coc1;
    partition 4 oc-slice 6 interface-type coc1;
    partition 5 oc-slice 7 interface-type coc1;
    partition 6 oc-slice 8 interface-type coc1;
    partition 7 oc-slice 9 interface-type coc1;
    partition 8 oc-slice 10-12 interface-type so;
}
so-4/2/0:1 {
    encapsulation ppp;
    unit 0 {
        family inet {
            address 10.255.0.2/30;
        }
    }
}
coc1-4/2/0:2 {
    no-partition interface-type t3;
}
t3-4/2/0:2 {
    encapsulation ppp;
    unit 0 {
        family inet {
            address 10.255.0.6/30;
        }
    }
}
coc1-4/2/0:3 {

```

```

    no-partition interface-type ct3;
}
ct3-4/2/0:3 {
    partition 1-28 interface-type t1;
}
coc1-4/2/0:4 {
    no-partition interface-type ct3;
}
ct3-4/2/0:4 {
    partition 1-2 interface-type ct1;
    partition 3-28 interface-type t1;
}
coc1-4/2/0:5 {
    no-partition interface-type t3;
}
t3-4/2/0:5 {
    encapsulation ppp;
    unit 0 {
        family inet {
            address 10.255.1.90/30;
        }
    }
}
coc1-4/2/0:6 {
    partition 1-28 interface-type t1;
}
coc1-4/2/0:7 {
    partition 1-2 interface-type ct1;
    partition 3-28 interface-type t1;
}
so-4/2/0:8 {
    encapsulation ppp;
    unit 0 {
        family inet {
            address 10.255.2.174/30;
        }
    }
}
t1-4/2/0:3:1 {
    encapsulation ppp;
    unit 0 {
        family inet {
            address 10.255.0.10/30;
        }
    }
}
...
t1-4/2/0:3:28 {
    encapsulation ppp;
    unit 0 {
        family inet {
            address 10.255.0.118/30;
        }
    }
}
ct1-4/2/0:4:1 {

```

```
partition 1 timeslots 1 interface-type ds;
partition 2 timeslots 2 interface-type ds;
partition 3 timeslots 3 interface-type ds;
partition 4 timeslots 4 interface-type ds;
partition 5 timeslots 5 interface-type ds;
partition 6 timeslots 6 interface-type ds;
partition 7 timeslots 7 interface-type ds;
partition 8 timeslots 8 interface-type ds;
partition 9 timeslots 9 interface-type ds;
partition 10 timeslots 10 interface-type ds;
partition 11 timeslots 11 interface-type ds;
partition 12 timeslots 12 interface-type ds;
partition 13 timeslots 13 interface-type ds;
partition 14 timeslots 14 interface-type ds;
partition 15 timeslots 15 interface-type ds;
partition 16 timeslots 16 interface-type ds;
partition 17 timeslots 17 interface-type ds;
partition 18 timeslots 18 interface-type ds;
partition 19 timeslots 19 interface-type ds;
partition 20 timeslots 20 interface-type ds;
partition 21 timeslots 21 interface-type ds;
partition 22 timeslots 22 interface-type ds;
partition 23 timeslots 23 interface-type ds;
partition 24 timeslots 24 interface-type ds;
}
ds-4/2/0:4:1:1 {
    encapsulation ppp;
    unit 0 {
        family inet {
            address 10.255.0.122/30;
        }
    }
}
...
ds-4/2/0:4:1:24 {
    encapsulation ppp;
    unit 0 {
        family inet {
            address 10.255.0.214/30;
        }
    }
}
ct1-4/2/0:4:2 {
    partition 1 timeslots 1-19 interface-type ds;
    partition 2 timeslots 20 interface-type ds;
    partition 3 timeslots 21 interface-type ds;
    partition 4 timeslots 22 interface-type ds;
    partition 5 timeslots 23 interface-type ds;
    partition 6 timeslots 24 interface-type ds;
}
ds-4/2/0:4:2:1 {
    encapsulation ppp;
    unit 0 {
        family inet {
            address 10.255.0.218/30;
        }
    }
}
```

```

    }
  }
  ds-4/2/0:4:2:2 {
    encapsulation ppp;
    unit 0 {
      family inet {
        address 10.120.0.222/30;
      }
    }
  }
  ...
  ds-4/2/0:4:2:6 {
    encapsulation ppp;
    unit 0 {
      family inet {
        address 10.120.0.238/30;
      }
    }
  }
  t1-4/2/0:4:3 {
    encapsulation ppp;
    unit 0 {
      family inet {
        address 10.120.0.242/30;
      }
    }
  }
  ...
  t1-4/2/0:4:28 {
    encapsulation ppp;
    unit 0 {
      family inet {
        address 10.255.1.86/30;
      }
    }
  }
  t1-4/2/0:6:1 {
    encapsulation ppp;
    unit 0 {
      family inet {
        address 10.255.1.94/30;
      }
    }
  }
  ...
  t1-4/2/0:6:28 {
    encapsulation ppp;
    unit 0 {
      family inet {
        address 10.255.1.202/30;
      }
    }
  }
  ct1-4/2/0:7:1 {
    partition 1 timeslots 1 interface-type ds;
    partition 2 timeslots 2 interface-type ds;
  }

```

```
partition 3 timeslots 3 interface-type ds;
partition 4 timeslots 4 interface-type ds;
partition 5 timeslots 5 interface-type ds;
partition 6 timeslots 6 interface-type ds;
partition 7 timeslots 7 interface-type ds;
partition 8 timeslots 8 interface-type ds;
partition 9 timeslots 9 interface-type ds;
partition 10 timeslots 10 interface-type ds;
partition 11 timeslots 11 interface-type ds;
partition 12 timeslots 12 interface-type ds;
partition 13 timeslots 13 interface-type ds;
partition 14 timeslots 14 interface-type ds;
partition 15 timeslots 15 interface-type ds;
partition 16 timeslots 16 interface-type ds;
partition 17 timeslots 17 interface-type ds;
partition 18 timeslots 18 interface-type ds;
partition 19 timeslots 19 interface-type ds;
partition 20 timeslots 20 interface-type ds;
partition 21 timeslots 21 interface-type ds;
partition 22 timeslots 22 interface-type ds;
partition 23 timeslots 23 interface-type ds;
partition 24 timeslots 24 interface-type ds;
}
ds-4/2/0:7:1 {
    encapsulation ppp;
    unit 0 {
        family inet {
            address 10.255.1.206/30;
        }
    }
}
...
ds-4/2/0:7:1:24 {
    encapsulation ppp;
    unit 0 {
        family inet {
            address 10.255.2.42/30;
        }
    }
}
ct1-4/2/0:7:2 {
    partition 1 timeslots 1-19 interface-type ds;
    partition 2 timeslots 20 interface-type ds;
    partition 3 timeslots 21 interface-type ds;
    partition 4 timeslots 22 interface-type ds;
    partition 5 timeslots 23 interface-type ds;
    partition 6 timeslots 24 interface-type ds;
}
ds-4/2/0:7:2:1 {
    encapsulation ppp;
    unit 0 {
        family inet {
            address 10.255.2.46/30;
        }
    }
}
```

```
ds-4/2/0:7:2:2 {
  encapsulation ppp;
  unit 0 {
    family inet {
      address 10.255.2.50/30;
    }
  }
}
...
ds-4/2/0:7:2:6 {
  encapsulation ppp;
  unit 0 {
    family inet {
      address 10.255.2.66/30;
    }
  }
}
t1-4/2/0:7:3 {
  encapsulation ppp;
  unit 0 {
    family inet {
      address 10.255.2.70/30;
    }
  }
}
...
t1-4/2/0:7:28 {
  encapsulation ppp;
  unit 0 {
    family inet {
      address 10.255.2.170/30;
    }
  }
}
```

## Verification

Confirm that the configuration is working properly.

- [Verifying That the Interfaces Are Active on page 39](#)
- [View the Operational Details of the Interfaces on page 41](#)

---

### Verifying That the Interfaces Are Active

**Purpose** View the names of the resulting interfaces and channelized interfaces configured on a channelized OC12 IQ interface.

**Action** From operational mode, issue the **show interfaces controller** command.

```

user@host> show interfaces controller
Controller
coc12-4/2/0
    so-4/2/0:1
    t3-4/2/0:2
    ct3-4/2/0:3
        t1-4/2/0:3:1
        t1-4/2/0:3:2
        t1-4/2/0:3:3
        ...
        t1-4/2/0:3:27
        t1-4/2/0:3:28
    ct3-4/2/0:4
        ct1-4/2/0:4:1
            ds-4/2/0:4:1:1
            ds-4/2/0:4:1:2
            ...
            ds-4/2/0:4:1:21
            ds-4/2/0:4:1:22
            ds-4/2/0:4:1:23
            ds-4/2/0:4:1:24
        ct1-4/2/0:4:2
            ds-4/2/0:4:2:1
            ds-4/2/0:4:2:2
            ds-4/2/0:4:2:3
            ds-4/2/0:4:2:4
            ds-4/2/0:4:2:5
            ds-4/2/0:4:2:6
        t1-4/2/0:4:3
        t1-4/2/0:4:4
        ...
        t1-4/2/0:4:25
        t1-4/2/0:4:26
        t1-4/2/0:4:27
        t1-4/2/0:4:28
    t3-4/2/0:5
coc1-4/2/0:6
    t1-4/2/0:6:1
    t1-4/2/0:6:2
    t1-4/2/0:6:3
    ...
    t1-4/2/0:6:24
    t1-4/2/0:6:25
    t1-4/2/0:6:26
    t1-4/2/0:6:27
    t1-4/2/0:6:28
coc1-4/2/0:7
    ct1-4/2/0:7:1
        ds-4/2/0:7:1:1
        ds-4/2/0:7:1:2
        ds-4/2/0:7:1:3
        ...
        ds-4/2/0:7:1:22
        ds-4/2/0:7:1:23
        ds-4/2/0:7:1:24
    ct1-4/2/0:7:2
        ds-4/2/0:7:2:1
        ds-4/2/0:7:2:2

```

|                 | Admin | Link |
|-----------------|-------|------|
| coc12-4/2/0     | up    | up   |
| so-4/2/0:1      | up    | up   |
| t3-4/2/0:2      | up    | up   |
| ct3-4/2/0:3     | up    | up   |
| t1-4/2/0:3:1    | up    | up   |
| t1-4/2/0:3:2    | up    | up   |
| t1-4/2/0:3:3    | up    | up   |
| ...             |       |      |
| t1-4/2/0:3:27   | up    | up   |
| t1-4/2/0:3:28   | up    | up   |
| ct3-4/2/0:4     | up    | up   |
| ct1-4/2/0:4:1   | up    | up   |
| ds-4/2/0:4:1:1  | up    | up   |
| ds-4/2/0:4:1:2  | up    | up   |
| ...             |       |      |
| ds-4/2/0:4:1:21 | up    | up   |
| ds-4/2/0:4:1:22 | up    | up   |
| ds-4/2/0:4:1:23 | up    | up   |
| ds-4/2/0:4:1:24 | up    | up   |
| ct1-4/2/0:4:2   | up    | up   |
| ds-4/2/0:4:2:1  | up    | up   |
| ds-4/2/0:4:2:2  | up    | up   |
| ds-4/2/0:4:2:3  | up    | up   |
| ds-4/2/0:4:2:4  | up    | up   |
| ds-4/2/0:4:2:5  | up    | up   |
| ds-4/2/0:4:2:6  | up    | up   |
| t1-4/2/0:4:3    | up    | up   |
| t1-4/2/0:4:4    | up    | up   |
| ...             |       |      |
| t1-4/2/0:4:25   | up    | up   |
| t1-4/2/0:4:26   | up    | up   |
| t1-4/2/0:4:27   | up    | up   |
| t1-4/2/0:4:28   | up    | up   |
| t3-4/2/0:5      | up    | up   |
| coc1-4/2/0:6    | up    | up   |
| t1-4/2/0:6:1    | up    | up   |
| t1-4/2/0:6:2    | up    | up   |
| t1-4/2/0:6:3    | up    | up   |
| ...             |       |      |
| t1-4/2/0:6:24   | up    | up   |
| t1-4/2/0:6:25   | up    | up   |
| t1-4/2/0:6:26   | up    | up   |
| t1-4/2/0:6:27   | up    | up   |
| t1-4/2/0:6:28   | up    | up   |
| coc1-4/2/0:7    | up    | up   |
| ct1-4/2/0:7:1   | up    | up   |
| ds-4/2/0:7:1:1  | up    | up   |
| ds-4/2/0:7:1:2  | up    | up   |
| ds-4/2/0:7:1:3  | up    | up   |
| ...             |       |      |
| ds-4/2/0:7:1:22 | up    | up   |
| ds-4/2/0:7:1:23 | up    | up   |
| ds-4/2/0:7:1:24 | up    | up   |
| ct1-4/2/0:7:2   | up    | up   |
| ds-4/2/0:7:2:1  | up    | up   |
| ds-4/2/0:7:2:2  | up    | up   |



```

ds-4/2/0:7:2:3      up      up
ds-4/2/0:7:2:4      up      up
ds-4/2/0:7:2:5      up      up
ds-4/2/0:7:2:6      up      up
t1-4/2/0:7:3        up      up
t1-4/2/0:7:4        up      up
t1-4/2/0:7:5        up      up
t1-4/2/0:7:6        up      up
t1-4/2/0:7:7        up      up
...
t1-4/2/0:7:25       up      up
t1-4/2/0:7:26       up      up
t1-4/2/0:7:27       up      up
t1-4/2/0:7:28       up      up
so-4/2/0:8          up      up

```

**Meaning** The output shows that the interfaces configured on the channelized OC12 IQ interface are active. The **Admin** field and the **Link** field displaying **up** indicate that the interface is active.

### View the Operational Details of the Interfaces

**Purpose** View the operational details of the interfaces to confirm that the interfaces are up and running.

**Action** To verify that your interfaces are working as expected, use the **show interfaces** command. Use the **show interfaces controller** command to find the name of the interface you want to view; then include this channelized name (for example, **ct3-4/2/0:4**) as an option with the **show interfaces extensive** command.

To view information about the physical channelized interface, include the **coc12-fpc/pic/port** option with the **show interfaces extensive** command:

```

user@host> show interfaces extensive coc12-4/2/0
Physical interface: coc12-4/2/0, Enabled, Physical link is Up
Interface index: 266, SNMP ifIndex: 1269, Generation: 601
Link-level type: Controller, MTU: 4474, Clocking: Internal, SONET mode, Speed:
OC12, Loopback: None,
FCS: 16, Payload scrambler: Disabled, Parent: None
Device flags   : Present Running
Interface flags: Point-To-Point SNMP-Traps
Link flags     : None
Hold-times     : Up 0 ms, Down 0 ms
Last flapped   : 2002-10-09 17:45:15 PDT (00:14:38 ago)
Statistics last cleared: Never
Input errors:
  Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0, Bucket drops:
0, Policed discards: 0,
  L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0, HS link CRC
errors: 0,
  HS link FIFO overflows: 0
Output errors:
  Carrier transitions: 0, Errors: 0, Drops: 0, Aged packets: 0, HS link FIFO
underflows: 0
SONET alarms   : None
SONET defects  : None
SONET PHY:      Seconds      Count   State

```

```

      PLL Lock                0          0 OK
      PHY Light                0          0 OK
SONET section:
      BIP-B1                   14          83
      SEF                      0          0 OK
      LOS                      0          0 OK
      LOF                      0          0 OK
      ES-S                     14
      SES-S                    0
      SEFS-S                   0
SONET line:
      BIP-B2                   14          162
      REI-L                    0          0
      RDI-L                    3          1 OK
      AIS-L                    0          0 OK
      BERR-SF                  0          0 OK
      BERR-SD                  0          0 OK
      ES-L                     14
      SES-L                    0
      UAS-L                    0
      ES-LFE                   3
      SES-LFE                  3
      UAS-LFE                  0
Received SONET overhead:
      F1      : 0x00, J0      : 0x00, K1      : 0x00, K2      : 0x00
      S1      : 0x00
Transmitted SONET overhead:
      F1      : 0x00, J0      : 0x01, K1      : 0x00, K2      : 0x00
      S1      : 0x00

```

To view information about a SONET OC3 channel, include the *so-fpc/pic/port:channel* option with the **show interfaces extensive** command:

```

user@host> show interfaces extensive so-4/2/0:8
Physical interface: so-4/2/0:8, Enabled, Physical link is Up
Interface index: 440, SNMP ifIndex: 2640, Generation: 787
Link-level type: PPP, MTU: 4474, Clocking: Internal, SONET mode, Speed: OC3,
Loopback: None, FCS: 16,
Payload scrambler: Enabled, Parent: coc12-4/2/0 (Index 266)
Device flags   : Present Running
Interface flags: Point-To-Point SNMP-Traps
Link flags     : Keepalives
Hold-times     : Up 0 ms, Down 0 ms
Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
Keepalive statistics:
  Input : 0 (last seen: never)
  Output: 0 (last sent: never)
LCP state: Conf-ack-sent
NCP state: inet: Down, inet6: Not-configured, iso: Not-configured, mpls:
Not-configured
CHAP state: Not-configured
Last flapped : 2002-10-09 17:45:18 PDT (00:11:45 ago)
Statistics last cleared: Never
Traffic statistics:
  Input bytes :          5967          56 bps
  Output bytes :        12672         128 bps
  Input packets:          351           0 pps
  Output packets:         704           0 pps
Input errors:
  Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0, Bucket drops:
0, Policed discards: 0,

```

```

L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0, HS link CRC
errors: 0,
HS link FIFO overflows: 0
Output errors:
Carrier transitions: 1, Errors: 0, Drops: 0, Aged packets: 0, HS link FIFO
underflows: 0
Queue counters:           Queued packets  Transmitted packets      Dropped packets

0 best-effort              704                0                        0

1 expedited-fo             0                  0                        0

2 assured-forw             0                  0                        0

3 network-cont             0                  0                        0

SONET alarms   : None
SONET defects  : None
SONET path:
BIP-B3         0          0
REI-P          0          0
LOP-P          0          0 OK
AIS-P          0          0 OK
RDI-P          0          0 OK
UNEQ-P         0          0 OK
PLM-P          0          0 OK
ES-P           0
SES-P           0
UAS-P           0
ES-PFE         0
SES-PFE        0
UAS-PFE        0
Received SONET overhead:
C2       : 0xcf, C2(cmp) : 0xcf, F2       : 0x00, Z3       : 0x00
Z4       : 0x00, S1(cmp) : 0x00
Transmitted SONET overhead:
C2       : 0xcf, F2       : 0x00, Z3       : 0x00, Z4       : 0x00
Received path trace: RouterB so-2/2/0:8
61 72 6d 61 67 6e 61 63 20 73 6f 2d 32 2f 32 2f RouterB so-2/2/
30 3a 38 00 00 00 00 00 00 00 00 00 00 00 00 00 0:8.....
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
00 00 00 00 00 00 00 00 00 00 00 00 00 00 0d 0a .....
Transmitted path trace: RouterA so-4/2/0:8
74 69 6d 6d 65 73 73 71 75 61 72 65 20 73 6f 2d RouterA so-
34 2f 32 2f 30 3a 38 00 00 00 00 00 00 00 00 00 4/2/0:8.....
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
HDLC configuration:
Policing bucket: Disabled
Shaping bucket : Disabled
Giant threshold: 0, Runt threshold: 0
Packet Forwarding Engine configuration:
Destination slot: 4, PLP byte: 4 (0x2a)
CoS transmit queue      Bandwidth      Buffer Priority  Limit
                        %      bps      %      bytes
0 best-effort            95    147744000 95      0      low  none
3 network-control        5     7776000   5      0      low  none
Logical interface so-4/2/0:8.0 (Index 180) (SNMP ifIndex 2641) (Generation 512)

Flags: Hardware-Down Point-To-Point SNMP-Traps Encapsulation: PPP
Protocol inet, MTU: 4470, Generation: 519, Route table: 0

```

```

Flags: Protocol-Down
Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
Destination: 10.255.2.172/30, Local: 10.255.2.174, Broadcast: Unspecified,
Generation: 1029

```

To view information about a T3 channel, include the **t3-fpc/pic/port:channel** option with the **show interfaces extensive** command.

