



Configuring Slices

This chapter describes the procedures to configure slices and supported configurations on the client and trunk ports of each slice.

- [Understanding Cisco NCS 1002](#) , on page 1
- [Slice and Port Numbering](#), on page 2
- [Supported Configurations](#), on page 2
- [Configure the Slice](#), on page 3
- [Verify Slice Configuration](#), on page 5
- [Illustrations for Supported Configurations](#), on page 8

Understanding Cisco NCS 1002

Cisco NCS 1002 is a 2Tbps muxponder that addresses the growing bandwidth needs of data center DWDM applications. The muxponder is 2 RU. It provides dense, low power, and cost-optimized DWDM transport for 10G, 40G, and 100G clients. The trunk ports can operate at 100G, 200G, and 250G traffic. NCS 1002 is ROHS6 compliant.

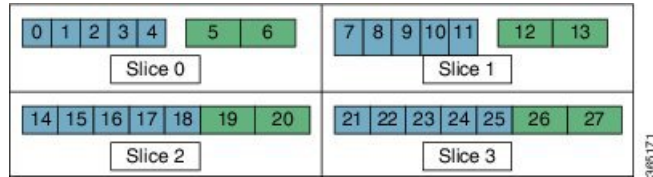
NCS 1002 has four independent slices. A slice is a group of client and trunk ports operating homogeneously. Each slice contains five QSFP+/QFSP28 client optical ports and two CFP2 DWDM trunk ports. Each slice delivers up to 500 Gbps traffic. NCS 1002 has one controller card, two Solid State Disks (SSD), 1+1 redundant 1800W AC power supply modules, and 2+1 redundant fans.

NCS 1002 delivers the following benefits:

- Supports up to 2 Tbps capacity
- Transports 100, 200, or 250Gbps per wavelength on the same platform through software provisioning
- Transports 10 GE, 40 GE, and 100 GE on the same platform through software provisioning
- Supports grid-less tuning for flex-grid dense wavelength-division multiplexing (DWDM)
- Supports different modulation formats (PM-QPSK or PM-16QAM)
- Supports 7% or 20% Soft Decision (SD) FEC for maximum optical performance
- Allows for automated installation, configuration and monitoring
- Supports machine-to-machine (M2M) APIs based on YANG models for ease of configuration
- Supports a telemetry agent for a pub-sub model of device monitoring

Slice and Port Numbering

Figure 1: Slice and Port Numbering



The slices are numbered from 0 to 3. The ports are numbered across the different slices from 0 to 27. The port numbers against blue background represent client ports; port numbers against green background represent trunk ports.

Supported Configurations

The following configurations are supported on client and trunk ports in each slice. Each slice contains up to twenty Ethernet client ports operating at 10G, or five Ethernet client ports operating at 100G, or five Ethernet client ports operating at 40G. The client ports map to two trunk ports operating at 100G, 200G, or 250G that provides muxponder functionality.

In mixed mode configuration, each slice contains up to three Ethernet client ports operating at 100G and eight Ethernet client ports operating at 10G. The client ports map to two trunk ports operating at 200G.

40G client ports are supported from R6.0.1.

Client Ports	Trunk Ports
20 x 10G	2 x 100G
20 x 10G	1 x 200G
4 x 40G	2 x 100G
5 x 40G	1 x 200G
2 x 100G	2 x 100G
4 x 100G	2 x 200G
5 x 100G	2 x 250G
3 x 100G + 8 x 10G	2 x 200G

All configurations can be accomplished using appropriate values for client bitrate and trunk bitrate parameters of the **hw-module** command.

Configure the Slice

You can configure the slice with traffic on client and trunk ports. All five client ports of the slice need to be configured at the same bitrate except for mixed mode configuration. Both the trunk ports are always set with the same FEC mode. The slice can be configured to send encrypted traffic from R6.1.1.

See the [Supported Configurations in Encrypted Mode](#) section to determine the supported configurations on the client and trunk ports in each slice configured in encrypted mode



Note When the slice is configured in encrypted mode, the drop-lldp cannot be enabled.