```

user@host> show interfaces extensive t3-4/2/0:2
Physical interface: t3-4/2/0:2, Enabled, Physical link is Up
  Interface index: 274, SNMP ifIndex: 1982, Generation: 609
  Link-level type: PPP, MTU: 4474, Clocking: Internal, Speed: T3, Loopback:None,
  FCS: 16,
  Mode: C/Bit parity, Parent: coc12-4/2/0 (Index 266)
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link flags     : Keepalives
  Hold-times    : Up 0 ms, Down 0 ms
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
  Keepalive statistics:
    Input : 85 (last seen 00:00:00 ago)
    Output: 82 (last sent 00:00:01 ago)
  LCP state: Opened
  NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured, mpls:
Not-configured
  CHAP state: Not-configured
  Last flapped : 2002-10-09 17:45:15 PDT (00:13:24 ago)
  Statistics last cleared: Never
  Traffic statistics:
    Input bytes :          2546          56 bps
    Output bytes :          2732          56 bps
    Input packets:           170           0 pps
    Output packets:          171           0 pps
  Input errors:
    Errors: 0, Drops: 0, Framing errors: 0, Bucket drops: 0, Policed discards:
0, L3 incompletes: 0,
    L2 channel errors: 0, L2 mismatch timeouts: 0, HS link CRC errors: 0, SRAM
errors: 0
  Output errors:
    Carrier transitions: 1, Errors: 0, Drops: 0, Aged packets: 0
  Queue counters:      Queued packets  Transmitted packets  Dropped packets

    0 best-effort          171             171             0
    1 expedited-fo           0             0             0
    2 assured-forw           0             0             0
    3 network-cont           0             0             0

  Active alarms : None
  Active defects : None
  DS3 media:
    Seconds      Count  State
  PLL Lock      0      0 OK
  Reframing      0      0 OK
  AIS            0      0 OK
  LOF            0      0 OK
  LOS            0      0 OK
  IDLE           0      0 OK
  YELLOW         0      0 OK
  BPV            0      0

```

```

EXZ                0          0
LCV                0          0
PCV                1        6827
CCV                0          0
LES                0
PES                1
PSES              1
CES                0
CSES              0
SEFS              0
UAS                0
HDLC configuration:
  Policing bucket: Disabled
  Shaping bucket : Disabled
  Giant threshold: 4484, Runt threshold: 0
DSU configuration:
  Compatibility mode: None, Scrambling: Disabled, Subrate: Disabled
  FEAC loopback: Inactive, Response: Disabled, Count: 0
DS-3 BERT configuration:
  BERT time period: 10 seconds, Elapsed: 0 seconds
  Algorithm: 2^3 - 1, Pseudorandom (1), Induced error rate: 10e-0
SONET alarms      : None
SONET defects     : None
SONET path:
  BIP-B3          0          0
  REI-P           0          0
  LOP-P           0          0 OK
  AIS-P           0          0 OK
  RDI-P           0          0 OK
  UNEQ-P          0          0 OK
  PLM-P           0          0 OK
  ES-P            0
  SES-P           0
  UAS-P           0
  ES-PFE          0
  SES-PFE         0
  UAS-PFE         0
Received SONET overhead:
  C2      : 0x04, C2(cmp) : 0x04, F2      : 0x00, Z3      : 0x00
  Z4      : 0x00, S1(cmp) : 0x00
Transmitted SONET overhead:
  C2      : 0x04, F2      : 0x00, Z3      : 0x00, Z4      : 0x00
Received path trace:
  5d 14 d6 ef 81 93 78 71 98 ec 55 27 35 84 3a 2c  ].Vo..xq.lU'5.:
Transmitted path trace: t3-4/2/0:2
  74 33 2d 34 2f 32 2f 30 3a 32 00 00 00 00 00 00  t3-4/2/0:2.....
Packet Forwarding Engine configuration:
  Destination slot: 4, PLP byte: 4 (0x00)
  CoS transmit queue      Bandwidth      Buffer Priority  Limit
                           %      bps      %      bytes
  0 best-effort           95      42499200 95          0      low      none
  3 network-control       5       2236800 5           0      low      none
Logical interface t3-4/2/0:2.0 (Index 10) (SNMP ifIndex 1983) (Generation 340)

Flags: Point-To-Point SNMP-Traps Encapsulation: PPP
Bandwidth: 0
Protocol inet, MTU: 4470, Generation: 347, Route table: 0
Flags: None
Addresses, Flags: Is-Preferred Is-Primary
  Destination: 10.255.0.4/30, Local: 10.255.0.6, Broadcast: Unspecified,
Generation: 685

```

To view information about a channelized T3 channel, include the `ct3-fpc/pic/port:channel` option with the `show interfaces extensive` command.

```
user@host> show interfaces extensive ct3-4/2/0:4
Physical interface: ct3-4/2/0:4, Enabled, Physical link is Up
  Interface index: 304, SNMP ifIndex: 2409, Generation: 639
  Link-level type: Controller, MTU: 4474, Clocking: Internal, Speed: T3, Loopback:
  None, FCS: 16,
  Mode: C/Bit parity, Parent: coc12-4/2/0 (Index 266)
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link flags     : None
  Hold-times     : Up 0 ms, Down 0 ms
  Last flapped   : 2002-10-09 17:45:16 PDT (00:12:56 ago)
  Statistics last cleared: Never
  Traffic statistics:
    Input bytes   :                0                0 bps
    Output bytes  :                0                0 bps
    Input packets :                0                0 pps
    Output packets:                0                0 pps
  Input errors:
    Errors: 0, Drops: 0, Framing errors: 0, Bucket drops: 0, Policed discards:
  0, L3 incompletes: 0,
    L2 channel errors: 0, L2 mismatch timeouts: 0, HS link CRC errors: 0, SRAM
  errors: 0
  Output errors:
    Carrier transitions: 0, Errors: 0, Drops: 0, Aged packets: 0
  Active alarms   : None
  Active defects  : None
  DS3 media:
    Seconds      Count  State
    PLL Lock     0       0 OK
    Reframing    0       0 OK
    AIS          0       0 OK
    LOF          0       0 OK
    LOS          0       0 OK
    IDLE         0       0 OK
    YELLOW       0       0 OK
    BPV          0       0
    EXZ          0       0
    LCV          0       0
    PCV          1       1
    CCV          1       1
    LES          0
    PES          1
    PSES         0
    CES          1
    CSES         0
    SEFS         0
    UAS          0
  HDLC configuration:
    Policing bucket: Disabled
    Shaping bucket  : Disabled
    Giant threshold: 0, Runt threshold: 0
  DSU configuration:
    Compatibility mode: None, Scrambling: Disabled, Subrate: Disabled
    FEAC loopback: Inactive, Response: Disabled, Count: 0
  DS-3 BERT configuration:
    BERT time period: 10 seconds, Elapsed: 0 seconds
    Algorithm: 2^3 - 1, Pseudorandom (1), Induced error rate: 10e-0
  SONET alarms   : None
  SONET defects  : None
```

```

SONET PHY:                Seconds      Count   State
  PLL Lock                  0           0   OK
  PHY Light                 0           0   OK
SONET section:
  BIP-B1                   14           83
  SEF                      0           0   OK
  LOS                      0           0   OK
  LOF                      0           0   OK
  ES-S                    14
  SES-S                   0
  SEFS-S                   0
SONET line:
  BIP-B2                   14          162
  REI-L                   0           0
  RDI-L                   3           1   OK
  AIS-L                   0           0   OK
  BERR-SF                 0           0   OK
  BERR-SD                 0           0   OK
  ES-L                    14
  SES-L                   0
  UAS-L                   0
  ES-LFE                  3
  SES-LFE                 3
  UAS-LFE                 0
SONET path:
  BIP-B3                   0           0
  REI-P                   0           0
  LOP-P                   0           0   OK
  AIS-P                   0           0   OK
  RDI-P                   0           0   OK
  UNEQ-P                  0           0   OK
  PLM-P                   0           0   OK
  ES-P                    0
  SES-P                   0
  UAS-P                   0
  ES-PFE                  0
  SES-PFE                 0
  UAS-PFE                 0
Received SONET overhead:
  F1      : 0x00, J0      : 0x00, K1      : 0x00, K2      : 0x00
  S1      : 0x00, C2      : 0x04, C2(cmp) : 0x04, F2      : 0x00
  Z3      : 0x00, Z4      : 0x00, S1(cmp) : 0x00
Transmitted SONET overhead:
  F1      : 0x00, J0      : 0x00, K1      : 0x00, K2      : 0x00
  S1      : 0x00, C2      : 0x04, F2      : 0x00, Z3      : 0x00
  Z4      : 0x00
Received path trace:
 39 b8 27 50 44 b6 5f c3 f3 de 27 9a a0 31 40 5c  98'PD6-Cs^'. 1@\
Transmitted path trace: RouterA ct3-4/2/0:4
 74 69 6d 6d 65 73 73 71 75 61 72 65 20 63 74 33  RouterA ct3
Packet Forwarding Engine configuration:
Destination slot: 0 (0x00)
CoS transmit queue      Bandwidth      Buffer Priority Limit
                        %      bps      %      bytes
0 best-effort            95      42499200 95      0      low  none
3 network-control        5       2236800  5      0      low  none

```

To view information about a channelized OC1 channel, include the **coc1-fpc/pic/port:channel** option with the **show interfaces extensive** command.

```
user@host> show interfaces extensive coc1-4/2/0:7
```

```

Physical interface: coc1-4/2/0:7, Enabled, Physical link is Up
  Interface index: 381, SNMP ifIndex: 2524, Generation: 728
  Link-level type: Controller, MTU: 4474, Clocking: Internal, SONET mode, Speed:
  51840kbps, Loopback: None,
  FCS: 16, Payload scrambler: Disabled, Parent: coc12-4/2/0 (Index 266)
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link flags     : None
  Hold-times    : Up 0 ms, Down 0 ms
  Last flapped  : 2002-10-09 17:45:31 PDT (00:12:11 ago)
  Statistics last cleared: Never
  Traffic statistics:
    Input bytes   :                0                0 bps
    Output bytes  :                0                0 bps
    Input packets :                0                0 pps
    Output packets:                0                0 pps
  Input errors:
    Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0, Bucket drops:
  0, Policed discards: 0,
    L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0, HS link CRC
  errors: 0,
    HS link FIFO overflows: 0
  Output errors:
    Carrier transitions: 0, Errors: 0, Drops: 0, Aged packets: 0, HS link FIFO
  underflows: 0
  SONET alarms   : None
  SONET defects  : None
  SONET section:
    BIP-B1        14          83
    SEF           0          0 OK
    LOS           0          0 OK
    LOF           0          0 OK
    ES-S          14
    SES-S         0
    SEFS-S        0
  SONET line:
    BIP-B2        14          162
    REI-L         0          0
    RDI-L         3          1 OK
    AIS-L         0          0 OK
    BERR-SF       0          0 OK
    BERR-SD       0          0 OK
    ES-L          14
    SES-L         0
    UAS-L         0
    ES-LFE        3
    SES-LFE       3
    UAS-LFE       0
  SONET path:
    BIP-B3        0          0
    REI-P         0          0
    LOP-P         0          0 OK
    AIS-P         0          0 OK
    RDI-P         0          0 OK
    UNEQ-P        3          1 OK
    PLM-P         3          1 OK
    ES-P          3
    SES-P         3
    UAS-P         0
    ES-PFE        0
    SES-PFE       0

```



```

UAS-PFE                                0
Received SONET overhead:
F1      : 0x00, J0      : 0x00, K1      : 0x00, K2      : 0x00
S1      : 0x00, C2      : 0x00, C2(cmp) : 0x00, F2      : 0x00
Z3      : 0x00, Z4      : 0x00, S1(cmp) : 0x00
Transmitted SONET overhead:
F1      : 0x00, J0      : 0x01, K1      : 0x00, K2      : 0x00
S1      : 0x00, C2      : 0x00, F2      : 0x00, Z3      : 0x00
Z4      : 0x00
Received path trace:
a0 6a b2 b6 97 aa 25 5e 54 e3 59 2a 80 84 dd fa    j26.*%^TcY*..]z
af ec 42 d3 21 45 5d 48 f4 5a dd e5 1c be e7 65    /lBS!E]HtZ]e.>ge
e7 f2 94 71 f1 d7 d7 86 98 83 d5 e2 ec 67 1d db    gr.qqWw...Ub1g.[
5b 72 29 b3 b9 97 98 c9 c1 a3 af e2 ab db d0 be    [r)39..IA#/b+[P>
Transmitted path trace: RouterA coc1-4/2/0:7
74 69 6d 6d 65 73 73 71 75 61 72 65 20 63 6f 63    RouterA coc
31 2d 34 2f 32 2f 30 3a 37 00 00 00 00 00 00 00    1-4/2/0:7.....
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00    .....
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00    .....
HDLC configuration:
Policing bucket: Disabled
Shaping bucket : Disabled
Giant threshold: 0, Runt threshold: 0
Packet Forwarding Engine configuration:
Destination slot: 0 (0x00)
CoS transmit queue      Bandwidth      Buffer Priority  Limit
                        %      bps      %      bytes
0 best-effort           95      49248000 95         0      low  none
3 network-control       5       2592000 5          0      low  none

```

To view information about a channelized T1 channel, include the **ct1-fpc/pic/port:channel** option with the **show interfaces extensive** command.

```

user@host> show interfaces extensive ct1-4/2/0:4:1
Physical interface: ct1-4/2/0:4:1, Enabled, Physical link is Up
Interface index: 305, SNMP ifIndex: 2410, Generation: 640
Link-level type: Controller, MTU: 1504, Clocking: Internal, Speed: T1, Loopback:
None, FCS: 16,
Framing: ESF, Parent: ct3-4/2/0:4 (Index 304)
Device flags   : Present Running
Interface flags: Point-To-Point SNMP-Traps
Link flags     : None
Hold-times     : Up 0 ms, Down 0 ms
Last flapped   : 2002-10-09 17:45:19 PDT (00:16:49 ago)
Statistics last cleared: Never
Traffic statistics:
Input bytes : 0 0 bps
Output bytes : 0 0 bps
Input packets: 0 0 pps
Output packets: 0 0 pps
Input errors:
Errors: 0, Drops: 0, Framing errors: 0, Policed discards: 0,
L3 incompletes:0, L2 channel errors: 0,
L2 mismatch timeouts: 0, HS link CRC errors: 0, SRAM errors: 0
Output errors:
Carrier transitions: 0, Errors: 0, Drops: 0, Aged packets: 0
DS1 alarms : None
DS1 defects : None
T1 media:
Seconds      Count  State
SEF          1      1 OK
BEE          1      1 OK

```

```

AIS                0                0 OK
LOF                1                1 OK
LOS                0                0 OK
YELLOW             0                0 OK
BPV                0                0
EXZ                0                0
LCV                0                0
PCV                0                0
CS                 0                0
LES                1
ES                 1
SES                2
SEFS               2
BES                0
UAS                0
HDLC configuration:
  Policing bucket: Disabled
  Shaping bucket : Disabled
  Giant threshold: 0, Runt threshold: 0
  Timeslots      : All active
  Line encoding: B8ZS, Byte encoding: Nx64K
  Buildout       : 0 to 132 feet
  Data inversion: Disabled
DS1 BERT configuration:
  BERT time period: 10 seconds, Elapsed: 0 seconds
  Induced Error rate: 10e-0, Algorithm: 2^15 - 1, 0.151, Pseudorandom (9)
Packet Forwarding Engine configuration:
  Destination slot: 0 (0x00)
  CoS transmit queue      Bandwidth      Buffer Priority  Limit
                           %             bps      %         bytes
0 best-effort             95             1459200  95         0         low  none
3 network-control          5              76800    5         0         low  none

To view information about a T1 channel, include the t1-fpc/pic/port:channel:channel option
with the show interfaces extensive command.

user@host> show interfaces extensive t1-4/2/0:7:3
Physical interface: t1-4/2/0:7:3, Enabled, Physical link is Up
  Interface index: 414, SNMP ifIndex: 2587, Generation: 761
  Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: T1, Loopback: None,
  FCS: 16, Framing:ESF,
  Parent: coc1-4/2/0:7 (Index 381)
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link flags     : Keepalives
  Hold-times     : Up 0 ms, Down 0 ms
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
  Keepalive statistics:
    Input : 0 (last seen: never)
    Output: 0 (last sent: never)
  LCP state: Conf-ack-sent
  NCP state: inet: Down, inet6: Not-configured, iso: Not-configured, mpls:
Not-configured
  CHAP state: Not-configured
  Last flapped : 2002-10-09 17:45:34 PDT (00:10:33 ago)
  Statistics last cleared: Never
  Traffic statistics:
    Input bytes : 10778 112 bps
    Output bytes: 11412 128 bps
    Input packets: 634 0 pps
    Output packets: 634 0 pps

```

```

Input errors:
  Errors: 0, Drops: 0, Framing errors: 0, Policed discards: 0,
L3 incompletes: 0, L2 channel errors: 0,
  L2 mismatch timeouts: 0, HS link CRC errors: 0, SRAM errors: 0
Output errors:
  Carrier transitions: 1, Errors: 0, Drops: 0, Aged packets: 0
Queue counters:      Queued packets  Transmitted packets  Dropped packets

  0 best-effort      633              633              0

  1 expedited-fo      0              0              0

  2 assured-forw      0              0              0

  3 network-cont      0              0              0

```

DS1 alarms : None

DS1 defects : None

| T1 media: | Seconds | Count | State |
|-----------|---------|-------|-------|
| SEF       | 1       | 1     | OK    |
| BEE       | 1       | 1     | OK    |
| AIS       | 3       | 1     | OK    |
| LOF       | 17      | 1     | OK    |
| LOS       | 0       | 0     | OK    |
| YELLOW    | 0       | 0     | OK    |
| BPV       | 0       | 0     |       |
| EXZ       | 0       | 0     |       |
| LCV       | 0       | 0     |       |
| PCV       | 0       | 0     |       |
| CS        | 0       | 0     |       |
| LES       | 17      |       |       |
| ES        | 17      |       |       |
| SES       | 34      |       |       |
| SEFS      | 34      |       |       |
| BES       | 0       |       |       |
| UAS       | 14      |       |       |

HDLC configuration:

```

  Policing bucket: Disabled
  Shaping bucket : Disabled
  Giant threshold: 1514, Runt threshold: 0
  Timeslots      : All active
  Line encoding: B8ZS, Byte encoding: Nx64K
  Buildout       : 0 to 132 feet
  Data inversion: Disabled

```

DS1 BERT configuration:

```

  BERT time period: 10 seconds, Elapsed: 0 seconds
  Induced Error rate: 10e-0, Algorithm: 2^15 - 1, 0.151, Pseudorandom (9)

```

SONET alarms : None

SONET defects : None

SONET vt:

|          |     |   |               |
|----------|-----|---|---------------|
| BIP-BIP2 | 648 | 0 |               |
| REI-V    | 651 | 1 |               |
| LOP-V    | 0   | 0 | OK            |
| AIS-V    | 0   | 0 | OK            |
| RDI-V    | 651 | 1 | Defect Active |
| UNEQ-V   | 0   | 0 | OK            |
| PLM-V    | 0   | 0 | OK            |
| ES-V     | 651 |   |               |
| SES-V    | 3   |   |               |
| UAS-V    | 0   |   |               |
| ES-VFE   | 0   |   |               |

```

SES-VFE                0
UAS-VFE                0
Received SONET overhead:
V5      : 0x02, V5(cmp) : 0x02
Transmitted SONET overhead:
V5      : 0x02
Packet Forwarding Engine configuration:
Destination slot: 4, PLP byte: 4 (0x24)
CoS transmit queue      Bandwidth      Buffer Priority  Limit
                        %      bps      %      bytes
0 best-effort           95      1459200 95      0      low      none
3 network-control       5      76800   5      0      low      none
Logical interface t1-4/2/0:7:3.0 (Index 152) (SNMP ifIndex 2588)
(Generation 484)
Flags: Hardware-Down Point-To-Point SNMP-Traps Encapsulation: PPP
Bandwidth: 0
Protocol inet, MTU: 1500, Generation: 491, Route table: 0
Flags: Protocol-Down
Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
Destination: 10.255.2.68/30, Local: 10.255.2.70, Broadcast: Unspecified,
Generation: 973

```

To view information about a DSO channel, include the **ds-fpc/pic/port:channel:channel** option with the **show interfaces extensive** command.

```

user@host> show interfaces extensive ds-4/2/0:4:1:1
Physical interface: ds-4/2/0:4:1:1, Enabled, Physical link is Up
Interface index: 306, SNMP ifIndex: 2411, Generation: 641
Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: 64kbps, Loopback:
None, FCS: 16,
Parent: ct1-4/2/0:4:1 (Index 305)
Device flags : Present Running
Interface flags: Point-To-Point SNMP-Traps
Link flags : Keepalives
Hold-times : Up 0 ms, Down 0 ms
Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
Keepalive statistics:
Input : 98 (last seen 00:00:01 ago)
Output: 100 (last sent 00:00:00 ago)
LCP state: Opened
NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured, mpls:
Not-configured
CHAP state: Not-configured
Last flapped : 2002-10-09 17:45:15 PDT (00:16:20 ago)
Statistics last cleared: Never
Traffic statistics:
Input bytes : 3013 0 bps
Output bytes : 3228 0 bps
Input packets: 201 0 pps
Output packets: 202 0 pps
Input errors:
Errors: 0, Drops: 0, Framing errors: 0, Policed discards: 0,
L3 incompletes: 0, L2 channel errors: 0,
L2 mismatch timeouts: 0, HS link CRC errors: 0
Output errors:
Carrier transitions: 1, Errors: 0, Drops: 0, Aged packets: 0
Queue counters:      Queued packets  Transmitted packets  Dropped packets

0 best-effort      202      202      0

1 expedited-fo      0      0      0

```

```

2 assured-forw          0          0          0
3 network-cont          0          0          0

Interface transmit queues:
      B/W  WRR    Packets      Bytes      Drops      Errors
Queue0    0    0         0         0         0         0
Queue1    0    0         0         0         0         0

HDLC configuration:
Giant threshold: 0, Runt threshold: 0
Timeslots      : 1
Byte encoding: Nx64K, Data inversion: Disabled
Idle cycle flag: flags, Start end flag: shared
Packet Forwarding Engine configuration:
Destination slot: 4, PLP byte: 4 (0x07)
CoS transmit queue      Bandwidth      Buffer Priority  Limit
                        %      bps      %      bytes
0 best-effort           95      60800  95         0      low  none
3 network-control       5       3200   5         0      low  none

Logical interface ds-4/2/0:4:1:1.0 (Index 39) (SNMP ifIndex 2412)
(Generation 369)
Flags: Point-To-Point SNMP-Traps Encapsulation: PPP
Bandwidth: 0
Protocol inet, MTU: 1500, Generation: 376, Route table: 0
Flags: None
Addresses, Flags: Is-Preferred Is-Primary
Destination: 10.255.0.120/30, Local: 10.255.0.122, Broadcast: Unspecified,
Generation: 743

```

**Meaning** The interfaces configured on the channelized OC12 IQ interface are up and running.

## Example: Converting a Channelized OC12 IQ PIC to a Channelized STM4 IQ Interface

This example shows how a converted channelized STM4 IQ interface can be turned into a clear channel STM4 (VC4-4c) SDH interface, or further subdivided into STM1 (VC4) interfaces and channelized administrative unit 4 (CAU4) interfaces, T3 and channelized T3 interfaces, T1 and channelized T1 interfaces, and NxDS0 channels.

- [Requirements on page 53](#)
- [Overview on page 54](#)
- [Configuration on page 54](#)
- [Verification on page 61](#)

### Requirements

This example can be configured using the following hardware and software components:

- Junos OS Release 8.0 or later
- Juniper Networks M Series Multiservice Edge Router or T Series Core Router with Channelized OC12 IQ PIC



**NOTE:** This configuration example has been tested using the software release listed and is assumed to work on all later releases.

No special configuration beyond device initialization is required before you configure this example.

## Overview

The Junos OS software allows you to convert a Channelized OC12 IQ PIC into a channelized STM4 IQ interface. The conversion process enables the Channelized OC12 IQ PIC to interconnect with European SDH telecommunications equipment at the STM4 and STM1 levels, then channelize the data into North American T3, T1, and NxDS0 interfaces. To place the Channelized OC12 IQ PIC in SDH mode, include the **framing** statement and specify the **sdh** option at the `[edit chassis fpc slot-number pic pic-number]` hierarchy level.

**Figure 9: Channelized OC12 IQ Interface in SDH Mode Example**

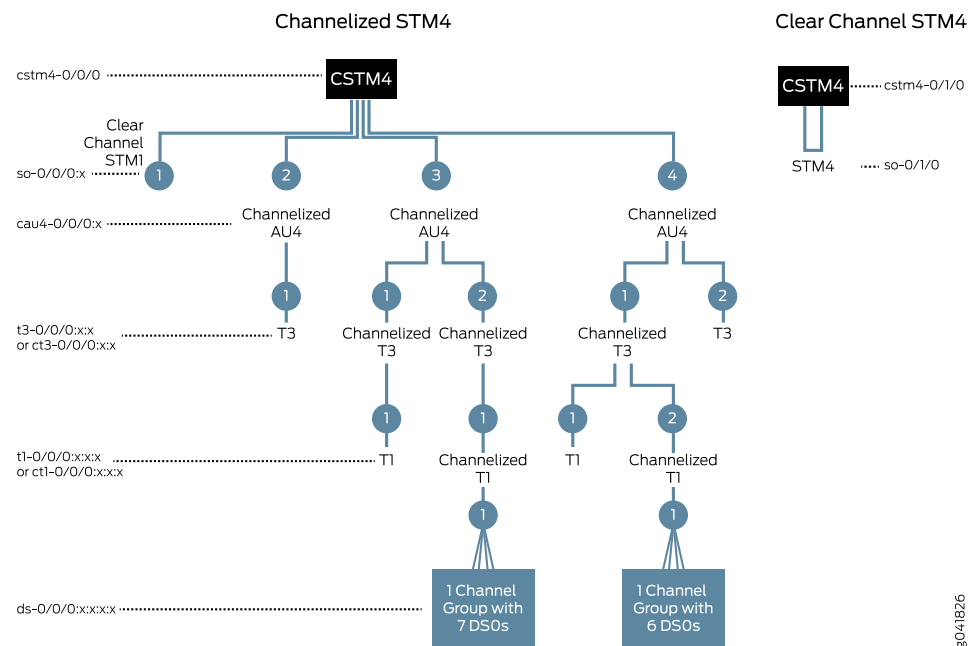


Figure 9 on page 54 and the following configuration example show how a converted channelized STM4 IQ interface can be turned into a clear channel STM4 (VC4-4c) SDH interface, or further subdivided into STM1 (VC4) interfaces and channelized administrative unit 4 (CAU4) interfaces, T3 and channelized T3 interfaces, T1 and channelized T1 interfaces, and NxDS0 channels.

## Configuration

### CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network

configuration, and then copy and paste the commands into the CLI at the **[edit]** hierarchy level.