Note When NCS 1002 is installed in a system where both the trunk interfaces in a slice are used, the two 250Gb 16QAM signals need to be co-routed on the same fiber (mandatory when the 5x100Gb client port is provisioned). Also, it is recommended to use adjacent wavelengths when the line modulation is set to 250Gb 16QAM. The reason for this is that the chromatic dispersion generates skew between wavelengths. Assuming a Dispersion of 10000 ps/nm, a span of 500 km, and using adjacent channel, the skew is evaluated in less than 200 ns and it is compensated by the deskew capability of NCS 1002. If the delta between the used channels is increased, the skew increases and it might exceed the skew compensation done by NCS 1002.

To configure the slice with unencrypted traffic, use the following commands.

configure

```
hw-module location location slice [slice_number | all ] client bitrate { 10G | 40G | 100G } trunk bitrate { 100G | 200G | 250G } fec { softdecision7 | softdecision20 }
```

commit

To configure the slice with mixed mode, use the following commands.

configure

```
hw-module location location slice [slice_number | all ] client bitrate 10G-100G trunk bitrate 200G fec { softdecision7 | softdecision20 }
```

commit

To configure the slice with encrypted traffic, use the following commands.

configure

```
hw-module location location slice [slice_number | all ] client bitrate { 10G | 40G | 100G } trunk bitrate { 100G | 200G } fec { softdecision7 | softdecision20 } [ encrypted ]
```

commit

Examples

The following is a sample in which slice 0 is configured in mixed mode, and FEC on the trunk ports is set to softdecision7.

```
configure
```

```
hw-module location 0/RP0/CPU0 slice 0 client bitrate 10G-100G trunk bitrate 200G fec
SoftDecision7
commit
```

The following is a sample in which slice 0 is configured to send encrypted traffic with 100G client rate, 200G trunk rate, and FEC on the trunk ports is set to softdecision7.

```
configure
hw-module location 0/RP0/CPU0 slice 0 client bitrate 100G trunk bitrate 200G softdecision7
  encrypted
commit
```

The following is a sample in which slice 0 is configured to send encrypted traffic with 10G client rate, 100G trunk rate, and FEC on the trunk ports is set to softdecision20. When a slice is configured with 10G client rate in encrypted mode, ten MACsec controllers are created for each slice. When all the four slices are configured with 10G client rate in encrypted mode, forty MACsec controllers are created for NCS 1002. Two MACsec controllers are created for the middle port, four controllers for the fourth port, and four controllers for the fifth port per slice.

```
configure
hw-module location 0/RP0/CPU0 slice 0 client bitrate 10G trunk bitrate 100G softdecision20
  encrypted
commit
```

The following is a sample in which slice 0 is configured to send encrypted traffic with 40G client rate, 100G trunk rate, and FEC on the trunk ports is set to softdecision20.

```
configure
hw-module location 0/RP0/CPU0 slice 0 client bitrate 40G trunk bitrate 100G softdecision20
  encrypted
commit
```

The following is a sample to configure all the slices with a specific client rate and trunk rate.

```
configure
hw-module location 0/RP0/CPU0 slice all client bitrate 10G trunk bitrate 100G fec
softDecision7
commit
```

```
configure
hw-module location 0/RP0/CPU0 slice all client bitrate 40G trunk bitrate 100G fec
softDecision7
commit
```

```
configure
hw-module location 0/RP0/CPU0 slice all client bitrate 100G trunk bitrate 200G fec
softDecision7
commit
```

The following is a sample to remove the configuration from all the slices.

```
configure
no hw-module location 0/RP0/CPU0 slice all client bitrate 10G trunk bitrate 100G fec
softDecision7
commit
```

```
configure
no hw-module location 0/RP0/CPU0 slice all client bitrate 40G trunk bitrate 100G fec
```

```

softDecision7
commit

configure
no hw-module location 0/RP0/CPU0 slice all client bitrate 100G trunk bitrate 200G fec
softDecision7
commit

```

Associated Commands

- [hw-module](#)
- [show hw-module](#)

Verify Slice Configuration

Use this procedure to verify whether the slice is correctly configured.

```
show hw-module { slice [ slicenumber | all ] }
```