```

set chassis fpc 0 pic 0 framing sdh
set interfaces cstm4-0/0/0 partition 1 oc-slice 1-3 interface-type so
set interfaces cstm4-0/0/0 partition 2 oc-slice 4-6 interface-type cau4
set interfaces cstm4-0/0/0 partition 3 oc-slice 7-9 interface-type cau4;
set interfaces cstm4-0/0/0 partition 4 oc-slice 10-12 interface-type cau4
set interfaces so-0/0/0:1 encapsulation frame-relay
set interfaces so-0/0/0:1 unit 0 dlci 16
set interfaces so-0/0/0:1 unit 0 family inet address 10.0.0.1/30
set interfaces so-0/0/0:1 unit 0 family inet6 address abcd::10.0.0.1/126
set interfaces cau4-0/0/0:2 partition 1 interface-type t3
set interfaces t3-0/0/0:2:1 encapsulation frame-relay
set interfaces t3-0/0/0:2:1 unit 0 dlci 16
set interfaces t3-0/0/0:2:1 unit 0 family inet address 10.0.0.5/30
set interfaces t3-0/0/0:2:1 unit 0 family inet6 address abcd::10.0.0.5/126
set interfaces cau4-0/0/0:3 partition 1 interface-type ct3
set interfaces cau4-0/0/0:3 partition 2 interface-type ct3
set interfaces ct3-0/0/0:3:1 partition 1 interface-type t1
set interfaces t1-0/0/0:3:1:1 encapsulation frame-relay
set interfaces t1-0/0/0:3:1:1 unit 0 dlci 16
set interfaces t1-0/0/0:3:1:1 unit 0 family inet address 10.0.0.9/30
set interfaces t1-0/0/0:3:1:1 unit 0 family inet6 address abcd::10.0.0.9/126
set interfaces ct3-0/0/0:3:2 partition 1 interface-type ct1
set interfaces ct1-0/0/0:3:2:1 partition 1 timeslots 1,3-7,24 interface-type ds
set interfaces ds-0/0/0:3:2:1:1 encapsulation frame-relay
set interfaces ds-0/0/0:3:2:1:1 unit 0 dlci 16
set interfaces ds-0/0/0:3:2:1:1 unit 0 family inet address 10.0.0.13/30
set interfaces ds-0/0/0:3:2:1:1 unit 0 family inet6 address abcd::10.0.0.13/126
set interfaces cau4-0/0/0:4 partition 2 interface-type t3
set interfaces cau4-0/0/0:4 partition 1 interface-type ct3
set interfaces ct3-0/0/0:4:1 partition 1 interface-type t1
set interfaces ct3-0/0/0:4:1 partition 2 interface-type ct1
set interfaces t1-0/0/0:4:1:1 encapsulation frame-relay
set interfaces t1-0/0/0:4:1:1 unit 0 dlci 16
set interfaces t1-0/0/0:4:1:1 family inet address 10.0.0.21/30
set interfaces t1-0/0/0:4:1:1 family inet6 address abcd::10.0.0.21/126
set interfaces ct1-0/0/0:4:1:2 partition 1 timeslots 6,8-11,7 interface-type ds
set interfaces ds-0/0/0:4:1:2:1 encapsulation frame-relay
set interfaces ds-0/0/0:4:1:2:1 unit 0 dlci 16
set interfaces ds-0/0/0:4:1:2:1 unit 0 family inet address 10.0.0.25/30
set interfaces ds-0/0/0:4:1:2:1 unit 0 family inet6 address abcd::10.0.0.25/126
set interfaces t3-0/0/0:4:2 encapsulation frame-relay
set interfaces t3-0/0/0:4:2 unit 0 dlci 16
set interfaces t3-0/0/0:4:2 unit 0 family inet address 10.0.0.17/30
set interfaces t3-0/0/0:4:2 unit 0 family inet6 address abcd::10.0.0.17/126
set interfaces cstm4-0/1/0 no-partition interface-type so
set interfaces so-0/1/0 unit 0 family inet address 10.22.22.1/30

```

### Converting a Channelized OC12 IQ PIC into a Channelized STM4 SDH Interface

**Step-by-Step Procedure** The following example requires that you navigate various levels in the configuration hierarchy. For information about navigating the CLI, see *Using the CLI Editor in Configuration Mode* in the *CLI User Guide*.

To configure the channelized STM4 IQ interface into a clear channel STM4 (VC4-4c) SDH interface:

1. Convert the Channelized OC12 IQ PIC into a channelized STM4 SDH interface.

```
[edit]
user@host# set chassis fpc 0 pic 0 framing sdh
```

2. Partition the cstm4-0/0/0 interface to create an STM1 SDH interface and three channelized AU4 channels.

```
[edit]
user@host# set interfaces cstm4-0/0/0 partition 1 oc-slice 1-3 interface-type so
user@host# set interfaces cstm4-0/0/0 partition 2 oc-slice 4-6 interface-type cau4
user@host# set interfaces cstm4-0/0/0 partition 3 oc-slice 7-9 interface-type cau4
user@host# set interfaces cstm4-0/0/0 partition 4 oc-slice 10-12 interface-type
cau4
```

3. Configure the so-0/0/0:1 interface (clear channel STM1 SDH (VC4) interface).

```
[edit]
user@host# set interfaces so-0/0/0:1 encapsulation frame-relay
user@host# set interfaces so-0/0/0:1 unit 0 dlci 16
user@host# set interfaces so-0/0/0:1 unit 0 family inet address 10.0.0.1/30
user@host# set interfaces so-0/0/0:1 unit 0 family inet6 address abcd::10.0.0.1/126
```

4. Partition the cau4-0/0/0:2 interface to create a T3 interface.

```
[edit]
user@host# set interfaces cau4-0/0/0:2 partition 1 interface-type t3
```

5. Configure the t3-0/0/0:2:1 interface.

```
[edit]
user@host# set interfaces t3-0/0/0:2:1 encapsulation frame-relay
user@host# set interfaces t3-0/0/0:2:1 unit 0 dlci 16
user@host# set interfaces t3-0/0/0:2:1 unit 0 family inet address 10.0.0.5/30
user@host# set interfaces t3-0/0/0:2:1 unit 0 family inet6 address
abcd::10.0.0.5/126
```

6. Partition the cau4-0/0/0:3 interface to create channelized T3 interfaces.

```
[edit]
user@host# set interfaces cau4-0/0/0:3 partition 1 interface-type ct3
user@host# set interfaces cau4-0/0/0:3 partition 2 interface-type ct3
```

7. Partition the ct3-0/0/0:3:1 interface to create a T1 interface.

```
[edit]
user@host# set interfaces ct3-0/0/0:3:1 partition 1 interface-type t1
```

8. Configure the t1-0/0/0:3:1:1 interface.

```
[edit]
```



```

user@host# set interfaces t1-0/0/0:3:1:1 encapsulation frame-relay
user@host# set interfaces t1-0/0/0:3:1:1 unit 0 dlci 16
user@host# set interfaces t1-0/0/0:3:1:1 unit 0 family inet address 10.0.0.9/30
user@host# set interfaces t1-0/0/0:3:1:1 unit 0 family inet6 address
abcd::10.0.0.9/126

```

9. Partition the ct3-0/0/0:3:2 interface to create a channelized T1 interface.

```

[edit]
user@host# set interfaces ct3-0/0/0:3:2 partition 1 interface-type ct1

```

10. Partition the ct1-0/0/0:3:2:1 interface to create an NxDS0 channel group with seven time slots.

```

[edit]
user@host# set interfaces ct1-0/0/0:3:2:1 partition 1 timeslots 1,3-7,24 interface-type
ds

```

11. Configure the ds-0/0/0:3:2:1:1 interface.

```

[edit]
user@host# set interfaces ds-0/0/0:3:2:1:1 encapsulation frame-relay
user@host# set interfaces ds-0/0/0:3:2:1:1 unit 0 dlci 16
user@host# set interfaces ds-0/0/0:3:2:1:1 unit 0 family inet address 10.0.0.13/30
user@host# set interfaces ds-0/0/0:3:2:1:1 unit 0 family inet6 address
abcd::10.0.0.13/126

```

12. Partition the cau4-0/0/0:4 interface to create a channelized T3 interface and a T3 interface.

```

[edit]
user@host# set interfaces cau4-0/0/0:4 partition 1 interface-type ct3
user@host# set interfaces cau4-0/0/0:4 partition 2 interface-type t3

```

13. Partition the ct3-0/0/0:4:1 interface to create a T1 interface and a channelized T1 interface.

```

[edit]
user@host# set interfaces ct3-0/0/0:4:1 partition 1 interface-type t1
user@host# set interfaces ct3-0/0/0:4:1 partition 2 interface-type ct1

```

14. Configure the t1-0/0/0:4:1:1 interface.

```

[edit]
user@host# set interfaces t1-0/0/0:4:1:1 encapsulation frame-relay
user@host# set interfaces t1-0/0/0:4:1:1 unit 0 dlci 16
user@host# set interfaces t1-0/0/0:4:1:1 unit 0 family inet address 10.0.0.21/30
user@host# set interfaces t1-0/0/0:4:1:1 unit 0 family inet6 address
abcd::10.0.0.21/126

```

15. Partition the ct1-0/0/0:4:1:2 interface to create an NxDS0 channel group with six time slots.

```

[edit]
user@host# set interfaces ct1-0/0/0:4:1:2 partition 1 timeslots 6,8-11,7 interface-type
ds

```

16. Configure the ds-0/0/0:4:1:2:1 interface.

```

[edit]
user@host# set interfaces ds-0/0/0:4:1:2:1 encapsulation frame-relay

```

```
user@host# set interfaces ds-0/0/0:4:1:2:1 unit 0 dlci 16
user@host# set interfaces ds-0/0/0:4:1:2:1 unit 0 family inet address 10.0.0.25/30
user@host# set interfaces ds-0/0/0:4:1:2:1 unit 0 family inet6 address
abcd::10.0.0.25/126
```

17. Configure the t3-0/0/0:4:2 interface.

```
[edit]
user@host# set interfaces t3-0/0/0:4:2 encapsulation frame-relay
user@host# set interfaces t3-0/0/0:4:2 unit 0 dlci 16
user@host# set interfaces t3-0/0/0:4:2 unit 0 family inet address 10.0.0.17/30
user@host# set interfaces t3-0/0/0:4:2 unit 0 family inet6 address
abcd::10.0.0.17/126
```

18. Configure the cstm4-0/1/0 interface to create a clear channel SDH STM4 interface.

```
[edit]
user@host# set interfaces cstm4-0/1/0 no-partition interface-type so
```

19. Configure the so-0/1/0 interface.

```
[edit]
user@host# set interfaces so-0/1/0 unit 0 family inet address 10.22.22.1/30
```

20. Commit the configuration.

```
[edit]
user@host# commit
```

## Results

---

From configuration mode, confirm your configuration by issuing the **show chassis** and **show interfaces** commands. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

```
[edit]
user@host# show chassis
fpc 0 {
  pic 0 {
    framing sdh;
  }
}
[edit]
user@host# show interfaces
cstm4-0/0/0 {
  partition 1 oc-slice 1-3 interface-type so;
  partition 2 oc-slice 4-6 interface-type cau4;
  partition 3 oc-slice 7-9 interface-type cau4;
  partition 4 oc-slice 10-12 interface-type cau4;
}
so-0/0/0:1 {
  encapsulation frame-relay;
  unit 0 {
    dlci 16;
    family inet {
      address 10.0.0.1/30;
    }
    family inet6 {
```

```

        address abcd::10.0.0.1/126;
    }
}
cau4-0/0/0:2 {
    partition 1 interface-type t3;
}
t3-0/0/0:2:1 {
    encapsulation frame-relay;
    unit 0 {
        dlci 16;
        family inet {
            address 10.0.0.5/30;
        }
        family inet6 {
            address abcd::10.0.0.5/126;
        }
    }
}
cau4-0/0/0:3 {
    partition 1 interface-type ct3;
    partition 2 interface-type ct3;
}
ct3-0/0/0:3:1 {
    partition 1 interface-type t1;
}
t1-0/0/0:3:1:1 {
    encapsulation frame-relay;
    unit 0 {
        dlci 16;
        family inet {
            address 10.0.0.9/30;
        }
        family inet6 {
            address abcd::10.0.0.9/126;
        }
    }
}
ct3-0/0/0:3:2 {
    partition 1 interface-type ct1;
}
ct1-0/0/0:3:2:1 {
    partition 1 timeslots 1,3-7,24 interface-type ds;
}
ds-0/0/0:3:2:1:1 {
    encapsulation frame-relay;
    unit 0 {
        dlci 16;
        family inet {
            address 10.0.0.13/30;
        }
        family inet6 {
            address abcd::10.0.0.13/126;
        }
    }
}
}

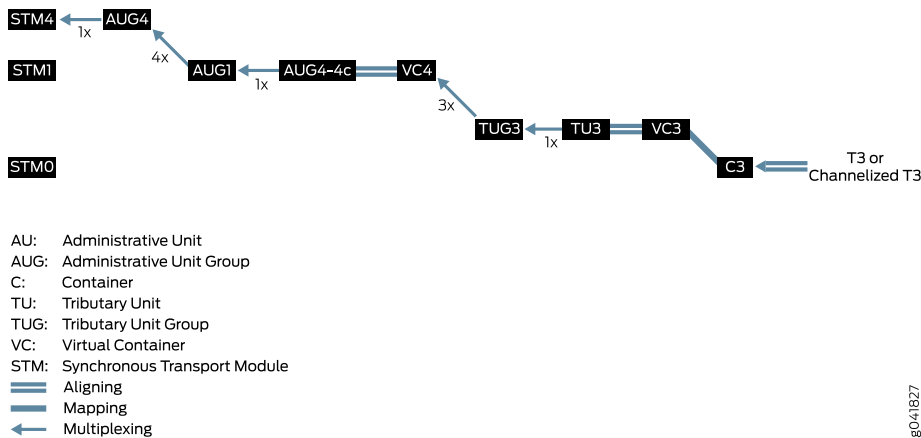
```

```
cau4-0/0/0:4 {
    partition 2 interface-type t3;
    partition 1 interface-type ct3;
}
ct3-0/0/0:4:1 {
    partition 1 interface-type t1;
    partition 2 interface-type ct1;
}
t1-0/0/0:4:1:1 {
    encapsulation frame-relay;
    unit 0 {
        dlci 16;
        family inet {
            address 10.0.0.21/30;
        }
        family inet6 {
            address abcd::10.0.0.21/126;
        }
    }
}
ct1-0/0/0:4:1:2 {
    partition 1 timeslots 6,8-11,7 interface-type ds;
}
ds-0/0/0:4:1:2:1 {
    encapsulation frame-relay;
    unit 0 {
        dlci 16;
        family inet {
            address 10.0.0.25/30;
        }
        family inet6 {
            address abcd::10.0.0.25/126;
        }
    }
}
t3-0/0/0:4:2 {
    encapsulation frame-relay;
    unit 0 {
        dlci 16;
        family inet {
            address 10.0.0.17/30;
        }
        family inet6 {
            address abcd::10.0.0.17/126;
        }
    }
}
cstm4-0/1/0 {
    no-partition interface-type so;
}
so-0/1/0 {
    unit 0 {
        family inet {
            address 10.22.22.1/30;
        }
    }
}
```

}

Figure 10 on page 61 shows a visual representation of the T3/channelized T3-to-STM4 SDH mapping method used by the Junos OS software for channelized OC12 IQ interfaces configured in SDH mode.

Figure 10: Converted Channelized OC12 IQ Interface SDH Mapping Method



Verification

Confirm that the configuration is working properly.

- [Verifying That the Interfaces Are Active on page 61](#)

Verifying That the Interfaces Are Active

**Purpose** To view the interface names of the physical channelized STM4 IQ interface and the resulting interfaces configured on the channelized IQ interface, use the **show interfaces controller** and **show interfaces terse** commands:

**Action** From operational mode, issue the **show interfaces controller cstm4-0/0/0** command.

```

user@host> show interfaces controller cstm4-0/0/0
Controller
cstm4-0/0/0
    so-0/0/0:1
    cau4-0/0/0:2
        t3-0/0/0:2:1
    cau4-0/0/0:3
        ct3-0/0/0:3:1
            t1-0/0/0:3:1:1
        ct3-0/0/0:3:2
            ct1-0/0/0:3:2:1
                ds-0/0/0:3:2:1:1
    cau4-0/0/0:4
        ct3-0/0/0:4:1
            t1-0/0/0:4:1:1
            ct1-0/0/0:4:1:2
                ds-0/0/0:4:1:2:1
        t3-0/0/0:4:2

```

[illegible]

fe80::2a0:a5ff:fe5c:15a6/64

**Meaning** The output shows that the interfaces configured on the channelized OC12 IQ interface are active. The **Admin** field and the **Link** field displaying **up** indicate that the interface is active.

## Example: Configuring a Channelized OC3 IQ Interface

This example shows how to configure a sample channelization structure for a channelized OC3 IQ interface.

- [Requirements on page 63](#)
- [Overview on page 63](#)
- [Configuration on page 65](#)
- [Verification on page 72](#)

### Requirements

This example can be configured using the following hardware and software components:

- Junos OS Release 8.0 or later
- Juniper Networks M Series Multiservice Edge Router or T Series Core Router with Channelized OC3 IQ PIC



**NOTE:** This configuration example has been tested using the software release listed and is assumed to work on all later releases.

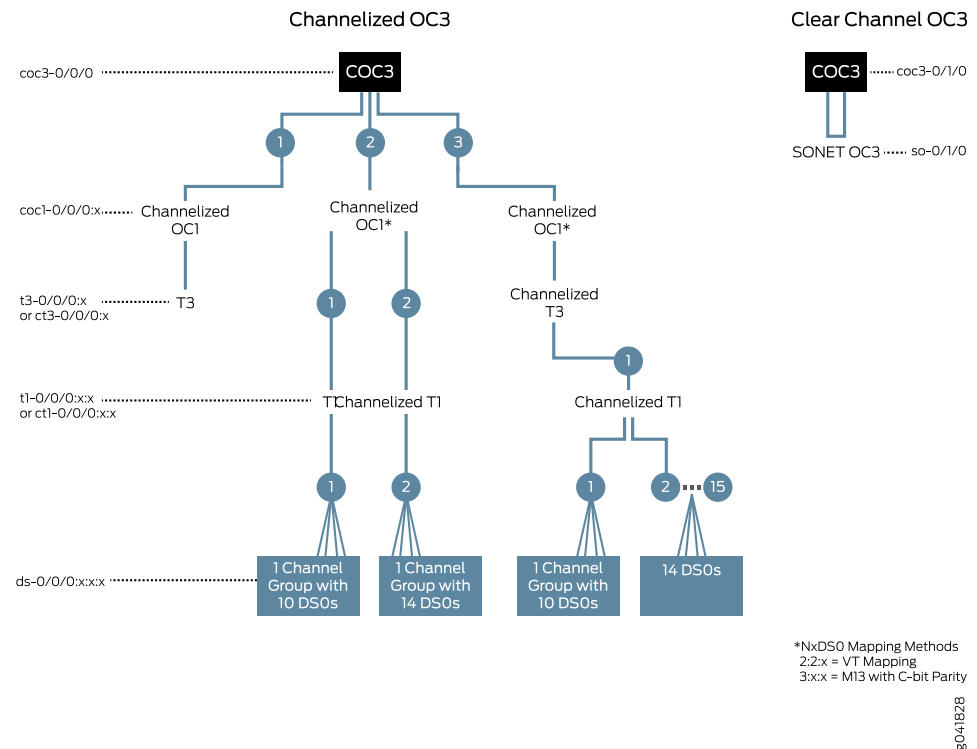
No special configuration beyond device initialization is required before you configure this example.

### Overview

This example shows two NxDS0 mapping methods. Partition 2:x:x uses VT mapping for SONET/SDH equipment, while partition 3:x:x uses M13 mapping for North American T-carrier equipment.

[Figure 11 on page 64](#) shows a sample channelization structure for a channelized OC3 IQ interface.

Figure 11: Channelized OC3 IQ Interface Example



- Top-level partitions 1, 2, and 3 create channelized OC1 interfaces.
- The first channelized OC1 interface, coc1-0/0/0:1, is converted directly into the T3 interface t3-0/0/0:1.
- The second channelized OC1 interface, coc1-0/0/0:2, is partitioned into a T1 interface and a channelized T1 interface. The channelized T1 interface, t1-0/0/0:2, is then further subdivided into two NxDS0 channel groups: ds-0/0/0:2:1 and ds-0/0/0:2:2.
- The remaining channelized OC1 interface, coc1-0/0/0:3, is converted to a channelized T3 interface, then to a channelized T1 interface, and ultimately to 14 individual NxDS0 channels and a channel group containing 10 NxDS0 channels.
- The channelized OC3 IQ interface coc3-0/1/0 uses the **no-partition** statement at the **[edit interface interface-name]** hierarchy level to create a clear channel SONET OC3 interface so-0/1/0.



**NOTE:** This example assumes corresponding interfaces. For example, for every sublevel T1 interface you configure on the router, assume you have configured a matching sublevel or physical T1 interface on a neighboring router.



## Configuration

### CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the **[edit]** hierarchy level.

```
set interfaces coc3-0/0/0 partition 1 oc-slice 1 interface-type coc1
set interfaces coc3-0/0/0 partition 1 oc-slice 1 interface-type coc1
set interfaces coc3-0/0/0 partition 1 oc-slice 1 interface-type coc1
set interfaces coc1-0/0/0:1 no-partition interface-type t3
set interfaces t3-0/0/0:1 no-keepalives
set interfaces t3-0/0/0:1 encapsulation cisco-hdlc
set interfaces t3-0/0/0:1 t3-options fcs 32
set interfaces t3-0/0/0:1 t3-options feac-loop-respond
set interfaces t3-0/0/0:1 unit 0 family inet address 10.21.21.2/30
set interfaces coc1-0/0/0:2 partition 1 interface-type t1
set interfaces coc1-0/0/0:2 partition 2 interface-type ct1
set interfaces t1-0/0/0:2:1 no-keepalives
set interfaces t1-0/0/0:2:1 encapsulation cisco-hdlc
set interfaces t1-0/0/0:2:1 t1-options fcs 32
set interfaces t1-0/0/0:2:1 unit 0 family inet address 10.12.12.2/30
set interfaces ct1-0/0/0:2:2 partition 1 timeslots 1-10 interface-type ds
set interfaces ct1-0/0/0:2:2 partition 2 timeslots 11-24 interface-type ds
set interfaces ds-0/0/0:2:2:1 no-keepalives
set interfaces ds-0/0/0:2:2:1 encapsulation cisco-hdlc
set interfaces ds-0/0/0:2:2:1 unit 0 family inet address 10.13.13.2/30
set interfaces ds-0/0/0:2:2:2 encapsulation frame-relay
set interfaces ds-0/0/0:2:2:2 unit 0 dlci 10
set interfaces ds-0/0/0:2:2:2 unit 0 family inet address 10.14.14.2/30
set interfaces coc1-0/0/0:3 partition 1 interface-type ct3
set interfaces ct1-0/0/0:3:1 partition 1 timeslots 1-10 interface-type ds
set interfaces ct1-0/0/0:3:1 partition 2 timeslots 11 interface-type ds
set interfaces ct1-0/0/0:3:1 partition 3 timeslots 12 interface-type ds
set interfaces ct1-0/0/0:3:1 partition 4 timeslots 13 interface-type ds
set interfaces ct1-0/0/0:3:1 partition 5 timeslots 14 interface-type ds
set interfaces ct1-0/0/0:3:1 partition 6 timeslots 15 interface-type ds
set interfaces ct1-0/0/0:3:1 partition 7 timeslots 16 interface-type ds
set interfaces ct1-0/0/0:3:1 partition 8 timeslots 17 interface-type ds
set interfaces ct1-0/0/0:3:1 partition 9 timeslots 18 interface-type ds
set interfaces ct1-0/0/0:3:1 partition 10 timeslots 19 interface-type ds
set interfaces ct1-0/0/0:3:1 partition 11 timeslots 20 interface-type ds
set interfaces ct1-0/0/0:3:1 partition 12 timeslots 21 interface-type ds
set interfaces ct1-0/0/0:3:1 partition 13 timeslots 22 interface-type ds
set interfaces ct1-0/0/0:3:1 partition 14 timeslots 23 interface-type ds
set interfaces ct1-0/0/0:3:1 partition 15 timeslots 24 interface-type ds
set interfaces ds-0/0/0:3:1:1 no-keepalives
set interfaces ds-0/0/0:3:1:1 encapsulation cisco-hdlc
set interfaces ds-0/0/0:3:1:1 unit 0 family inet address 10.31.31.2/30
set interfaces ds-0/0/0:3:1:2 encapsulation frame-relay
set interfaces ds-0/0/0:3:1:2 unit 0 dlci 10
set interfaces ds-0/0/0:3:1:2 unit 0 family inet address 10.32.32.2/30
set interfaces ds-0/0/0:3:1:3 encapsulation frame-relay
set interfaces ds-0/0/0:3:1:3 unit 0 dlci 10
set interfaces ds-0/0/0:3:1:3 unit 0 family inet address 10.33.33.2/30
```

```
set interfaces ds-0/0/0:3:1:4 encapsulation frame-relay
set interfaces ds-0/0/0:3:1:4 unit 0 dlci 10
set interfaces ds-0/0/0:3:1:4 unit 0 family inet address 10.34.34.2/30
set interfaces ds-0/0/0:3:1:5 encapsulation frame-relay
set interfaces ds-0/0/0:3:1:5 unit 0 dlci 10
set interfaces ds-0/0/0:3:1:5 unit 0 family inet address 10.35.35.2/30
set interfaces ds-0/0/0:3:1:6 encapsulation frame-relay
set interfaces ds-0/0/0:3:1:6 unit 0 dlci 10
set interfaces ds-0/0/0:3:1:6 unit 0 family inet address 10.36.36.2/30
set interfaces ds-0/0/0:3:1:7 encapsulation frame-relay
set interfaces ds-0/0/0:3:1:7 unit 0 dlci 10
set interfaces ds-0/0/0:3:1:7 unit 0 family inet address 10.37.37.2/30
set interfaces ds-0/0/0:3:1:8 encapsulation frame-relay
set interfaces ds-0/0/0:3:1:8 unit 0 dlci 10
set interfaces ds-0/0/0:3:1:8 unit 0 family inet address 10.38.38.2/30
set interfaces ds-0/0/0:3:1:9 encapsulation frame-relay
set interfaces ds-0/0/0:3:1:9 unit 0 dlci 10
set interfaces ds-0/0/0:3:1:9 unit 0 family inet address 10.39.39.2/30
set interfaces ds-0/0/0:3:1:10 encapsulation frame-relay
set interfaces ds-0/0/0:3:1:10 unit 0 dlci 10
set interfaces ds-0/0/0:3:1:10 unit 0 family inet address 10.41.41.2/30
set interfaces ds-0/0/0:3:1:11 encapsulation frame-relay
set interfaces ds-0/0/0:3:1:11 unit 0 dlci 10
set interfaces ds-0/0/0:3:1:11 unit 0 family inet address 10.42.42.2/30
set interfaces ds-0/0/0:3:1:12 encapsulation frame-relay
set interfaces ds-0/0/0:3:1:12 unit 0 dlci 10
set interfaces ds-0/0/0:3:1:12 unit 0 family inet address 10.43.43.2/30
set interfaces ds-0/0/0:3:1:13 encapsulation frame-relay
set interfaces ds-0/0/0:3:1:13 unit 0 dlci 10
set interfaces ds-0/0/0:3:1:13 unit 0 family inet address 10.44.44.2/30
set interfaces ds-0/0/0:3:1:14 encapsulation frame-relay
set interfaces ds-0/0/0:3:1:14 unit 0 dlci 10
set interfaces ds-0/0/0:3:1:14 unit 0 family inet address 10.45.45.2/30
set interfaces ds-0/0/0:3:1:15 encapsulation frame-relay
set interfaces ds-0/0/0:3:1:15 unit 0 dlci 10
set interfaces ds-0/0/0:3:1:15 unit 0 family inet address 10.46.46.2/30
set interfaces coc3-0/1/0 no-partition interface-type so
set interfaces so-0/1/0 dce
set interfaces so-0/1/0 encapsulation frame-relay
set interfaces so-0/1/0 unit 1 dlci 11
set interfaces so-0/1/0 unit 1 family inet address 10.22.22.1/30
```

### Configuring a Sample Channelization Structure on a Channelized OC3 IQ Interface

#### **Step-by-Step Procedure**

The following example requires that you navigate various levels in the configuration hierarchy. For information about navigating the CLI, see *Using the CLI Editor in Configuration Mode* in the *CLI User Guide*.

To configure the sample channelization structure for a channelized OC3 IQ interface of a router:

1. Partition the coc3-0/0/0 interface to create three channelized OC1 interfaces, coc1-0/0/0:1 through coc1-0/0/0:3.

[edit]

- ```

user@host# set interfaces coc3-0/0/0 partition 1 oc-slice 1 interface-type coc1
user@host# set interfaces coc3-0/0/0 partition 2 oc-slice 2 interface-type coc1
user@host# set interfaces coc3-0/0/0 partition 3 oc-slice 3 interface-type coc1

```
2. Convert the coc1-0/0/0:1 interface into a T3 interface.
 

```

[edit]
user@host# set interfaces coc1-0/0/0:1 no-partition interface-type t3

```
  3. Configure the t3-0/0/0:1 interface.
 

```

[edit]
user@host# set interfaces t3-0/0/0:1 no-keepalives
user@host# set interfaces t3-0/0/0:1 encapsulation cisco-hdlc
user@host# set interfaces t3-0/0/0:1 t3-options fcs 32
user@host# set interfaces t3-0/0/0:1 t3-options feac-loop-respond
user@host# set interfaces t3-0/0/0:1 unit 0 family inet address 10.21.21.2/30

```
  4. Partition the coc1-0/0/0:2 interface to create a T1 interface and a channelized T1 interface.
 

```

[edit]
user@host# set interfaces coc1-0/0/0:2 partition 1 interface-type t1
user@host# set interfaces coc1-0/0/0:2 partition 2 interface-type ct1

```
  5. Configure the t1-0/0/0:2:1 interface.
 

```

[edit]
user@host# set interfaces t1-0/0/0:2:1 no-keepalives
user@host# set interfaces t1-0/0/0:2:1 encapsulation cisco-hdlc
user@host# set interfaces t1-0/0/0:2:1 t1-options fcs 32
user@host# set interfaces t1-0/0/0:2:1 unit 0 family inet address 10.12.12.2/30

```
  6. Convert the ct1-0/0/0:2:2 interface into two channel groups of 10 and 14 NxDSOs respectively.
 

```

[edit]
user@host# set interfaces ct1-0/0/0:2:2 partition 1 timeslots 1-10 interface-type ds
user@host# set interfaces ct1-0/0/0:2:2 partition 2 timeslots 11-24 interface-type ds

```
  7. Configure the ds-0/0/0:2:2:1 interface.
 

```

[edit]
user@host# set interfaces ds-0/0/0:2:2:1 no-keepalives
user@host# set interfaces ds-0/0/0:2:2:1 encapsulation cisco-hdlc
user@host# set interfaces ds-0/0/0:2:2:1 unit 0 family inet address 10.13.13.2/30

```
  8. Configure the ds-0/0/0:2:2:2 interface.
 

```

[edit]
user@host# set interfaces ds-0/0/0:2:2:2 encapsulation frame-relay
user@host# set interfaces ds-0/0/0:2:2:2 unit 0 dlci 10
user@host# set interfaces ds-0/0/0:2:2:2 unit 0 family inet address 10.14.14.2/30

```
  9. Partition the coc1-0/0/0:3 interface to create a channelized T3 interface.
 

```

[edit]
user@host# set interfaces coc1-0/0/0:3 partition 1 interface-type ct3

```
  10. Partition the ct1-0/0/0:3:1 interface to create a channel group of 10 NxDSOs and 14 single NxDSO channels.

```
[edit]
user@host# set interfaces ct1-0/0/0:3:1 partition 1 timeslots 1-10 interface-type ds
user@host# set interfaces ct1-0/0/0:3:1 partition 2 timeslots 11 interface-type ds
user@host# set interfaces ct1-0/0/0:3:1 partition 3 timeslots 12 interface-type ds
user@host# set interfaces ct1-0/0/0:3:1 partition 4 timeslots 13 interface-type ds
user@host# set interfaces ct1-0/0/0:3:1 partition 5 timeslots 14 interface-type ds
user@host# set interfaces ct1-0/0/0:3:1 partition 6 timeslots 15 interface-type ds
user@host# set interfaces ct1-0/0/0:3:1 partition 7 timeslots 16 interface-type ds
user@host# set interfaces ct1-0/0/0:3:1 partition 8 timeslots 17 interface-type ds
user@host# set interfaces ct1-0/0/0:3:1 partition 9 timeslots 18 interface-type ds
user@host# set interfaces ct1-0/0/0:3:1 partition 10 timeslots 19 interface-type ds
user@host# set interfaces ct1-0/0/0:3:1 partition 11 timeslots 20 interface-type ds
user@host# set interfaces ct1-0/0/0:3:1 partition 12 timeslots 21 interface-type ds
user@host# set interfaces ct1-0/0/0:3:1 partition 13 timeslots 22 interface-type ds
user@host# set interfaces ct1-0/0/0:3:1 partition 14 timeslots 23 interface-type ds
user@host# set interfaces ct1-0/0/0:3:1 partition 15 timeslots 24 interface-type ds
```

11. Configure the ds-0/0/0:3:1:1 interface.

```
[edit]
user@host# set interfaces ds-0/0/0:3:1:1 no-keepalives
user@host# set interfaces ds-0/0/0:3:1:1 encapsulation cisco-hdlc
user@host# set interfaces ds-0/0/0:3:1:1 unit 0 family inet address 10.31.31.2/30
```

12. Configure the ds-0/0/0:3:1:2 through ds-0/0/0:3:1:15 interfaces.

```
[edit]
user@host# set interfaces ds-0/0/0:3:1:2 encapsulation frame-relay
user@host# set interfaces ds-0/0/0:3:1:2 unit 0 dlci 10
user@host# set interfaces ds-0/0/0:3:1:2 unit 0 family inet address 10.32.32.2/30
user@host# set interfaces ds-0/0/0:3:1:3 encapsulation frame-relay
user@host# set interfaces ds-0/0/0:3:1:3 unit 0 dlci 10
user@host# set interfaces ds-0/0/0:3:1:3 unit 0 family inet address 10.33.33.2/30
user@host# set interfaces ds-0/0/0:3:1:4 encapsulation frame-relay
user@host# set interfaces ds-0/0/0:3:1:4 unit 0 dlci 10
user@host# set interfaces ds-0/0/0:3:1:4 unit 0 family inet address 10.34.34.2/30
user@host# set interfaces ds-0/0/0:3:1:5 encapsulation frame-relay
user@host# set interfaces ds-0/0/0:3:1:5 unit 0 dlci 10
user@host# set interfaces ds-0/0/0:3:1:5 unit 0 family inet address 10.35.35.2/30
user@host# set interfaces ds-0/0/0:3:1:6 encapsulation frame-relay
user@host# set interfaces ds-0/0/0:3:1:6 unit 0 dlci 10
user@host# set interfaces ds-0/0/0:3:1:6 unit 0 family inet address 10.36.36.2/30
user@host# set interfaces ds-0/0/0:3:1:7 encapsulation frame-relay
user@host# set interfaces ds-0/0/0:3:1:7 unit 0 dlci 10
user@host# set interfaces ds-0/0/0:3:1:7 unit 0 family inet address 10.37.37.2/30
user@host# set interfaces ds-0/0/0:3:1:8 encapsulation frame-relay
user@host# set interfaces ds-0/0/0:3:1:8 unit 0 dlci 10
user@host# set interfaces ds-0/0/0:3:1:8 unit 0 family inet address 10.38.38.2/30
user@host# set interfaces ds-0/0/0:3:1:9 encapsulation frame-relay
user@host# set interfaces ds-0/0/0:3:1:9 unit 0 dlci 10
user@host# set interfaces ds-0/0/0:3:1:9 unit 0 family inet address 10.39.39.2/30
user@host# set interfaces ds-0/0/0:3:1:10 encapsulation frame-relay
user@host# set interfaces ds-0/0/0:3:1:10 unit 0 dlci 10
user@host# set interfaces ds-0/0/0:3:1:10 unit 0 family inet address 10.41.41.2/30
user@host# set interfaces ds-0/0/0:3:1:11 encapsulation frame-relay
user@host# set interfaces ds-0/0/0:3:1:11 unit 0 dlci 10
user@host# set interfaces ds-0/0/0:3:1:11 unit 0 family inet address 10.42.42.2/30
```

```

user@host# set interfaces ds-0/0/0:3:1:12 encapsulation frame-relay
user@host# set interfaces ds-0/0/0:3:1:12 unit 0 dlci 10
user@host# set interfaces ds-0/0/0:3:1:12 unit 0 family inet address 10.43.43.2/30
user@host# set interfaces ds-0/0/0:3:1:13 encapsulation frame-relay
user@host# set interfaces ds-0/0/0:3:1:13 unit 0 dlci 10
user@host# set interfaces ds-0/0/0:3:1:13 unit 0 family inet address 10.44.44.2/30
user@host# set interfaces ds-0/0/0:3:1:14 encapsulation frame-relay
user@host# set interfaces ds-0/0/0:3:1:14 unit 0 dlci 10
user@host# set interfaces ds-0/0/0:3:1:14 unit 0 family inet address 10.45.45.2/30
user@host# set interfaces ds-0/0/0:3:1:15 encapsulation frame-relay
user@host# set interfaces ds-0/0/0:3:1:15 unit 0 dlci 10
user@host# set interfaces ds-0/0/0:3:1:15 unit 0 family inet address 10.46.46.2/30

```

13. Configure the coc3-0/1/0 interface to create a clear channel SONET OC3 interface.

```

[edit]
user@host# set interfaces coc3-0/1/0 no-partition interface-type so

```

14. Configure the so-0/1/0 interface.

```

[edit]
user@host# set interfaces so-0/1/0 dce
user@host# set interfaces so-0/1/0 encapsulation frame-relay
user@host# set interfaces so-0/1/0 unit 1 dlci 11
user@host# set interfaces so-0/1/0 unit 1 family inet address 10.22.22.1/30

```

15. Commit the configuration.

```

[edit]
user@host# commit

```

## Results

From configuration mode, confirm your configuration by issuing the **show interfaces** command. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.



**NOTE:** The output of the show interfaces command has been truncated for brevity.

```

[edit]
user@host# show interfaces
coc3-0/0/0 {
  partition 1 oc-slice 1 interface-type coc1;
  partition 2 oc-slice 2 interface-type coc1;
  partition 3 oc-slice 3 interface-type coc1;
}
coc1-0/0/0:1 {
  no-partition interface-type t3;
}
t3-0/0/0:1 {
  no-keepalives;
  encapsulation cisco-hdlc;
  t3-options {

```

```
        fcs 32;
        feac-loop-respond;
    }
    unit 0 {
        family inet {
            address 10.21.21.2/30;
        }
    }
}
coc1-0/0/0:2 {
    partition 1 interface-type t1;
    partition 2 interface-type ct1;
}
t1-0/0/0:2:1 {
    no-keepalives;
    encapsulation cisco-hdlc;
    t1-options {
        fcs 32;
    }
    unit 0 {
        family inet {
            address 10.12.12.2/30;
        }
    }
}
ct1-0/0/0:2:2 {
    partition 1 timeslots 1-10 interface-type ds;
    partition 2 timeslots 11-24 interface-type ds;
}
ds-0/0/0:2:2:1 {
    no-keepalives;
    encapsulation cisco-hdlc;
    unit 0 {
        family inet {
            address 10.13.13.2/30;
        }
    }
}
ds-0/0/0:2:2:2 {
    encapsulation frame-relay;
    unit 0 {
        dlci 10;
        family inet {
            address 10.14.14.2/30;
        }
    }
}
coc1-0/0/0:3 {
    partition 1 interface-type ct3;
}
ct1-0/0/0:3:1 {
    partition 1 timeslots 1-10 interface-type ds;
    partition 2 timeslots 11 interface-type ds;
    partition 3 timeslots 12 interface-type ds;
    partition 4 timeslots 13 interface-type ds;
    partition 5 timeslots 14 interface-type ds;
```

```
partition 6 timeslots 15 interface-type ds;
partition 7 timeslots 16 interface-type ds;
partition 8 timeslots 17 interface-type ds;
partition 9 timeslots 18 interface-type ds;
partition 10 timeslots 19 interface-type ds;
partition 11 timeslots 20 interface-type ds;
partition 12 timeslots 21 interface-type ds;
partition 13 timeslots 22 interface-type ds;
partition 14 timeslots 23 interface-type ds;
partition 15 timeslots 24 interface-type ds;
}
ds-0/0/0:3:1:1 {
  no-keepalives;
  encapsulation cisco-hdlc;
  unit 0 {
    family inet {
      address 10.31.31.2/30;
    }
  }
}
ds-0/0/0:3:1:2 {
  encapsulation frame-relay;
  unit 0 {
    dlci 10;
    family inet {
      address 10.32.32.2/30;
    }
  }
}
...
ds-0/0/0:3:1:15 {
  encapsulation frame-relay;
  unit 0 {
    dlci 10;
    family inet {
      address 10.45.45.2/30;
    }
  }
}
coc3-0/1/0 {
  no-partition interface-type so;
}
so-0/1/0 {
  dce;
  encapsulation frame-relay;
  unit 1 {
    dlci 11;
    family inet {
      address 10.22.22.1/30;
    }
  }
}
```

## Verification

Confirm that the configuration is working properly.

- [Verifying That the Interfaces Are Active on page 72](#)
- [View the Operational Details of the Interfaces on page 72](#)

### Verifying That the Interfaces Are Active

---

**Purpose** View the interface names of the physical channelized OC3 IQ interface and the resulting interfaces configured on the channelized IQ interface.

**Action** From operational mode, issue the **show interfaces controller** command.