Example:

```

RP/0/RP0/CPU0:ios# show hw-module slice 0

Thu Aug 11 16:16:58.935 IST
Slice ID:                0
Status:                  Provisioned
Client Bitrate:         100
Trunk Bitrate:          200
DP FPGA FW Type:        M100
DP FPGA FW Version:     02.00
HW Status:              CURRENT

Encryption Supported:    TRUE
LLDP Drop Enabled:      FALSE
Client Port - Trunk Port      CoherentDSP0/0/0/6
Traffic Split Percentage

HundredGigEctr1r0/0/0/3      100
HundredGigEctr1r0/0/0/4      100

RP/0/RP0/CPU0:ios# show hw-module slice 0

Sun Dec 18 13:59:18.805 IST
Slice ID:                0
Status:                  Provisioned
Client Bitrate:         40
Trunk Bitrate:          100
DP FPGA FW Type:        MM40
DP FPGA FW Version:     03.00
HW Status:              CURRENT

Encryption Supported:    TRUE
LLDP Drop Enabled:      FALSE
Client Port - Trunk Port      CoherentDSP0/0/0/6
Traffic Split Percentage

FortyGigEctr1r0/0/0/3        100

```

```

FortyGigECtrlr0/0/0/4          100

RP/0/RP0/CPU0:ios# show hw-module slice 1

Tue Jan  1 06:55:12.293 UTC
Slice ID:                        1
Status:                          Provisioned
Client Bitrate:                   10
Trunk Bitrate:                    100
DP FPGA FW Type:                  MM10
DP FPGA FW Version:               03.00
HW Status:                        CURRENT

Encryption Supported:             TRUE
LLDP Drop Enabled:                FALSE
Client Port - Trunk Port          CoherentDSP0/0/0/13
Traffic Split Percentage

TenGigECtrlr0/0/0/9/1           100
TenGigECtrlr0/0/0/9/2           100
TenGigECtrlr0/0/0/10/1          100
TenGigECtrlr0/0/0/10/2         100
TenGigECtrlr0/0/0/10/3         100
TenGigECtrlr0/0/0/10/4         100
TenGigECtrlr0/0/0/11/1         100
TenGigECtrlr0/0/0/11/2         100
TenGigECtrlr0/0/0/11/3         100
TenGigECtrlr0/0/0/11/4         100

RP/0/RP0/CPU0:ios# show hw-module slice 2

Slice ID:                        2
Status:                          Provisioned
Client Bitrate:                   10,100
Trunk Bitrate:                    200
DP FPGA FW Type:                  RMM
DP FPGA FW Version:               04.00
HW Status:                        CURRENT

Encryption Supported:             FALSE
LLDP Drop Enabled:                FALSE
Client Port - Trunk Port          CoherentDSP0/0/0/19 CoherentDSP0/0/0/20
Traffic Split Percentage

HundredGigECtrlr0/0/0/14        100          0
HundredGigECtrlr0/0/0/15        100          0
HundredGigECtrlr0/0/0/16         0          100
TenGigECtrlr0/0/0/17/1          0          100
TenGigECtrlr0/0/0/17/2          0          100
TenGigECtrlr0/0/0/17/3          0          100
TenGigECtrlr0/0/0/17/4          0          100
TenGigECtrlr0/0/0/18/1          0          100
TenGigECtrlr0/0/0/18/2          0          100
TenGigECtrlr0/0/0/18/3          0          100
TenGigECtrlr0/0/0/18/4          0          100

```

Displays the details of the slice such as the slice ID, client rate, trunk rate, and the traffic percentage carried on the trunk ports. The **Encryption Supported** field indicates whether the slice is provisioned with firmware that supports encryption or not.

Note The HW Status field might display "Need Upgrade" when the user needs to use the MACsec feature and upgrades from R6.0.1 to 6.1.1. Hence, the control FPGA (CTRL_BKP_UP, CTRL_BKP_LOW, CTRL_FPGA_UP, and CTRL_FPGA_LOW) needs to be upgraded to the latest firmware version provided by R6.1.1. See [Verify Firmware Version](#) for more information.

The Provisioned status does not indicate that the traffic can flow immediately. For example, use the **show controllers maCSecCtrlr 0/0/0/3** command output to view the provisioning information of the port after the slice is provisioned.