```
user@host> show interfaces controller
Controller
coc3-0/0/0
  coc1-0/0/0:1
  t3-0/0/0:1
  coc1-0/0/0:2
    t1-0/0/0:2:1
    ct1-0/0/0:2:2
      ds-0/0/0:2:2:1
      ds-0/0/0:2:2:2
  coc1-0/0/0:3
  ct3-0/0/0:3
    ct1-0/0/0:3:1
      ds-0/0/0:3:1:1
      ds-0/0/0:3:1:2
      ds-0/0/0:3:1:3
      ds-0/0/0:3:1:4
      ds-0/0/0:3:1:5
      ds-0/0/0:3:1:6
      ds-0/0/0:3:1:7
      ds-0/0/0:3:1:8
      ds-0/0/0:3:1:9
      ds-0/0/0:3:1:10
      ds-0/0/0:3:1:11
      ds-0/0/0:3:1:12
      ds-0/0/0:3:1:13
      ds-0/0/0:3:1:14
      ds-0/0/0:3:1:15
```

	Admin	Link
coc3-0/0/0	up	up
coc1-0/0/0:1	up	up
t3-0/0/0:1	up	up
coc1-0/0/0:2	up	up
t1-0/0/0:2:1	up	up
ct1-0/0/0:2:2	up	up
ds-0/0/0:2:2:1	up	up
ds-0/0/0:2:2:2	up	up
coc1-0/0/0:3	up	up
ct3-0/0/0:3	up	up
ct1-0/0/0:3:1	up	up
ds-0/0/0:3:1:1	up	up
ds-0/0/0:3:1:2	up	up
ds-0/0/0:3:1:3	up	up
ds-0/0/0:3:1:4	up	up
ds-0/0/0:3:1:5	up	up
ds-0/0/0:3:1:6	up	up
ds-0/0/0:3:1:7	up	up
ds-0/0/0:3:1:8	up	up
ds-0/0/0:3:1:9	up	up
ds-0/0/0:3:1:10	up	up
ds-0/0/0:3:1:11	up	up
ds-0/0/0:3:1:12	up	up
ds-0/0/0:3:1:13	up	up
ds-0/0/0:3:1:14	up	up
ds-0/0/0:3:1:15	up	up

**Meaning** The output shows that the interfaces configured on the channelized OC3 IQ interface are active. The **Admin** field and the **Link** field displaying **up** indicate that the interface is active.

### View the Operational Details of the Interfaces

---

**Purpose** View the operational details of the interfaces to confirm that the interfaces are up and running.

**Action** To verify that your channelized IQ interfaces are working as expected, use the **show interfaces** command. Use the **show interfaces controller** command to find the name of



the channelized interface you want to view; then include this channelized name (for example, **ct3-0/0/0:3**) as an option with the **show interfaces** command.

To view information about the physical channelized OC3 interface, include the **coc3-fpc/pic/port** option with the **show interfaces** command:

```
user@host> show interfaces coc3-0/0/0
Physical interface: coc3-0/0/0, Enabled, Physical link is Up
  Interface index: 128, SNMP ifIndex: 1954
  Link-level type: Controller, Clocking: Internal, SONET mode,
  Speed: OC3, Loopback: None, Parent: None
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps 16384
  Link flags     : None
  CoS queues    : 4 supported
  Last flapped   : 2005-02-15 20:35:24 PST (22:10:54 ago)
  SONET alarms   : None
  SONET defects  : None
```

To view information about a channelized OC1 channel, include the **coc1-fpc/pic/port:channel** option with the **show interfaces** command:

```
user@host> show interfaces coc1-0/0/0:1
Physical interface: coc1-0/0/0:1, Enabled, Physical link is Up
  Interface index: 226, SNMP ifIndex: 1957
  Link-level type: Controller, Clocking: Internal, SONET mode, Speed: 51840kbps,
  Loopback: None,
  Parent: coc3-0/0/0 Interface index 138
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps 16384
  Link flags     : None
  CoS queues    : 4 supported
  Last flapped   : 2004-11-04 10:55:50 PST (05:38:36 ago)
  SONET alarms   : None
  SONET defects  : None
```

To view information about a T3 channel, include the **t3-fpc/pic/port:channel** option with the **show interfaces** command:

```
user@host> show interfaces t3-0/0/0:1
Physical interface: t3-0/0/0:1, Enabled, Physical link is Up
  Interface index: 227, SNMP ifIndex: 43
  Link-level type: Cisco-HDLC, MTU: 4474, Clocking: Internal, Speed: T3, Loopback:
  None, FCS: 16, Mode: C/Bit parity,
  Parent: coc1-0/0/0:1 Interface index 226
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps 16384
  Link flags     : No-Keepalives
  CoS queues    : 4 supported
  Last flapped   : Never
  Input rate     : 0 bps (0 pps)
  Output rate    : 0 bps (0 pps)
  Active alarms  : None
  Active defects : None
  DS3 BERT configuration:
    BERT time period: 10 seconds, Elapsed: 0 seconds
    Algorithm: 2^15 - 1, 0.151, Pseudorandom (9), Induced error rate: 10e-0
  Logical interface t3-0/0/0:1.0 (Index 69) (SNMP ifIndex 1960)
    Flags: Point-To-Point SNMP-Traps Encapsulation: Cisco-HDLC
    Protocol inet, MTU: 4470
    Flags: None
```

```
Addresses, Flags: Is-Preferred Is-Primary
Destination: 10.21.21.0/30, Local: 10.21.21.2, Broadcast: 10.21.21.3
```

To view information about a channelized T3 channel, include the **ct3-fpc/pic/port:channel** option with the **show interfaces** command:

```
user@host> show interfaces ct3-0/0/0:3
Physical interface: ct3-0/0/0:3, Enabled, Physical link is Up
  Interface index: 234, SNMP ifIndex: 2218
  Link-level type: Controller, Clocking: Internal, Speed: T3, Loopback: None,
Mode: C/Bit parity,
  Parent: coc1-0/0/0:3 Interface index 233
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps 16384
  Link flags     : None
  CoS queues     : 4 supported
  Last flapped   : Never
  Active alarms  : None
  Active defects : None
  DS3 BERT configuration:
    BERT time period: 10 seconds, Elapsed: 0 seconds
    Algorithm: 2^15 - 1, 0.151, Pseudorandom (9), Induced error rate: 10e-0
```

To view information about a T1 channel, include the **t1-fpc/pic/port:channel:channel** option with the **show interfaces** command:

```
user@host> show interfaces t1-0/0/0:2:1
Physical interface: t1-0/0/0:2:1, Enabled, Physical link is Up
  Interface index: 229, SNMP ifIndex: 2091
  Link-level type: Cisco-HDLC, MTU: 1504, Clocking: Internal, Speed: T1,
Loopback: None, FCS: 32, Framing: ESF,
  Parent: coc1-0/0/0:2 Interface index 228
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps 16384
  Link flags     : No-Keepalives
  CoS queues     : 4 supported
  Last flapped   : Never
  Input rate     : 0 bps (0 pps)
  Output rate    : 0 bps (0 pps)
  DS1 alarms    : None
  DS1 defects    : None
  SONET alarms   : None
  SONET defects  : None
  Logical interface t1-0/0/0:2:1.0 (Index 70) (SNMP ifIndex 2092)
    Flags: Point-To-Point SNMP-Traps Encapsulation: Cisco-HDLC
    Protocol inet, MTU: 1500
    Flags: None
    Addresses, Flags: Is-Preferred Is-Primary
    Destination: 10.12.12.0/30, Local: 10.12.12.2, Broadcast: 10.12.12.3
```

To view information about a channelized T1 channel, include the **ct1-fpc/pic/port:channel:channel** option with the **show interfaces** command:

```
user@host> show interfaces ct1-0/0/0:2:2
Physical interface: ct1-0/0/0:2:2, Enabled, Physical link is Up
  Interface index: 230, SNMP ifIndex: 13985
  Link-level type: Controller, Clocking: Internal, Speed: T1, Loopback: None,
Framing: ESF,
  Parent: coc1-0/0/0:2 Interface index 228
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps 16384
```

```

Link flags      : None
CoS queues      : 4 supported
Last flapped    : Never
DS1 alarms      : None
DS1 defects     : None
SONET alarms    : None
SONET defects    : None

```

To view information about an NxDSO channel, include the **ds-fpc/pic/port:channel:channel:channel** option with the **show interfaces** command:

```

user@host> show interfaces ds-0/0/0:2:2:1
Physical interface: ds-0/0/0:2:2:1, Enabled, Physical link is Up
  Interface index: 231, SNMP ifIndex: 14016
  Link-level type: Cisco-HDLC, MTU: 1504, Clocking: Internal, Speed: 640kbps,
  Loopback: None, FCS: 16,
  Parent: ct1-0/0/0:2:2 Interface index 230
  Device flags      : Present Running
  Interface flags: Point-To-Point SNMP-Traps 16384
  Link flags        : No-Keepalives
  CoS queues        : 8 maximum usable queues, 4 in use
  Egress queues     : 8 supported, 4 in use4 supported
  Last flapped      : Never
  Input rate        : 0 bps (0 pps)
  Output rate       : 0 bps (0 pps)
  DSO BERT configuration:
    BERT time period: 10 seconds, Elapsed: 0 seconds
    Induced Error rate: 10e-0, Algorithm: 2^15 - 1, 0.151, Pseudorandom (9)
  Logical interface ds-0/0/0:2:2:1.0 (Index 71) (SNMP ifIndex 20889)
  Flags: Point-To-Point SNMP-Traps Encapsulation: Cisco-HDLC
  Protocol inet, MTU: 1500
  Flags: None
  Addresses, Flags: Is-Preferred Is-Primary
    Destination: 10.13.13.0/30, Local: 10.13.13.2, Broadcast: 10.13.13.3

```

To view information about the clear channel SONET OC3 interface, include the **so-fpc/pic/port** option with the **show interfaces** command:

```

user@host> show interfaces so-0/1/0
Physical interface: so-0/1/0, Enabled, Physical link is Up
  Interface index: 128, SNMP ifIndex: 15684
  Link-level type: Cisco-HDLC, MTU: 4474, Clocking: Internal, SONET mode, Speed:
  OC3, Loopback: None, FCS: 16,
  Payload scrambler: Enabled
  Parent: coc3-0/1/0 Interface index 142
  Device flags      : Present Running
  Interface flags: Point-To-Point SNMP-Traps 16384
  Link flags        : Keepalives
  CoS queues        : 4 supported
  Last flapped      : 2004-11-04 10:53:54 PST (05:51:04 ago)
  Input rate        : 0 bps (0 pps)
  Output rate       : 0 bps (0 pps)
  SONET alarms      : PLM-P
  SONET defects     : PLM-P
  Logical interface so-0/1/0.0 (Index 67) (SNMP ifIndex 15686)
  Flags: Device-Down Point-To-Point SNMP-Traps Encapsulation: Cisco-HDLC
  Protocol inet, MTU: 4470
  Flags: None
  Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
    Destination: 10.22.22.0/30, Local: 10.22.22.1, Broadcast: 10.22.22.3

```

**Meaning** The interfaces configured on the channelized OC3 IQ interface are up and running.

## Example: Configuring a Channelized DS3 IQ Interface

---

This example shows how to configure a channelized DS3 IQ interface.

- [Requirements on page 76](#)
- [Overview on page 76](#)
- [Configuration on page 77](#)
- [Verification on page 79](#)

### Requirements

This example can be configured using the following hardware and software components:

- Junos OS Release 8.0 or later
- Juniper Networks M Series Multiservice Edge Router or T Series Core Router with Channelized DS3 IQ PIC



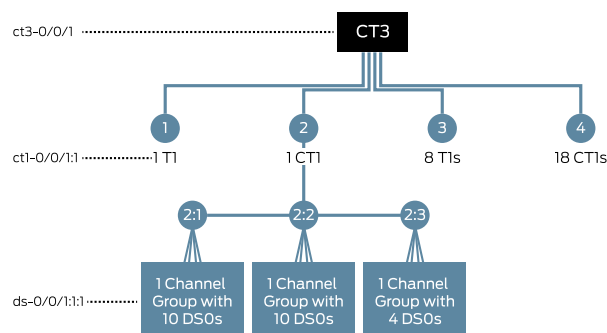
**NOTE:** This configuration example has been tested using the software release listed and is assumed to work on all later releases.

No special configuration beyond device initialization is required before you configure this example.

### Overview

This example shows how to configure a channelized DS3 IQ interface. [Figure 12 on page 77](#) shows the breakdown of a DS3 interface into a variety of channels. The path that leads to NxDS0 channels is similar to the M13 with C-bit parity method seen in the complex OC12 configuration example (see “[Example: Configuring a Complex Channelized OC12 IQ Interface](#)” on page 14). This method breaks the channelized DS3 IQ interface into channelized T1s before additional splits create DS0 time slots.

Figure 12: Channelized DS3 IQ Interface Example



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To create T1 channels, include the **partition** statement at the **[edit interfaces ct3-fpc/pic/port]** hierarchy level with the **interface-type t1** option. To create channelized T1 channels, include the **partition** statement at the **[edit interfaces ct3-fpc/pic/port]** hierarchy level with the **interface-type ct1** option.

After you have established a channelized T1 channel, you can split it into a maximum of 24 NxDS0 channels. To configure NxDS0 channels, include the **partition** statement at the **[edit interfaces ct1-fpc/pic/port:channel]** hierarchy level with the **timeslots** and **interface-type ds** options to create the desired number of NxDS0 channels or channel groups.

Although it is not part of the example shown, you can also create a clear channel T3 or a fractional T3 interface on a channelized DS3 IQ interface. To configure a clear channel T3 or fractional T3 interface, include the **no-partition** statement at the **[edit interfaces ct3-fpc/pic/port]** hierarchy level. After you commit this part of the configuration, a clear channel T3 interface is established. You can configure standard T3 options on this interface. To fractionalize the T3 interface, include the **timeslots** statement at the **[edit interfaces t3-fpc/pic/port t3-options]** hierarchy level.

## Configuration

### CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the **[edit]** hierarchy level.

```
set interfaces ct3-0/0/1 partition 1 interface-type t1
set interfaces ct3-0/0/1 partition 2 interface-type ct1
set interfaces ct3-0/0/1 partition 3-10 interface-type t1
set interfaces ct3-0/0/1 partition 11-28 interface-type ct1
set interfaces ct1-0/0/1:2 partition 1 timeslots 1-10 interface-type ds
set interfaces ct1-0/0/1:2 partition 2 timeslots 11-20 interface-type ds
set interfaces ct1-0/0/1:2 partition 3 timeslots 21-24 interface-type ds
set interfaces ds-0/0/1:2:1 unit 0 family inet address 10.25.1.2/24
set interfaces ds-0/0/1:2:2 unit 0 family inet address 10.25.2.2/24
set interfaces ds-0/0/1:2:3 unit 0 family inet address 10.25.3.2/24
```

### Configuring the Channelized DS3 IQ Interface

---

**Step-by-Step Procedure** The following example requires that you navigate various levels in the configuration hierarchy. For information about navigating the CLI, see *Using the CLI Editor in Configuration Mode* in the *CLI User Guide*.

To configure the channelized DS3 IQ interface of a router:

1. Partition the ct3-0/0/1 interface to create T1 and channelized T1 channels.  

```
[edit]
user@host# set interfaces ct3-0/0/1 partition 1 interface-type t1
user@host# set interfaces ct3-0/0/1 partition 2 interface-type ct1
user@host# set interfaces ct3-0/0/1 partition 3-10 interface-type t1
user@host# set interfaces ct3-0/0/1 partition 11-28 interface-type ct1
```
2. Partition the ct1-0/0/1:2 interface to create three NxDS0 channel groups.  

```
[edit]
user@host# set interfaces ct1-0/0/1:2 partition 1 timeslots 1-10 interface-type ds
user@host# set interfaces ct1-0/0/1:2 partition 2 timeslots 11-20 interface-type ds
user@host# set interfaces ct1-0/0/1:2 partition 3 timeslots 21-24 interface-type ds
```
3. Configure the ds-0/0/1:2:1, ds-0/0/1:2:2, and ds-0/0/1:2:3 interfaces.  

```
[edit]
user@host# set interfaces
user@host# set interfaces ds-0/0/1:2:1 unit 0 family inet address 10.25.1.2/24
user@host# set interfaces ds-0/0/1:2:2 unit 0 family inet address 10.25.2.2/24
user@host# set interfaces ds-0/0/1:2:3 unit 0 family inet address 10.25.3.2/24
```
4. Commit the configuration.  

```
[edit]
user@host# commit
```

### Results

---

From configuration mode, confirm your configuration by issuing the **show interfaces** command. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

```
[edit]
user@host# show interfaces
ct3-0/0/1 {
  partition 1 interface-type t1;
  partition 2 interface-type ct1;
  partition 3-10 interface-type t1;
  partition 11-28 interface-type ct1;
}
ct1-0/0/1:2 {
  partition 1 timeslots 1-10 interface-type ds;
  partition 2 timeslots 11-20 interface-type ds;
  partition 3 timeslots 21-24 interface-type ds;
}
ds-0/0/1:2:1 {
  unit 0 {
```

```
family inet {  
    address 10.25.1.2/24;  
}  
}  
ds-0/0/1:2:2 {  
    unit 0 {  
        family inet {  
            address 10.25.2.2/24;  
        }  
    }  
}  
ds-0/0/1:2:3 {  
    unit 0 {  
        family inet {  
            address 10.25.3.2/24;  
        }  
    }  
}
```

## Verification

Confirm that the configuration is working properly.

- [Verifying That the Interfaces Are Active on page 79](#)
- [View the Operational Details of the Interfaces on page 80](#)

### Verifying That the Interfaces Are Active

**Purpose** View the interface names of the physical channelized DS3 IQ interface and the channels configured on this interface.

**Action** From operational mode, issue the **show interfaces controller** command.

```

user@host> show interfaces controller ct3-0/0/1
Controller
ct3-0/0/1
    t1-0/0/1:1
    ct1-0/0/1:2
        ds-0/0/1:2:1
        ds-0/0/1:2:2
        ds-0/0/1:2:3
    t1-0/0/1:3
    t1-0/0/1:4
    t1-0/0/1:5
    t1-0/0/1:6
    t1-0/0/1:7
    t1-0/0/1:8
    t1-0/0/1:9
    t1-0/0/1:10
    ct1-0/0/1:11
    ct1-0/0/1:12
    ct1-0/0/1:13
    ct1-0/0/1:14
    ct1-0/0/1:15
    ct1-0/0/1:16
    ct1-0/0/1:17
    ct1-0/0/1:18
    ct1-0/0/1:19
    ct1-0/0/1:20
    ct1-0/0/1:21
    ct1-0/0/1:22
    ct1-0/0/1:23
    ct1-0/0/1:24
    ct1-0/0/1:25
    ct1-0/0/1:26
    ct1-0/0/1:27
    ct1-0/0/1:28

```

**Meaning** The output shows that the interfaces configured on the channelized DS3 IQ interface are active. The **Admin** field and the **Link** field displaying **up** indicate that the interface is active.

## View the Operational Details of the Interfaces

<b>Purpose</b>	View the operational details of the interfaces to confirm that the interfaces are up and running.
----------------	---

**Action** To view information about the physical channelized interface, include the `ct3-fpc/pic/port` option with the `show interfaces extensive` command:

```
user@host> show interfaces extensive ct3-0/0/1
Physical interface: ct3-0/0/1, Enabled, Physical link is Up
  Interface index: 30, SNMP ifIndex: 317, Generation: 29
  Link-level type: Controller, MTU: 4474, Clocking: Internal, Speed: T3,
  Loopback: None, FCS: 16, Mode: C/Bit parity, Parent: None
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link flags     : None
```



```

Hold-times      : Up 0 ms, Down 0 ms
Last flapped   : 2002-10-04 10:24:18 PDT (01:40:40 ago)
Statistics last cleared: 2002-10-04 11:47:27 PDT (00:17:31 ago)
Traffic statistics:
Input bytes  :                0                0 bps
Output bytes :                0                0 bps
Input packets:                0                0 pps
Output packets:              0                0 pps
Input errors:
  Errors: 0, Drops: 0, Framing errors: 0, Bucket drops: 0,
  Policed discards: 0, L3 incompletes: 0, L2 channel errors: 0,
  L2 mismatch timeouts: 0, HS link CRC errors: 0, SRAM errors: 0
Output errors:
  Carrier transitions: 0, Errors: 0, Drops: 0, Aged packets: 0
Active alarms  : None
Active defects : None
DS3 media:
Seconds      Count  State
PLL Lock      0      0 OK
Reframing     0      0 OK
AIS           0      0 OK
LOF           0      0 OK
LOS           0      0 OK
IDLE          0      0 OK
YELLOW        0      0 OK
BPV           0      0
EXZ           0      0
LCV           0      0
PCV           0      0
CCV           0      0
LES           0
PES           0
PSES          0
CES           0
CES           0
SEFS          0
HDLc configuration:
  Policing bucket: Disabled
  Shaping bucket : Disabled
  Giant threshold: 0, Runt threshold: 0
DSU configuration:
  Compatibility mode: None, Scrambling: Disabled, Subrate: Disabled
  FEAC loopback: Inactive, Response: Disabled, Count: 0
DS-3 BERT configuration:
  BERT time period: 10 seconds, Elapsed: 0 seconds
  Algorithm: 2^3 - 1, Pseudorandom (1), Induced error rate: 10e-0
Packet Forwarding Engine configuration:
  Destination slot: 0 (0x00)
  CoS transmit queue      Bandwidth      Buffer Priority  Limit
                           %      bps      %      bytes
  0 best-effort           95      42499200  95      0      low  none
  3 network-control       5       2236800   5       0      low  none

```

To view information about a channelized T1 channel, include the **ct1-fpc/pic/port:channel** option with the **show interfaces extensive** command:

```

user@host> show interfaces extensive ct1-0/0/1:2
Physical interface: ct1-0/0/1:2, Enabled, Physical link is Up
Interface index: 175, SNMP ifIndex: 1505, Generation: 174
Link-level type: Controller, MTU: 1504, Clocking: Internal, Speed: T1,
Loopback: None, FCS: 16, Framing: ESF, Parent: ct3-0/0/1 (Index 32)
Device flags   : Present Running

```

```

Interface flags: Point-To-Point SNMP-Traps
Link flags      : None
Hold-times     : Up 0 ms, Down 0 ms
Last flapped   : 2002-10-04 12:08:23 PDT (00:05:57 ago)
Statistics last cleared: Never
Traffic statistics:
Input bytes : 0 0 bps
Output bytes : 0 0 bps
Input packets: 0 0 pps
Output packets: 0 0 pps
Input errors:
Errors: 0, Drops: 0, Framing errors: 0, Policed discards: 0,
L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0,
HS link CRC errors: 0, SRAM errors: 0
Output errors:
Carrier transitions: 0, Errors: 0, Drops: 0, Aged packets: 0
DS1 alarms : None
DS1 defects : AIS, LOF
T1 media:
Seconds      Count  State
SEF          0      0 OK
BEE          1      1 OK
AIS         355      1 Defect Active
LOF         355      1 Defect Active
LOS          0      0 OK
YELLOW       0      0 OK
BPV          0      0
EXZ          0      0
LCV          0      0
PCV          0      0
CS           0      0
LES         355
ES          355
SES         355
SEFS        355
BES         0
UAS         0
HDLC configuration:
Policing bucket: Disabled
Shaping bucket : Disabled
Giant threshold: 1514, Runt threshold: 0
Timeslots      : All active
Line encoding: B8ZS, Byte encoding: Nx64K
Buildout       : 0 to 132 feet
Data inversion: Disabled
DS1 BERT configuration:
BERT time period: 10 seconds, Elapsed: 0 seconds
Induced Error rate: 10e-0, Algorithm: 2^15 - 1, 0.151, Pseudorandom (9)
Packet Forwarding Engine configuration:
Destination slot: 0 (0x00)
CoS transmit queue      Bandwidth      Buffer Priority  Limit
                        %      bps      %      bytes
0 best-effort           95    1459200 95      0      low  none
3 network-control       5     76800  5      0      low  none

```

To view information about an NxDS0 interface, include the **ds-fpc/pic/port:channel** option with the **show interfaces extensive** command. In this case, the speed is 640 Kbps because this channel contains 10 DS0s (**64 x 10 = 640**).