Example:

```
RP/0/RP0/CPU0:ios# show hw-module slice all

Thu Aug 11 16:16:58.935 IST
Slice ID:                0
Status:                  Provisioned
Client Bitrate:          100
Trunk Bitrate:           200
DP FPGA FW Type:         M100
DP FPGA FW Version:      02.00
HW Status:               CURRENT

Encryption Supported:    TRUE
Client Port - Trunk Port      CoherentDSP0/0/0/6
Traffic Split Percentage

HundredGigEctrler0/0/0/3          100
HundredGigEctrler0/0/0/4          100

Slice ID:                1
Status:                  Provisioned
Client Bitrate:          100
Trunk Bitrate:           200
DP FPGA FW Type:         M100
DP FPGA FW Version:      02.00
HW Status:               CURRENT

Encryption Supported:    TRUE
Client Port - Trunk Port      CoherentDSP0/0/0/13
Traffic Split Percentage

HundredGigEctrler0/0/0/10         100
HundredGigEctrler0/0/0/11         100

Slice ID:                2
Status:                  Provisioned
Client Bitrate:          100
Trunk Bitrate:           200
DP FPGA FW Type:         M100
DP FPGA FW Version:      02.00
HW Status:               CURRENT

Encryption Supported:    TRUE
Client Port - Trunk Port      CoherentDSP0/0/0/20
Traffic Split Percentage

HundredGigEctrler0/0/0/17         100
HundredGigEctrler0/0/0/18         100

Slice ID:                3
Status:                  Provisioned
Client Bitrate:          100
Trunk Bitrate:           200
DP FPGA FW Type:         M100
```

```

DP FPGA FW Version:    02.00
HW Status:             CURRENT

Encryption Supported:  TRUE
Client Port - Trunk Port      CoherentDSP0/0/0/27
Traffic Split Percentage

HundredGigECtrlr0/0/0/24      100
HundredGigECtrlr0/0/0/25      100

```

Associated Commands

- [hw-module](#)
- [show hw-module](#)

Illustrations for Supported Configurations

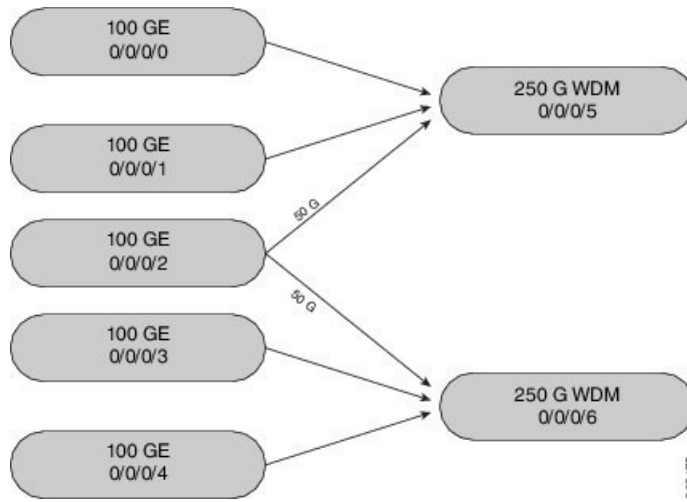
The following table describes the client and trunk ports in slice 0 that are enabled or disabled for each supported configuration.

Client Data Rate	Trunk Data Rate	Client Port 0	Client Port 1	Client Port 2	Client Port 3	Client Port 4	Trunk Port 5	Trunk Port 6
100G	100G	E	D	D	D	E	E	E
100G	200G	E	E	D	E	E	E	E
100G	250G	E	E	E	E	E	E	E
10G	100G	E	E	E	E	E	E	E
10G	200G	E	E	E	E	E	D	E
40G	100G	E	E	D	E	E	E	E
40G	200G	E	E	E	E	E	D	E

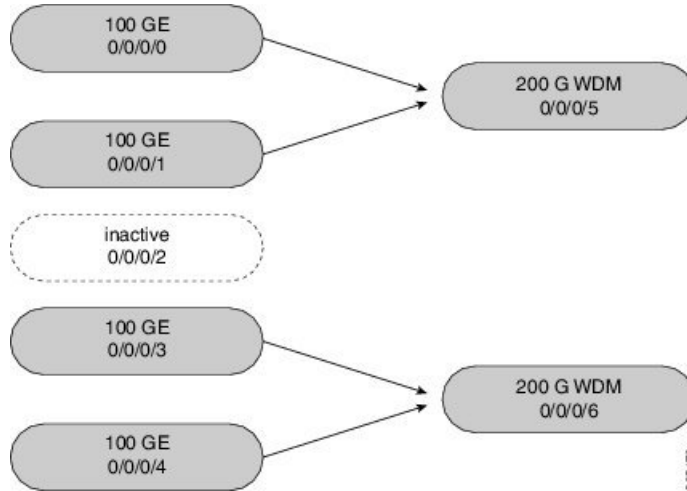
E indicates that the port is enabled; D indicates that the port is disabled.