```

user@host> show interfaces extensive ds-0/0/1:2:1
Physical interface: ds-0/0/1:2:1, Enabled, Physical link is Up
Interface index: 176, SNMP ifIndex: 1563, Generation: 175

```

```

Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: 640kbps,
Loopback: None, FCS: 16, Parent: ct1-0/0/1:2 (Index 175)
Device flags : Present Running
Interface flags: Point-To-Point SNMP-Traps
Link flags : Keepalives
Hold-times : Up 0 ms, Down 0 ms
Last flapped : 2002-10-04 12:09:06 PDT (00:05:54 ago)
Statistics last cleared: Never
Traffic statistics:
  Input bytes : 0 0 bps
  Output bytes : 0 0 bps
  Input packets: 0 0 pps
  Output packets: 0 0 pps
Input errors:
  Errors: 0, Drops: 0, Framing errors: 0, Policed discards: 0,
  L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0,
  HS link CRC errors: 0
Output errors:
  Carrier transitions: 1, Errors: 0, Drops: 0, Aged packets: 0
Queue counters:
  Queued packets  Transmitted packets  Dropped packets

  0 best-effort 0 0 0
  1 expedited-fo 0 0 0
  2 assured-forw 0 0 0
  3 network-cont 0 0 0

Interface transmit queues:
  B/W WRR Packets Bytes Drops Errors
Queue0 0 0 0 0 0 0
Queue1 0 0 0 0 0 0
HDLC configuration:
  Giant threshold: 0, Runt threshold: 0
  Timeslots : 1-10
  Byte encoding: Nx64K, Data inversion: Disabled
Packet Forwarding Engine configuration:
  Destination slot: 0, PLP byte: 4 (0x10)
  CoS transmit queue Bandwidth Buffer Priority Limit
                        % bps % bytes
  0 best-effort 95 608000 95 0 low none
  3 network-control 5 32000 5 0 low none

```

**Meaning** The interfaces configured on the channelized DS3 IQ interface are up and running.

## Example: Configuring a Channelized T1 IQ Interface

This example shows two ways to configure a channelized T1 IQ interface.

- [Requirements on page 84](#)
- [Overview on page 84](#)
- [Configuration on page 85](#)
- [Verification on page 87](#)

## Requirements

This example can be configured using the following hardware and software components:

- Junos OS Release 8.0 or later
- Juniper Networks M Series Multiservice Edge Router or T Series Core Router with Channelized T1 IQ PIC



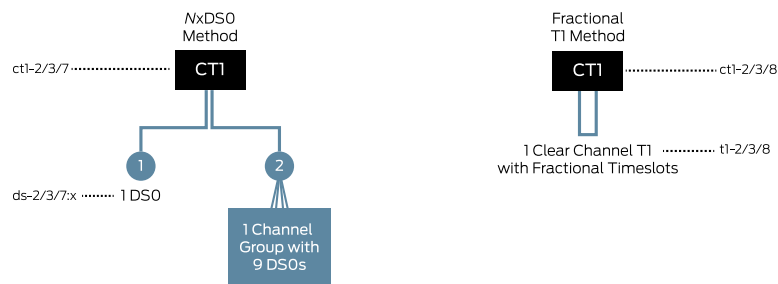
**NOTE:** This configuration example has been tested using the software release listed and is assumed to work on all later releases.

No special configuration beyond device initialization is required before you configure this example.

## Overview

The following example shows two ways to configure a channelized T1 IQ interface. [Figure 13 on page 84](#) shows a fractional T1 method and the NxDSO method seen previously in the complex OC12 configuration example (see [“Example: Configuring a Complex Channelized OC12 IQ Interface” on page 14](#)). The NxDSO method breaks the channelized T1 IQ interface into discrete DSO blocks, whereas the fractional method creates a clear channel T1 that is segmented by time slots.

**Figure 13: Channelized T1 IQ Interface Example**



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To configure NxDSO channels, include the **partition** statement at the **[edit interfaces ct1-fpc/pic/port]** hierarchy level. Include the **timeslots** and **interface-type ds** options to create the desired number of NxDSO interfaces in time slots 1 through 24.

To configure a clear channel T1 on a channelized T1 IQ interface, include the **no-partition** statement with the **interface-type t1** option at the **[edit interfaces ct1-fpc/pic/port]** hierarchy level. After you commit this configuration, you can create a fractional T1 on the clear channel T1 interface. To do so, include the **timeslots** statement at the **[edit interfaces t1-fpc/pic/port t1-options]** hierarchy level and specify the number of DSO blocks to be allowed in the fractional T1 interface. The minimum number of 64-Kbps DSO blocks you can configure is 1 and the maximum is 24.

Usually, you configure loopback statements at the controller level for all IQ-based channelized interfaces. One exception for channelized T1 IQ interfaces is that you must configure a payload loopback on a T1 IQ interface instead of the controller-level channelized T1 IQ interface. To configure, include the **payload** option at the **[edit interfaces t1-fpc/pic/port t1-options loopback]** hierarchy level.

## Configuration

### CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the **[edit]** hierarchy level.

### NxDSO Method

```
set interfaces ct1-2/3/7 partition 1 timeslots 10 interface-type ds
set interfaces ct1-2/3/7 partition 2 timeslots 1-9 interface-type ds
set interfaces ds-2/3/7:1 unit 0 family inet address 10.25.1.2/24
set interfaces ds-2/3/7:2 unit 0 family inet address 10.25.2.2/24
```

### Fractional T1 Method

```
set interfaces ct1-2/3/8 no-partition interface-type t1
set interfaces t1-2/3/8 t1-options timeslots 1-2
set interfaces unit 0 family inet address 10.255.126.2/24
```

## Configuring a Channelized T1 IQ Interface

### Step-by-Step Procedure

The following example requires that you navigate various levels in the configuration hierarchy. For information about navigating the CLI, see *Using the CLI Editor in Configuration Mode* in the *CLI User Guide*.

To configure a channelized T1 IQ interface of a router using the NxDSO method:

1. Partition the ct1-2/3/7 interface to create a NxDSO channel and a channel group with nine NxDSOs.

```
[edit]
user@host# set interfaces ct1-2/3/7 partition 1 timeslots 10 interface-type ds
user@host# set interfaces ct1-2/3/7 partition 2 timeslots 1-9 interface-type ds
```

2. Configure the ds-2/3/7:1 and ds-2/3/7:2 interfaces.

```
[edit]
user@host# set interfaces ds-2/3/7:1 unit 0 family inet address 10.25.1.2/24
user@host# set interfaces ds-2/3/7:2 unit 0 family inet address 10.25.2.2/24
```

3. Commit the configuration.

```
[edit]
user@host# commit
```

### Step-by-Step Procedure

To configure a channelized T1 IQ interface of a router using the fractional T1 method:

1. Configure the ct1-2/3/8 interface to create a single T1 channel.

```
[edit]
user@host# set interfaces ct1-2/3/8 no-partition interface-type t1
```

2. Configure the t1-2/3/8 interface to enable two NxDSO time slots.

```
[edit]
user@host# set interfaces t1-2/3/8 t1-options timeslots 1-2
```

3. Configure an address for the t1-2/3/8 interface.

```
[edit]
user@host# set interfaces t1-2/3/8 unit 0 family inet address 10.255.126.2/24
```

4. Commit the configuration.

```
[edit]
user@host# commit
```

---

## Results

From configuration mode, confirm your configuration by issuing the **show interfaces** command. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

```
[edit]
user@host# show interfaces
ct1-2/3/7 {
  partition 1 timeslots 10 interface-type ds;
  partition 2 timeslots 1-9 interface-type ds;
}
ds-2/3/7:1 {
  unit 0 {
    family inet {
      address 10.25.1.2/24;
    }
  }
}
ds-2/3/7:2 {
  unit 0 {
    family inet {
      address 10.25.2.2/24;
    }
  }
}
ct1-2/3/8 {
  no-partition interface-type t1;
}
t1-2/3/8 {
  t1-options {
    timeslots 1-2;
  }
  unit 0 {
    family inet {
      address 10.255.126.2/24;
    }
  }
}
```

## Verification

Confirm that the configuration is working properly.

- [Verifying That the Interfaces Are Active on page 87](#)
- [View the Operational Details of the Interfaces on page 87](#)

### Verifying That the Interfaces Are Active

**Purpose** To view the interface names of the physical channelized T1 IQ interface and the resulting interfaces configured on the channelized IQ interface, use the **show interfaces controller** command:

```

Action user@host> show interfaces controller ct1-2/3/7
          Controller
          ct1-2/3/7
              ds-2/3/7:1
              ds-2/3/7:2
          Admin Link
          up    up
          up    up
          up    up

user@host> show interfaces controller ct1-2/3/8
          Controller
          ct1-2/3/8
          t1-2/3/8
          Admin Link
          up    up
          up    up
  
```

**Meaning** The output shows that the interfaces configured on the channelized T1 IQ interface are active. The **Admin** field and the **Link** field displaying **up** indicate that the interface is active.

### View the Operational Details of the Interfaces

**Purpose** View the operational details of the interfaces to confirm that the interfaces are up and running.

**Action** To view information about the physical channelized interface, include the **ct1-fpc/pic/port** option with the **show interfaces** command:

```

user@host> show interfaces ct1-2/3/7
Physical interface: ct1-2/3/7, Enabled, Physical link is Up
  Interface index: 18, SNMP ifIndex: 1128, Generation: 27
  Link-level type: Controller, Clocking: Internal, Speed: T1,
  Loopback: None, Framing: ESF, Parent: None
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps 16384
  Link flags     : None
  Hold-times    : Up 0 ms, Down 0 ms
  CoS queues    : 4 supported
  Last flapped  : 2005-08-01 18:00:12 PDT (1d 00:31 ago)
  Input rate    : 0 bps (0 pps)
  Output rate   : 0 bps (0 pps)
  Statistics last cleared: Never
  DS1 alarms   : None
  DS1 defects   : None
  Line encoding: B8ZS

user@host> show interfaces ct1-2/3/8
  
```

```

Physical interface: ct1-2/3/8, Enabled, Physical link is Up
  Interface index: 25, SNMP ifIndex: 1134, Generation: 28
  Link-level type: Controller, Clocking: Internal, Speed: T1,
  Loopback: None, Framing: ESF, Parent: None
  FCS: 16, Framing: G704, Parent: None
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps 16384
  Link flags     : None
  Hold-times     : Up 0 ms, Down 0 ms
  CoS queues     : 4 supported
  Last flapped   : 2005-08-01 18:00:11 PDT (1d 00:30 ago)
  Input rate     : 0 bps (0 pps)
  Output rate    : 0 bps (0 pps)
  Statistics last cleared: Never
  DS1 alarms    : None
  DS1 defects    : None
  Line encoding  : B8ZS

```

To view information about an NxDS0 interface, include the **ds-fpc/pic/port:channel** option with the **show interfaces** command:

```

user@host> show interfaces ds-2/3/7:1 detail
Physical interface: ds-2/3/7:1, Enabled, Physical link is Up
  Interface index: 73, SNMP ifIndex: 1202, Generation: 325
  Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: 64kbps, Loopback:
None,
  FCS: 16, Parent: ct1-2/3/7 Interface index 18
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps 16384
  Link flags     : Keepalives
  Hold-times     : Up 0 ms, Down 0 ms
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
  Keepalive statistics:
    Input : 11 (last seen 00:00:02 ago)
    Output: 10 (last sent 00:00:06 ago)
  LCP state: Opened
  NCP state: inet: Opened, inet6: Opened, iso: Opened, mpls: Not-configured
  CHAP state: Not-configured
  CoS queues     : 4 supported
  Last flapped   : 2005-08-03 12:30:37 PDT (00:10:26 ago)
  Statistics last cleared: Never
  Traffic statistics:
    Input bytes :          559          56 bps
    Output bytes :          656          56 bps
    Input packets:           33           0 pps
    Output packets:          36           0 pps
  Queue counters:

```

	Queued packets	Transmitted packets	Dropped packets
0 best-effort	40	40	0
1 expedited-fo	0	0	0
2 assured-forw	0	0	0
3 network-cont	0	0	0

```

Logical interface ds-2/3/7:1.0 (Index 36) (SNMP ifIndex 1266) (Generation 153)

  Flags: Point-To-Point SNMP-Traps Encapsulation: PPP
  Protocol inet, MTU: 1500, Generation: 352, Route table: 0
  Flags: None

```



```

Addresses, Flags: Is-Preferred Is-Primary
  Destination: 10.25.1/24, Local: 10.25.1.2, Broadcast: 10.25.1.255,
  Generation: 445
Protocol iso, MTU: 1500, Generation: 353, Route table: 0
  Flags: Is-Primary
Protocol inet6, MTU: 1500, Generation: 354, Route table: 0
  Flags: Is-Primary
Addresses, Flags: Is-Preferred
  Destination: fe80::/64, Local: fe80::2a0:a5ff:fe3d:ac6, Broadcast:
Unspecified,
  Generation: 446
Addresses, Flags: Is-Preferred Is-Primary
  Destination: feee::10:25:1:0/126, Local: feee::10:25:1:2,
  Broadcast: Unspecified, Generation: 448

```

To view information about a T1 or fractional T1 interface, include the **t1-fpc/pic/port** option with the **show interfaces** command. The **Speed**: field shows if the interface is a full T1 (T1) or a fractional T1 (increments of 64 Kbps). In this case, **t1-2/3/8** is a fractional T1 using two 64-Kbps time slots for a total speed of 128 Kbps.

```

user@host> show interfaces t1-2/3/8 detail
Physical interface: t1-2/3/8, Enabled, Physical link is Up
  Interface index: 89, SNMP ifIndex: 1278, Generation: 341
  Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: 128kbps,
  Loopback: None, FCS: 16, Parent: ct1-2/3/8 Interface index 25
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps 16384
  Link flags     : Keepalives
  Hold-times     : Up 0 ms, Down 0 ms
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
  Keepalive statistics:
    Input : 4 (last seen 00:00:05 ago)
    Output: 3 (last sent 00:00:09 ago)
  LCP state: Opened
  NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured, mpls:
  Not-configured
  CHAP state: Not-configured
  CoS queues   : 4 supported
  Last flapped : 2005-08-03 12:30:37 PDT (01:17:36 ago)
  Statistics last cleared: Never
  Traffic statistics:
    Input bytes :          189          0 bps
    Output bytes :          478          0 bps
    Input packets:           13          0 pps
    Output packets:          28          0 pps
  Queue counters:

```

	Queued packets	Transmitted packets	Dropped packets
0 best-effort	28	28	0
1 expedited-fo	0	0	0
2 assured-forw	0	0	0
3 network-cont	0	0	0

```

  DS1  alarms   : None
  DS1  defects  : None
  Logical interface t1-2/3/8.0 (Index 52) (SNMP ifIndex 1279) (Generation 169)
    Flags: Point-To-Point SNMP-Traps Encapsulation: PPP
    Protocol inet, MTU: 1500, Generation: 401, Route table: 0
    Flags: None

```

Addresses, Flags: Is-Preferred Is-Primary  
Destination: 10.255.126/24, Local: 10.255.126.2,  
Broadcast: 10.255.126.255, Generation: 525

**Meaning** The interfaces configured on the channelized T1 IQ interface are up and running.

---

## Example: Configuring a Channelized STM1 IQ Interface

---

This example shows how to configure a channelized STM1 IQ interface.

- [Requirements on page 90](#)
- [Overview on page 90](#)
- [Configuration on page 92](#)
- [Verification on page 96](#)

### Requirements

This example can be configured using the following hardware and software components:

- Junos OS Release 8.0 or later
- Juniper Networks M Series Multiservice Edge Router or T Series Core Router with Channelized STM1 IQ PIC



**NOTE:** This configuration example has been tested using the software release listed and is assumed to work on all later releases.

---

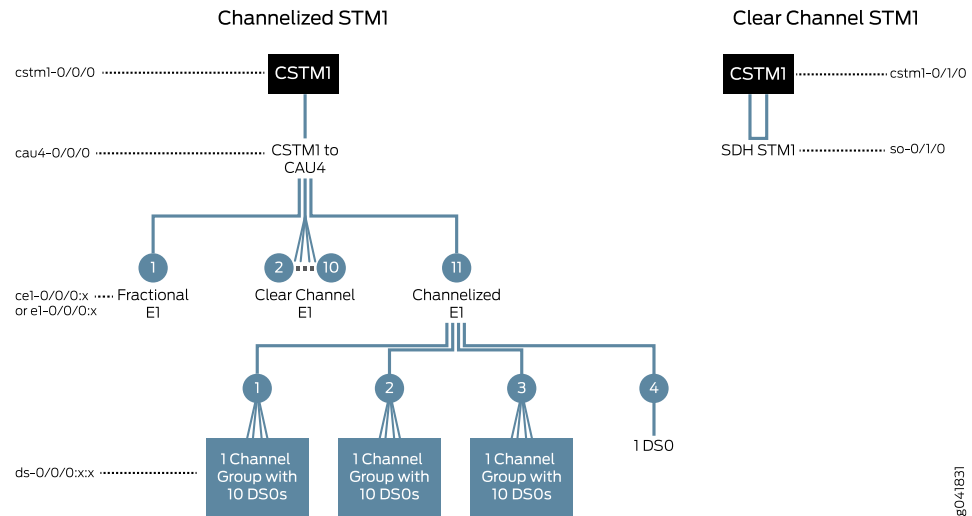
No special configuration beyond device initialization is required before you configure this example.

### Overview

This example shows how to configure a channelized STM1 IQ interface.

[Figure 14 on page 91](#) shows the breakdown of one channelized STM1 IQ interface into a variety of channels and the conversion of the second interface into a clear channel STM1.

Figure 14: Channelized STM1 IQ Interface Example



For the first interface, you must first convert the STM1 interface into a channelized Administrative Unit 4 (AU-4) interface with the **no-partition** and **interface-type cau-4** statements at the **[edit interfaces cstm1-fpc/pic/port]** hierarchy level. You must specify KLM or ITU-T AU-4 formatting with the **vtmapping** statement at the **[edit interfaces cau4-fpc/pic/port sonet-options]** hierarchy level. From the channelized AU-4 interface, you can create E1 channels or channelized E1 channels. The channelized E1 channels can be further broken into DS0 time slots.

To create E1 channels, include the **partition** statement at the **[edit interfaces cau4-fpc/pic/port]** hierarchy level with the **interface-type e1** option. To create channelized E1 channels, include the **partition** statement at the **[edit interfaces cau4-fpc/pic/port]** hierarchy level with the **interface-type ce1** option.

After you have established a channelized E1 channel, you can split it into a maximum of 31 NxDS0 channels. To create the desired number of NxDS0 channels, include the **partition** statement with the **timeslots** and **interface-type ds** options at the **[edit interfaces ce1-fpc/pic/port:channel]** hierarchy level. Time slot 1 is reserved in an NxDS0-based channelized E1 channel, so you can use time slots 2 through 32.

To create an NxDS0 channel group, include a range of time slots after the **timeslots** option.

You can also create fractional E1 interfaces on a channelized STM1 IQ interface. To configure a fractional E1 interface, include the **partition** statement at the **[edit interfaces cau4-fpc/pic/port]** hierarchy level and select the **interface-type e1** option. After you commit this part of the configuration, a clear channel E1 interface is established. You can configure standard E1 options on this interface. To fractionalize the E1 interface, include the **timeslots** statement at the **[edit interfaces e1-fpc/pic/port e1-options]** hierarchy level. Time slot 1 is reserved in a fractional E1 channel, so you can use time slots 2 through 32.

In the second interface shown in [Figure 14 on page 91](#), you convert the channelized STM1 IQ interface into a clear channel STM1 interface. To configure, include the **no-partition**

and **interface-type so** statements at the **[edit interfaces cstm1-fpc/pic/port]** hierarchy level.

## Configuration

**CLI Quick Configuration** To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the **[edit]** hierarchy level.

```
set interfaces cau4-0/0/0 partition 1-10 interface-type e1
set interfaces cau4-0/0/0 partition 11 interface-type ce1
set interfaces cau4-0/0/0 sonet-options vtmapping itu-t
set interfaces cstm1-0/0/0 no-partition interface-type cau4
set interfaces e1-0/0/0:1 encapsulation ppp
set interfaces e1-0/0/0:1 e1-options timeslots 2-21
set interfaces e1-0/0/0:1 unit 0 family inet address 10.133.0.1/30
set interfaces e1-0/0/0:2 encapsulation ppp
set interfaces e1-0/0/0:2 unit 0 family inet address 10.133.0.5/30
set interfaces e1-0/0/0:3 encapsulation ppp
set interfaces e1-0/0/0:3 unit 0 family inet address 10.133.0.9/30
set interfaces e1-0/0/0:4 encapsulation ppp
set interfaces e1-0/0/0:4 unit 0 family inet address 10.133.0.13/30
set interfaces e1-0/0/0:5 encapsulation ppp
set interfaces e1-0/0/0:5 unit 0 family inet address 10.133.0.17/30
set interfaces e1-0/0/0:6 encapsulation ppp
set interfaces e1-0/0/0:6 unit 0 family inet address 10.133.0.21/30
set interfaces e1-0/0/0:7 encapsulation ppp
set interfaces e1-0/0/0:7 unit 0 family inet address 10.133.0.25/30
set interfaces e1-0/0/0:8 encapsulation ppp
set interfaces e1-0/0/0:8 unit 0 family inet address 10.133.0.29/30
set interfaces e1-0/0/0:9 encapsulation ppp
set interfaces e1-0/0/0:9 unit 0 family inet address 10.133.0.33/30
set interfaces e1-0/0/0:10 encapsulation ppp
set interfaces e1-0/0/0:10 unit 0 family inet address 10.133.0.37/30
set interfaces ce1-0/0/0:11 partition 1 timeslots 2-11 interface-type ds
set interfaces ce1-0/0/0:11 partition 2 timeslots 12-21 interface-type ds
set interfaces ce1-0/0/0:11 partition 3 timeslots 22-31 interface-type ds
set interfaces ce1-0/0/0:11 partition 4 timeslots 32 interface-type ds
set interfaces ds-0/0/0:11:1 unit 0 family inet address 10.134.1.1/30
set interfaces ds-0/0/0:11:2 unit 0 family inet address 10.134.2.1/30
set interfaces ds-0/0/0:11:3 unit 0 family inet address 10.134.3.1/30
set interfaces ds-0/0/0:11:4 unit 0 family inet address 10.134.4.1/30
set interfaces cstm1-0/1/0 no-partition interface-type so
set interfaces so-0/1/0 unit 0 family inet address 10.22.22.1/30
```

---

### Configuring a Channelized STM1 IQ Interface

**Step-by-Step Procedure** The following example requires that you navigate various levels in the configuration hierarchy. For information about navigating the CLI, see *Using the CLI Editor in Configuration Mode* in the *CLI User Guide*.

To configure a channelized STM1 IQ interface of a router:

1. Partition the cau4-0/0/0 interface to create E1 and channelized E1 interfaces.

- ```
[edit]
user@host# set interfaces cau4-0/0/0 partition 1-10 interface-type e1
user@host# set interfaces cau4-0/0/0 partition 11 interface-type ce1
```
2. Configure the cau4-0/0/0 interface to use ITU-T as the VT mapping frame format.
 

```
[edit]
user@host# set interfaces cau4-0/0/0 sonet-options vtmapping itu-t
```
  3. Configure the cstm1-0/0/0 interface to create a channelized AU-4 interface.
 

```
[edit]
user@host# set interfaces cstm1-0/0/0 no-partition interface-type cau4
```
  4. Configure the e1-0/0/0:1 interface as a fractional E1 interface.
 

```
[edit]
user@host# set interfaces e1-0/0/0:1 e1-options timeslots 2-21
```
  5. Configure the e1-0/0/0:1 interface.
 

```
[edit]
user@host# set interfaces e1-0/0/0:1 encapsulation ppp
user@host# set interfaces e1-0/0/0:1 unit 0 family inet address 10.133.0.1/30
```
  6. Configure the e1-0/0/0:2 through e1-0/0/0:10 interfaces.
 

```
[edit]
user@host# set interfaces e1-0/0/0:2 encapsulation ppp
user@host# set interfaces e1-0/0/0:2 unit 0 family inet address 10.133.0.5/30
user@host# set interfaces e1-0/0/0:3 encapsulation ppp
user@host# set interfaces e1-0/0/0:3 unit 0 family inet address 10.133.0.9/30
user@host# set interfaces e1-0/0/0:4 encapsulation ppp
user@host# set interfaces e1-0/0/0:4 unit 0 family inet address 10.133.0.13/30
user@host# set interfaces e1-0/0/0:5 encapsulation ppp
user@host# set interfaces e1-0/0/0:5 unit 0 family inet address 10.133.0.17/30
user@host# set interfaces e1-0/0/0:6 encapsulation ppp
user@host# set interfaces e1-0/0/0:6 unit 0 family inet address 10.133.0.21/30
user@host# set interfaces e1-0/0/0:7 encapsulation ppp
user@host# set interfaces e1-0/0/0:7 unit 0 family inet address 10.133.0.25/30
user@host# set interfaces e1-0/0/0:8 encapsulation ppp
user@host# set interfaces e1-0/0/0:8 unit 0 family inet address 10.133.0.29/30
user@host# set interfaces e1-0/0/0:9 encapsulation ppp
user@host# set interfaces e1-0/0/0:9 unit 0 family inet address 10.133.0.33/30
user@host# set interfaces e1-0/0/0:10 encapsulation ppp
user@host# set interfaces e1-0/0/0:10 unit 0 family inet address 10.133.0.37/30
```
  7. Partition the ce1-0/0/0:11 interface to create three NxDS0 channel groups and an NxDS0 channel.
 

```
[edit]
user@host# set interfaces ce1-0/0/0:11 partition 1 timeslots 2-11 interface-type ds
user@host# set interfaces ce1-0/0/0:11 partition 2 timeslots 12-21 interface-type ds
user@host# set interfaces ce1-0/0/0:11 partition 3 timeslots 22-31 interface-type ds
user@host# set interfaces ce1-0/0/0:11 partition 4 timeslots 32 interface-type ds
```
  8. Configure the ds-0/0/0:11:1 through ds-0/0/0:11:4 interfaces.
 

```
[edit]
```

```
user@host# set interfaces ds-0/0/0:11:1 unit 0 family inet address 10.134.1.1/30
user@host# set interfaces ds-0/0/0:11:2 unit 0 family inet address 10.134.2.1/30
user@host# set interfaces ds-0/0/0:11:3 unit 0 family inet address 10.134.3.1/30
user@host# set interfaces ds-0/0/0:11:4 unit 0 family inet address 10.134.4.1/30
```

9. Configure the cstm1-0/1/0 interface to create a clear channel STM1 interface.

```
[edit]
user@host# set interfaces cstm1-0/1/0 no-partition interface-type so
```

10. Configure the so-0/1/0 interface.

```
[edit]
user@host# set interfaces so-0/1/0 unit 0 family inet address 10.22.22.1/30
```

11. Commit the configuration.

```
[edit]
user@host# commit
```

---

## Results

From configuration mode, confirm your configuration by issuing the **show interfaces** command. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.



**NOTE:** The output of the show interfaces command has been truncated for brevity.

```
[edit]
user@host# show interfaces
cau4-0/0/0 {
  partition 1-10 interface-type e1;
  partition 11 interface-type ce1;
  sonet-options {
    vtmapping itu-t;
  }
}
cstm1-0/0/0 {
  no-partition interface-type cau4;
}
e1-0/0/0:1 {
  encapsulation ppp;
  e1-options {
    timeslots 2-21;
  }
  unit 0 {
    family inet {
      address 10.133.0.1/30;
    }
  }
}
e1-0/0/0:2 {
  encapsulation ppp;
```

```
    unit 0 {
        family inet {
            address 10.133.0.5/30;
        }
    }
}
...
e1-0/0/0:10 {
    encapsulation ppp;
    unit 0 {
        family inet {
            address 10.133.0.37/30;
        }
    }
}
ce1-0/0/0:11 {
    partition 1 timeslots 2-11 interface-type ds;
    partition 2 timeslots 12-21 interface-type ds;
    partition 3 timeslots 22-31 interface-type ds;
    partition 4 timeslots 32 interface-type ds;
}
ds-0/0/0:11:1 {
    unit 0 {
        family inet {
            address 10.134.1.1/30;
        }
    }
}
ds-0/0/0:11:2 {
    unit 0 {
        family inet {
            address 10.134.2.1/30;
        }
    }
}
ds-0/0/0:11:3 {
    unit 0 {
        family inet {
            address 10.134.3.1/30;
        }
    }
}
ds-0/0/0:11:4 {
    unit 0 {
        family inet {
            address 10.134.4.1/30;
        }
    }
}
cstm1-0/1/0 {
    no-partition interface-type so;
}
so-0/1/0 {
    unit 0 {
        family inet {
            address 10.22.22.1/30;
        }
    }
}
```

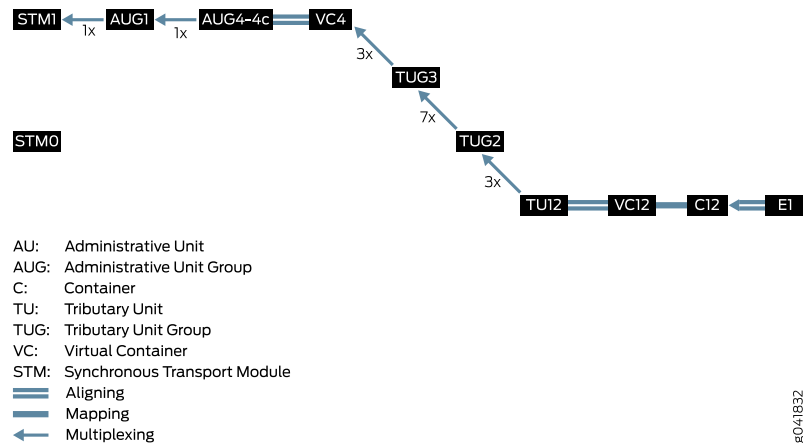
```

    }
  }
}

```

Figure 15 on page 96 shows a visual representation of the E1-to-STM1 SDH mapping method used by Juniper Networks in its channelized STM1 IQ interface.

Figure 15: Channelized STM1 IQ Interface SDH Mapping Method



## Verification

Confirm that the configuration is working properly.

- [Verifying That the Interfaces Are Active on page 96](#)
- [View the Operational Details of the Interfaces on page 97](#)

### Verifying That the Interfaces Are Active

**Purpose** View the interface names of the physical channelized STM1 IQ interface and the channels configured on this interface.



**Action** From operational mode, issue the **show interfaces controller** command.

```

user@host> show interfaces controller cstm1-0/0/0
Controller
cstm1-0/0/0
cau4-0/0/0
  e1-0/0/0:1
  e1-0/0/0:2
  e1-0/0/0:3
  e1-0/0/0:4
  e1-0/0/0:5
  e1-0/0/0:6
  e1-0/0/0:7
  e1-0/0/0:8
  e1-0/0/0:9
  e1-0/0/0:10
  ce1-0/0/0:11
    ds-0/0/0:11:1
    ds-0/0/0:11:2
    ds-0/0/0:11:3
    ds-0/0/0:11:4

```

|               | Admin | Link |
|---------------|-------|------|
| cstm1-0/0/0   | up    | up   |
| cau4-0/0/0    | up    | up   |
| e1-0/0/0:1    | up    | up   |
| e1-0/0/0:2    | up    | up   |
| e1-0/0/0:3    | up    | up   |
| e1-0/0/0:4    | up    | up   |
| e1-0/0/0:5    | up    | up   |
| e1-0/0/0:6    | up    | up   |
| e1-0/0/0:7    | up    | up   |
| e1-0/0/0:8    | up    | up   |
| e1-0/0/0:9    | up    | up   |
| e1-0/0/0:10   | up    | up   |
| ce1-0/0/0:11  | up    | up   |
| ds-0/0/0:11:1 | up    | up   |
| ds-0/0/0:11:2 | up    | up   |
| ds-0/0/0:11:3 | up    | up   |
| ds-0/0/0:11:4 | up    | up   |

**Meaning** The output shows that the interfaces configured on the channelized STM1 IQ interface are active. The **Admin** field and the **Link** field displaying **up** indicate that the interface is active.

### View the Operational Details of the Interfaces

**Purpose** View the operational details of the interfaces to confirm that the interfaces are up and running.

**Action** To view information about the physical channelized interface, include the **cstm1-*fpc/pic/port*** option with the **show interfaces** command:

```

user@host> show interfaces cstm1-0/0/0
Physical interface: cstm1-0/0/0, Enabled, Physical link is Up
  Interface index: 146, SNMP ifIndex: 35
  Link-level type: Controller, Clocking: Internal, SDH mode, Speed: OC3,
Loopback: None, Parent: None
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link flags     : None
  Last flapped   : 2003-02-06 15:01:56 PST (07:15:06 ago)
  SDH alarms     : None
  SDH defects    : None

```

To view information about the channelized AU-4 channel, include the **cau4-*fpc/pic/port*** option with the **show interfaces** command:

```

user@host> show interfaces cau4-0/0/0
Physical interface: cau4-0/0/0, Enabled, Physical link is Up
  Interface index: 147, SNMP ifIndex: 36
  Link-level type: Controller, Clocking: Internal, SDH mode, Speed: OC3,
Loopback: None, Parent: cstm1-0/0/0 Interface index 146
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link flags     : None

```

```

Last flapped   : 2003-02-06 19:36:31 PST (02:40:42 ago)
SDH alarms    : None
SDH defects    : None

```

To view information about an E1 channel, include the **e1-fpc/pic/port:channel** option with the **show interfaces** command. In this case, the fractional E1 appears as channel **e1-0/0/0:1** and the normal E1 appears as channel **e1-0/0/0:2**.

```

user@host> show interfaces e1-0/0/0:1
Physical interface: e1-0/0/0:1, Enabled, Physical link is Up
  Interface index: 148, SNMP ifIndex: 33
  Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: 1280kbps ,
Loopback: None, FCS: 16, Framing: G704,
Parent: cau4-0/0/0 Interface index 147
Device flags   : Present Running
Interface flags: Point-To-Point SNMP-Traps
Link flags     : Keepalives
Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
Keepalive: Input: 1055 (00:00:03 ago), Output: 1059 (00:00:06 ago)
LCP state: Opened
NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured,
mpls: Not-configured
CHAP state: Not-configured
Last flapped   : Never
Input rate     : 16 bps (0 pps)
Output rate    : 16 bps (0 pps)
DS1 alarms     : None
DS1 defects    : None
SDH alarms     : None
SDH defects    : None
Logical interface e1-0/0/0:1.0 (Index 67) (SNMP ifIndex 169)
  Flags: Point-To-Point SNMP-Traps Encapsulation: PPP
  Bandwidth: 0
  Protocol inet, MTU: 1500
  Flags: None
  Addresses, Flags: Is-Preferred Is-Primary
  Destination: 10.133.0.0/30, Local: 10.133.0.1

```

```

user@host> show interfaces e1-0/0/0:2
Physical interface: e1-0/0/0:2, Enabled, Physical link is Up
  Interface index: 149, SNMP ifIndex: 34
  Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: E1,
Loopback: None, FCS: 16, Framing: G704,
Parent: cau4-0/0/0 Interface index 147
Device flags   : Present Running
Interface flags: Point-To-Point SNMP-Traps
Link flags     : Keepalives
Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
Keepalive: Input: 917 (00:00:05 ago), Output: 915 (00:00:01 ago)
LCP state: Opened
NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured,
mpls: Not-configured
CHAP state: Not-configured
Last flapped   : Never
Input rate     : 16 bps (0 pps)
Output rate    : 16 bps (0 pps)
DS1 alarms     : None
DS1 defects    : None
SDH alarms     : None
SDH defects    : None
Logical interface e1-0/0/0:2.0 (Index 68) (SNMP ifIndex 170)

```

```

Flags: Point-To-Point SNMP-Traps Encapsulation: PPP
Bandwidth: 0
Protocol inet, MTU: 1500
  Flags: None
  Addresses, Flags: Is-Preferred Is-Primary
    Destination: 10.133.0.4/30, Local: 10.133.0.5

```

To view information about a CE1 channel, include the **ce1-fpc/pic/port:channel** option with the **show interfaces** command:

```

user@host> show interfaces ce1-0/0/0:11
Physical interface: ce1-0/0/0:11, Enabled, Physical link is Up
  Interface index: 169, SNMP ifIndex: 288
  Link-level type: Controller, Clocking: Internal, Speed: E1, Loopback: None,
Framing: G704, Parent: cau4-0/0/0 Interface index 147
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link flags     : None
  Last flapped   : 2003-02-06 22:05:23 PST (00:13:45 ago)
  DS1 alarms    : None
  DS1 defects    : None
  SDH alarms     : None
  SDH defects    : None

```

To view information about an NxDSO interface, include the **ds-fpc/pic/port:channel:channel** option with the **show interfaces** command. For channel group **ds-0/0/0:11:1**, the speed of the link is 640 Kbps because it contains 10 DSOs ( $64 \times 10 = 640$ ). For single DSO channel **ds-0/0/0:11:4**, the speed of the link is the standard 64 Kbps.

```

user@host> show interfaces ds-0/0/0:11:1
Physical interface: ds-0/0/0:11:1, Enabled, Physical link is Up
  Interface index: 170, SNMP ifIndex: 289
  Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: 640kbps,
Loopback: Illegal, FCS: 16,
  Parent: ce1-0/0/0:11 Interface index 169
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link flags     : Keepalives
  Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
  Keepalive: Input: 0 (never), Output: 0 (never)
  LCP state: Conf-req-sent
  NCP state: inet: Down, inet6: Not-configured, iso: Not-configured, mpls:
Not-configured
  CHAP state: Not-configured
  Last flapped   : Never
  Input rate     : 0 bps (0 pps)
  Output rate    : 0 bps (0 pps)
  DSO BERT configuration:
    BERT time period: 10 seconds, Elapsed: 0 seconds
    Induced Error rate: 10e-0, Algorithm: 2^15 - 1, 0.151, Pseudorandom (9)
  Logical interface ds-0/0/0:11:1.0 (Index 77) (SNMP ifIndex 290)
  Flags: Hardware-Down Point-To-Point SNMP-Traps Encapsulation: PPP
  Bandwidth: 0
  Protocol inet, MTU: 1500
    Flags: Protocol-Down
    Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
      Destination: 10.134.1.0/30, Local: 10.134.1.1

user@host> show interfaces ds-0/0/0:11:4
Physical interface: ds-0/0/0:11:4, Enabled, Physical link is Up
  Interface index: 173, SNMP ifIndex: 295

```

```
Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: 64kbps, Loopback:
Illegal, FCS: 16,
Parent: ce1-0/0/0:11 Interface index 169
Device flags   : Present Running
Interface flags: Point-To-Point SNMP-Traps
Link flags     : Keepalives
Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
Keepalive: Input: 0 (never), Output: 0 (never)
LCP state: Conf-req-sent
NCP state: inet: Down, inet6: Not-configured, iso: Not-configured, mp1s:
Not-configured
CHAP state: Not-configured
Last flapped   : Never
Input rate     : 0 bps (0 pps)
Output rate    : 0 bps (0 pps)
DSO BERT configuration:
  BERT time period: 10 seconds, Elapsed: 0 seconds
  Induced Error rate: 10e-0, Algorithm: 2^15 - 1, 0.151, Pseudorandom (9)
Logical interface ds-0/0/0:11:4.0 (Index 80) (SNMP ifIndex 296)
Flags: Hardware-Down Point-To-Point SNMP-Traps Encapsulation: PPP
Bandwidth: 0
Protocol inet, MTU: 1500
Flags: Protocol-Down
Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
Destination: 10.134.4.0/30, Local: 10.134.4.1
```

**Meaning** The interfaces configured on the channelized STM1 IQ interface are up and running.

---

## Example: Configuring a Channelized E1 IQ Interface

---

This example shows two ways to configure a channelized E1 IQ interface.

- [Requirements on page 100](#)
- [Overview on page 101](#)
- [Configuration on page 101](#)
- [Verification on page 103](#)

### Requirements

This example can be configured using the following hardware and software components:

- Junos OS Release 8.0 or later
- Juniper Networks M Series Multiservice Edge Router or T Series Core Router with Channelized E1 IQ PIC



**NOTE:** This configuration example has been tested using the software release listed and is assumed to work on all later releases.

---

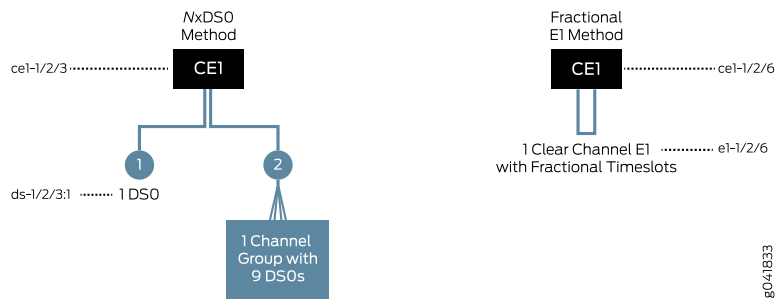
No special configuration beyond device initialization is required before you configure this example.

## Overview

This example shows two ways to configure a channelized E1 IQ interface.

Figure 16 on page 101 shows a fractional E1 method and the NxDS0 method seen previously in the complex OC12 configuration example (see “[Example: Configuring a Complex Channelized OC12 IQ Interface](#)” on page 14). The NxDS0 method breaks the channelized E1 IQ interface into discrete DS0 blocks, whereas the fractional method creates a clear channel E1 that is segmented by time slots.

Figure 16: Channelized E1 IQ Interface Example



- To configure NxDS0 channels, include the **partition** statement at the **[edit interfaces ce1-fpc/pic/port]** hierarchy level. Include the **timeslots** and **interface-type ds** options to create the desired number of NxDS0 interfaces in time slots 2 through 32.
- To configure a fractional E1 on a channelized E1 IQ interface, include the **no-partition** statement at the **[edit interfaces ce1-fpc/pic/port]** hierarchy level. After you commit this configuration, configure standard E1 options on the clear channel E1 interface. Include the **timeslots** statement at the **[edit interfaces e1-fpc/pic/port e1-options]** hierarchy level. Time slot 1 is reserved; use time slots 2 through 32.

## Configuration

### CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the **[edit]** hierarchy level.

### NxDS0 Method

```
set interfaces ce1-1/2/3 partition 1 timeslots 11 interface-type ds
set interfaces ce1-1/2/3 partition 2 timeslots 2-10 interface-type ds
set interfaces ds-1/2/3:1 unit 0 family inet address 10.25.1.2/24
set interfaces ds-1/2/3:2 unit 0 family inet address 10.25.2.2/24
```

### Fractional T1 Method

```
set interfaces ce1-1/2/6 no-partition interface-type e1
set interfaces e1-1/2/6 e1-options timeslots 2-3
set interfaces e1-1/2/6 unit 0 family inet address 10.255.126.2/24
```

### Configuring a Channelized E1 IQ Interface

---

**Step-by-Step Procedure** The following example requires that you navigate various levels in the configuration hierarchy. For information about navigating the CLI, see *Using the CLI Editor in Configuration Mode* in the *CLI User Guide*.

To configure a channelized E1 IQ interface of a router using the NxDS0 method:

1. Partition the ce1-1/2/3 interface to create a NxDS0 channel and a channel group with nine NxDS0s.