The following illustrations describe the mapping of traffic from client to trunk ports for certain configurations.

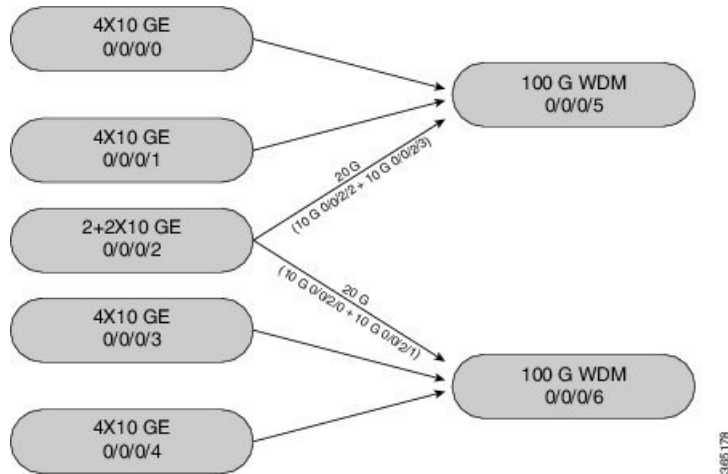
Client: 5 x 100G Trunk: 2 x 250G



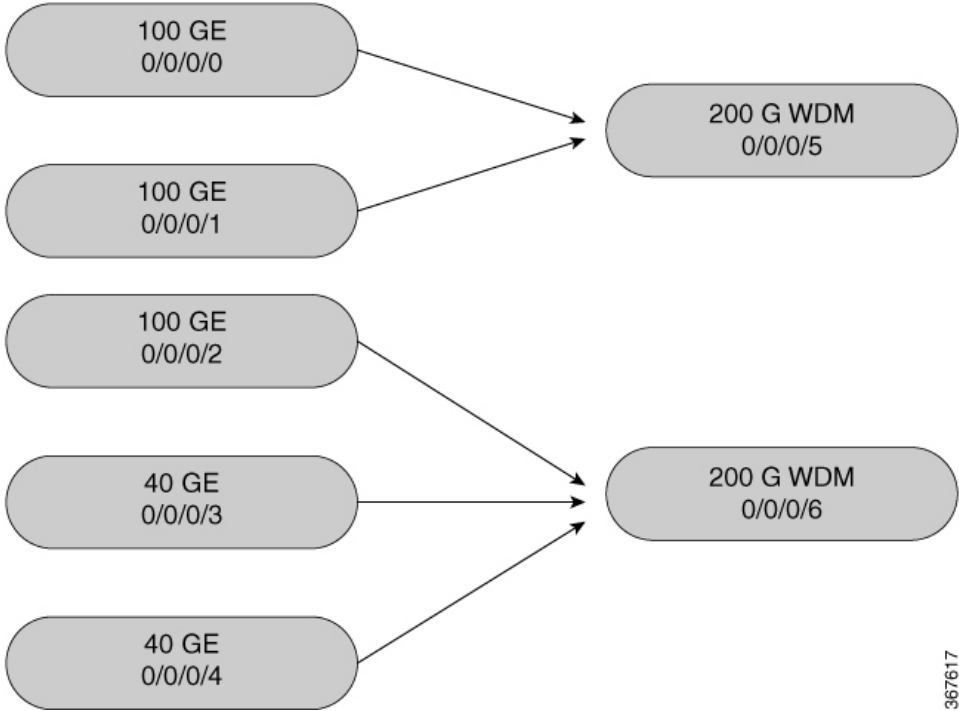
Client: 4 x 100G Trunk: 2 x 200G



Client: 20 x 10G Trunk: 2 x 100G



The following illustration describes the mapping of traffic from client to trunk ports for mixed mode configuration.



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