```
[edit]
user@host# set interfaces ce1-1/2/3 partition 1 timeslots 11 interface-type ds
user@host# set interfaces ce1-1/2/3 partition 2 timeslots 2-10 interface-type ds
```

2. Configure the ds-1/2/3:1 and ds-1/2/3:1 interfaces.

```
[edit]
user@host# set interfaces ds-1/2/3:1 unit 0 family inet address 10.25.1.2/24
user@host# set interfaces ds-1/2/3:2 unit 0 family inet address 10.25.2.2/24
```

3. Commit the configuration.

```
[edit]
user@host# commit
```

**Step-by-Step Procedure** To configure a channelized E1 IQ interface of a router using the fractional T1 method:

1. Configure the ce1-1/2/6 interface to create a single E1 channel.

```
[edit]
user@host# set interfaces ce1-1/2/6 no-partition interface-type e1
```

2. Configure the e1-1/2/6 interface to enable two NxDS0 time slots.

```
[edit]
user@host# set interfaces e1-1/2/6 e1-options timeslots 2-3
```

3. Configure an address for the e1-1/2/6 interface.

```
[edit]
user@host# set interfaces e1-1/2/6 unit 0 family inet address 10.255.126.2/24
```

4. Commit the configuration.

```
[edit]
user@host# commit
```

### Results

---

From configuration mode, confirm your configuration by issuing the **show interfaces** command. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

```
[edit]
user@host# show interfaces
ce1-1/2/3 {
  partition 1 timeslots 11 interface-type ds;
```

```
partition 2 timeslots 2-10 interface-type ds;
}
ds-1/2/3:1 {
  unit 0 {
    family inet {
      address 10.25.1.2/24;
    }
  }
}
ds-1/2/3:2 {
  unit 0 {
    family inet {
      address 10.25.2.2/24;
    }
  }
}
cel-1/2/6 {
  no-partition interface-type e1;
}
e1-1/2/6 {
  e1-options {
    timeslots 2-3;
  }
  unit 0 {
    family inet {
      address 10.255.126.2/24;
    }
  }
}
```

## Verification

Confirm that the configuration is working properly.

- [Verifying That the Interfaces Are Active on page 103](#)
- [View the Operational Details of the Interfaces on page 104](#)

### Verifying That the Interfaces Are Active

**Purpose** To view the interface names of the physical channelized E1 IQ interface and the resulting interfaces configured on the channelized IQ interface, use the **show interfaces controller** command:

|               |                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                           |       |      |    |    |    |    |    |    |       |      |    |    |    |    |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------|----|----|----|----|----|----|-------|------|----|----|----|----|
| <b>Action</b> | <pre> user@host&gt; show interfaces controller ce1-1/2/3 Controller ce1-1/2/3     ds-1/2/3:1     ds-1/2/3:2  user@host&gt; show interfaces controller ce1-1/2/6 Controller ce1-1/2/6 e1-1/2/6 </pre> | <table border="0"> <tr> <td>Admin</td> <td>Link</td> </tr> <tr> <td>up</td> <td>up</td> </tr> <tr> <td>up</td> <td>up</td> </tr> <tr> <td>up</td> <td>up</td> </tr> </table><br><table border="0"> <tr> <td>Admin</td> <td>Link</td> </tr> <tr> <td>up</td> <td>up</td> </tr> <tr> <td>up</td> <td>up</td> </tr> </table> | Admin | Link | up | up | up | up | up | up | Admin | Link | up | up | up | up |
| Admin         | Link                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                           |       |      |    |    |    |    |    |    |       |      |    |    |    |    |
| up            | up                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                           |       |      |    |    |    |    |    |    |       |      |    |    |    |    |
| up            | up                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                           |       |      |    |    |    |    |    |    |       |      |    |    |    |    |
| up            | up                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                           |       |      |    |    |    |    |    |    |       |      |    |    |    |    |
| Admin         | Link                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                           |       |      |    |    |    |    |    |    |       |      |    |    |    |    |
| up            | up                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                           |       |      |    |    |    |    |    |    |       |      |    |    |    |    |
| up            | up                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                           |       |      |    |    |    |    |    |    |       |      |    |    |    |    |

**Meaning** The output shows that the interfaces configured on the channelized E1 IQ interface are active. The **Admin** field and the **Link** field displaying **up** indicate that the interface is active.

### View the Operational Details of the Interfaces

**Purpose** View the operational details of the interfaces to confirm that the interfaces are up and running.

**Action** To view information about the physical channelized interface, include the **ce1-fpc/pic/port** option with the **show interfaces** command:

```

user@host> show interfaces ce1-1/2/3
Physical interface: ce1-1/2/3, Enabled, Physical link is Up
  Interface index: 18, SNMP ifIndex: 1128
  Link-level type: Controller, MTU: 1504, Clocking: Internal, Speed: E1,
  Loopback: None, FCS: 16, Framing: G704, Parent: None
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link flags     : None
  Last flapped   : 2002-10-04 17:52:51 PDT (00:32:57 ago)
  Input rate     : 0 bps (0 pps)
  Output rate    : 0 bps (0 pps)
  DS1 alarms     : None
  DS1 defects    : None

user@host> show interfaces ce1-1/2/6
Physical interface: ce1-1/2/6, Enabled, Physical link is Up
  Interface index: 25, SNMP ifIndex: 1134
  Link-level type: Controller, MTU: 1504, Clocking: Internal, Speed: E1, Loopback:
  None,
  FCS: 16, Framing: G704, Parent: None
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link flags     : None
  Last flapped   : 2002-10-04 17:52:51 PDT (00:34:49 ago)
  Input rate     : 0 bps (0 pps)
  Output rate    : 0 bps (0 pps)
  DS1 alarms     : None
  DS1 defects    : None

```

To view information about an NxDS0 interface, include the **ds-fpc/pic/port:channel** option with the **show interfaces** command:

```

user@host> show interfaces ds-1/2/3:1 detail
Physical interface: ds-1/2/3:1, Enabled, Physical link is Up
  Interface index: 73, SNMP ifIndex: 1202, Generation: 325
  Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: 64kbps, Loopback:
  None,

```



```

FCS: 16, Parent: ce1-1/2/3 (Index 18)
Device flags : Present Running
Interface flags: Point-To-Point SNMP-Traps
Link flags : Keepalives
Hold-times : Up 0 ms, Down 0 ms
Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
Keepalive statistics:
  Input : 11 (last seen 00:00:02 ago)
  Output: 10 (last sent 00:00:06 ago)
LCP state: Opened
NCP state: inet: Opened, inet6: Opened, iso: Opened, mpls: Not-configured
CHAP state: Not-configured
Last flapped : 2002-10-04 18:24:32 PDT (00:01:46 ago)
Statistics last cleared: Never
Traffic statistics:
  Input bytes : 559 56 bps
  Output bytes : 656 56 bps
  Input packets: 33 0 pps
  Output packets: 36 0 pps
Queue counters:
  Queued packets  Transmitted packets  Dropped packets

  0 best-effort 40 40 0
  1 expedited-fo 0 0 0
  2 assured-forw 0 0 0
  3 network-cont 0 0 0

Logical interface ds-1/2/3:1.0 (Index 36) (SNMP ifIndex 1266) (Generation 153)

Flags: Point-To-Point SNMP-Traps Encapsulation: PPP
Protocol inet, MTU: 1500, Generation: 352, Route table: 0
  Flags: None
  Addresses, Flags: Is-Preferred Is-Primary
    Destination: 10.25.1/24, Local: 10.25.1.2, Broadcast: Unspecified,
    Generation: 445
Protocol iso, MTU: 1500, Generation: 353, Route table: 0
  Flags: Is-Primary
Protocol inet6, MTU: 1500, Generation: 354, Route table: 0
  Flags: Is-Primary
  Addresses, Flags: Is-Preferred
    Destination: fe80::/64, Local: fe80::2a0:a5ff:fe3d:ac6, Broadcast:
Unspecified,
    Generation: 446
  Addresses, Flags: Is-Preferred Is-Primary
    Destination: feee::10:25:1:0/126, Local: feee::10:25:1:2,
    Broadcast: Unspecified, Generation: 448

```

To view information about the fractional E1 interface, include the **e1-fpc/pic/port** option with the **show interfaces** command:

```

user@host> show interfaces e1-1/2/6 detail
Physical interface: e1-1/2/6, Enabled, Physical link is Up
Interface index: 89, SNMP ifIndex: 1278, Generation: 341
Link-level type: PPP, MTU: 1504, Clocking: Internal, Speed: E1, Loopback:None,

FCS: 16, Framing: G704, Parent: ce1-1/2/6 (Index 25)
Device flags : Present Running
Interface flags: Point-To-Point SNMP-Traps
Link flags : Keepalives

```

```

Hold-times      : Up 0 ms, Down 0 ms
Keepalive settings: Interval 10 seconds, Up-count 1, Down-count 3
Keepalive statistics:
  Input : 4 (last seen 00:00:05 ago)
  Output: 3 (last sent 00:00:09 ago)
LCP state: Opened
NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured, mpls:
Not-configured
CHAP state: Not-configured
Last flapped   : 2002-10-04 18:28:27 PDT (00:01:07 ago)
Statistics last cleared: Never
Traffic statistics:
  Input bytes :          189          0 bps
  Output bytes :          478          0 bps
  Input packets:           13          0 pps
  Output packets:          28          0 pps
Queue counters:      Queued packets  Transmitted packets      Dropped packets

  0 best-effort          28              28              0
  1 expedited-fo          0              0              0
  2 assured-forw          0              0              0
  3 network-cont          0              0              0

DS1  alarms   : None
DS1  defects  : None
DS1  BERT configuration:
  BERT time period: 10 seconds, Elapsed: 0 seconds
  Induced Error rate: 10e-0, Algorithm: Unknown (0)
Logical interface e1-1/2/6.0 (Index 52) (SNMP ifIndex 1279) (Generation 169)
Flags: Point-To-Point SNMP-Traps Encapsulation: PPP
Bandwidth: 0
Protocol inet, MTU: 1500, Generation: 401, Route table: 0
Flags: None
Addresses, Flags: Is-Preferred Is-Primary
  Destination: 10.255.126/24, Local: 10.255.126.2, Broadcast: Unspecified,

  Generation: 525

```

**Meaning** The interfaces configured on the channelized E1 IQ interface are up and running.

## Example: Configuring Class of Service on a Channelized IQ Interface

This example applies class of service at the logical interface level on a clear channel T3 interface derived from a channelized DS3 IQ interface.

- [Requirements on page 106](#)
- [Overview on page 107](#)
- [Configuration on page 107](#)
- [Verification on page 111](#)

### Requirements

This example can be configured using the following hardware and software components:

- Junos OS Release 8.0 or later
- Juniper Networks M Series Multiservice Edge Router or T Series Core Router with Channelized DS3 IQ PIC



**NOTE:** This configuration example has been tested using the software release listed and is assumed to work on all later releases.

No special configuration beyond device initialization is required before you configure this example.

## Overview

This example applies class of service at the logical interface level on a clear channel T3 interface derived from a channelized DS3 IQ interface. (For more information on configuring a channelized DS3 IQ interface, see [“Example: Configuring a Channelized DS3 IQ Interface” on page 76.](#))

To apply class of service at the logical interface level:

- Configure a scheduler map, complete with the desired transmit rates, buffer sizes, and service classes.
- Enable the logical interface-level class of service with the **per-unit-scheduler** statement at the **[edit interfaces *interface-name*]** hierarchy level. Also, configure a DLCI for each logical interface with the **dlci *dlci-number*** statement at the **[edit interfaces *interface-name* unit *unit-number*]** hierarchy level.
- Finally, configure the logical interfaces for class of service with the **scheduler-map** and **shaping-rate** statements at the **[edit class-of-service interfaces *interface-name* unit *unit-number*]** hierarchy level. These statements specify which scheduler map to associate with each logical interface and how much bandwidth to reserve for the DLCI queues.

## Configuration

### CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the **[edit]** hierarchy level.

```
set class-of-service schedulers af transmit-rate percent 10
set class-of-service schedulers af buffer-size percent 10
set class-of-service schedulers be transmit-rate percent 20
set class-of-service schedulers be buffer-size percent 20
set class-of-service schedulers ef transmit-rate percent 70
set class-of-service schedulers ef buffer-size percent 70
set class-of-service schedulers af-1 transmit-rate percent 10
set class-of-service schedulers af-1 buffer-size percent 10
set class-of-service schedulers be-1 transmit-rate percent 30
set class-of-service schedulers be-1 buffer-size percent 30
set class-of-service schedulers ef-1 transmit-rate percent 60
```

```
set class-of-service schedulers ef-1 buffer-size percent 60
set class-of-service scheduler-maps sched-0 forwarding-class assured-forwarding
  scheduler af
set class-of-service scheduler-maps sched-0 forwarding-class best-effort scheduler be
set class-of-service scheduler-maps sched-0 forwarding-class expedited-forwarding
  scheduler ef
set class-of-service scheduler-maps sched-1 forwarding-class assured-forwarding
  scheduler af-1
set class-of-service scheduler-maps sched-1 forwarding-class best-effort scheduler be-1
set class-of-service scheduler-maps sched-1 forwarding-class expedited-forwarding
  scheduler ef-1
set interfaces ct3-3/1/0 no-partition interface-type t3
set interfaces t3-3/1/0 per-unit-scheduler
set interfaces t3-3/1/0 encapsulation frame-relay
set interfaces t3-3/1/0 unit 0 dlci 100
set interfaces t3-3/1/0 unit 0 family inet address 10.40.1.1/30
set interfaces t3-3/1/0 unit 1 dlci 101
set interfaces t3-3/1/0 unit 1 family inet address 10.40.2.1/30
set class-of-service interfaces t3-3/1/0 unit 0 scheduler-map sched-0
set class-of-service interfaces t3-3/1/0 unit 0 shaping-rate 10m
set class-of-service interfaces t3-3/1/0 unit 1 scheduler-map sched-1
set class-of-service interfaces t3-3/1/0 unit 1 shaping-rate 10m
```

---

### Applying Class of Service on a Channelized IQ Interface

#### Step-by-Step Procedure

The following example requires that you navigate various levels in the configuration hierarchy. For information about navigating the CLI, see *Using the CLI Editor in Configuration Mode* in the *CLI User Guide*.

To apply class of service at the logical interface level of a clear channel T3 interface derived from a channelized DS3 IQ interface:

1. Configure the schedulers.

```
[edit]
user@host# set class-of-service schedulers af transmit-rate percent 10
user@host# set class-of-service schedulers af buffer-size percent 10
user@host# set class-of-service schedulers be transmit-rate percent 20
user@host# set class-of-service schedulers be buffer-size percent 20
user@host# set class-of-service schedulers ef transmit-rate percent 70
user@host# set class-of-service schedulers ef buffer-size percent 70
user@host# set class-of-service schedulers af-1 transmit-rate percent 10
user@host# set class-of-service schedulers af-1 buffer-size percent 10
user@host# set class-of-service schedulers be-1 transmit-rate percent 30
user@host# set class-of-service schedulers be-1 buffer-size percent 30
user@host# set class-of-service schedulers ef-1 transmit-rate percent 60
user@host# set class-of-service schedulers ef-1 buffer-size percent 60
```

2. Associate the classes of service with a scheduler.

```
[edit]
user@host# set class-of-service scheduler-maps sched-0 forwarding-class
  assured-forwarding scheduler af
user@host# set class-of-service scheduler-maps sched-0 forwarding-class
  best-effort scheduler be
```

```

user@host# set class-of-service scheduler-maps sched-0 forwarding-class
expedited-forwarding scheduler ef
user@host# set class-of-service scheduler-maps sched-1 forwarding-class
assured-forwarding scheduler af-1
user@host# set class-of-service scheduler-maps sched-1 forwarding-class
best-effort scheduler be-1
user@host# set class-of-service scheduler-maps sched-1 forwarding-class
expedited-forwarding scheduler ef-1

```

3. Convert the channelized DS3 IQ interface to a T3 interface.

```

[edit]
user@host# set interfaces ct3-3/1/0 no-partition interface-type t3

```

4. Enable scheduling at the logical interface level of the T3 interface.

```

[edit]
user@host# set interfaces t3-3/1/0 per-unit-scheduler
user@host# set interfaces t3-3/1/0 unit 0 dlci 100
user@host# set interfaces t3-3/1/0 unit 1 dlci 101

```

5. Configure the T3 interface.

```

[edit]
user@host# set interfaces t3-3/1/0 encapsulation frame-relay
user@host# set interfaces t3-3/1/0 unit 0 family inet address 10.40.1.1/30
user@host# set interfaces t3-3/1/0 unit 1 family inet address 10.40.2.1/30

```

6. Configure the logical interfaces for class of service by specifying which scheduler map to associate with each logical interface and how much bandwidth to reserve for the DLCI queues.

```

[edit]
user@host# set class-of-service interfaces t3-3/1/0 unit 0 scheduler-map sched-0
user@host# set class-of-service interfaces t3-3/1/0 unit 0 shaping-rate 10m
user@host# set class-of-service interfaces t3-3/1/0 unit 1 scheduler-map sched-1
user@host# set class-of-service interfaces t3-3/1/0 unit 1 shaping-rate 10m

```

7. Commit the configuration.

```

[edit]
user@host# commit

```

## Results

From configuration mode, confirm your configuration by issuing the **show interfaces** and **show class-of-service** commands. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

```

[edit]
user@host# show interfaces
ct3-3/1/0 {
  no-partition interface-type t3;
}
t3-3/1/0 {
  per-unit-scheduler;
  encapsulation frame-relay;
  unit 0 {

```

```
    dlci 100;
    family inet {
        address 10.40.1.1/30;
    }
}
unit 1 {
    dlci 101;
    family inet {
        address 10.40.2.1/30;
    }
}
}
[edit]
user@host# show class-of-service
interfaces {
    t3-3/1/0 {
        unit 0 {
            scheduler-map sched-0;
            shaping-rate 10m;
        }
        unit 1 {
            scheduler-map sched-1;
            shaping-rate 10m; .
        }
    }
}
scheduler-maps {
    sched-0 {
        forwarding-class assured-forwarding scheduler af;
        forwarding-class best-effort scheduler be;
        forwarding-class expedited-forwarding scheduler ef;
    }
    sched-1 {
        forwarding-class assured-forwarding scheduler af-1;
        forwarding-class best-effort scheduler be-1;
        forwarding-class expedited-forwarding scheduler ef-1;
    }
}
schedulers {
    af {
        transmit-rate percent 10;
        buffer-size percent 10;
    }
    be {
        transmit-rate percent 20;
        buffer-size percent 20;
    }
    ef {
        transmit-rate percent 70;
        buffer-size percent 70;
    }
    af-1 {
        transmit-rate percent 10;
        buffer-size percent 10;
    }
    be-1 {
```

```

        transmit-rate percent 30;
        buffer-size percent 30;
    }
    ef-1 {
        transmit-rate percent 60;
        buffer-size percent 60;
    }
}

```

## Verification

Confirm that the configuration is working properly.

- [Verifying Scheduler Operation on page 111](#)

### Verifying Scheduler Operation

**Purpose** Verify correct operation of class-of-service schedulers on a channelized IQ interface.

**Action** From operational mode, issue the **show class-of-service interface t3-3/1/0** command.

```

user@host> show class-of-service interface t3-3/1/0
Physical interface: t3-3/1/0, Index: 169
Scheduler map: <default>, Index: 1
Logical interface: t3-3/1/0.0, Index: 68
  Object      Name                Type                Index
  Scheduler-map sched-0                               11204
  Rewrite      exp-default          exp                  2
  Classifier    ipprec-compatibility    ip                   5
Logical interface: t3-3/1/0.1, Index: 69
  Object      Name                Type                Index
  Scheduler-map sched-1                               7038
  Rewrite      exp-default          exp                  2
  Classifier    ipprec-compatibility    ip                   5

```

**Meaning** The class of service has been applied. Appearance of the configured scheduler maps in the output indicates the successful application of the class of service.

