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

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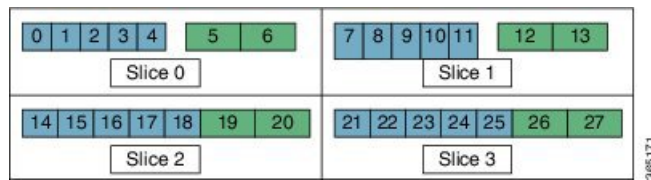
The slices are numbered from 0 to 3. The ports are numbered across the different slices from 0 to 27. The port numbers against blue background represent client ports; port numbers against green background represent trunk ports.

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

Client Ports	Trunk Ports
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
```

Note Until R6.3.2, if the user wants to modify the slice configuration using the **hw-module** command, the existing slice must be deleted and new slice must be configured. From R6.5.1, the user can directly change the existing parameters on the configured slice without deleting the slice.

The slice configuration can be done using hw-module configuration or terminal-device configuration. However, the hw-module configuration cannot be modified or deleted using the terminal-device configuration and vice versa.

Example of Slice Modification

Display the slice configuration.

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


Fri Jun  1 10:07:22.035 IST
Slice ID:               0
Status:                 Provisioned
Client Bitrate:         100
Trunk Bitrate:          200
DP FPGA FW Type:        X100
DP FPGA FW Version:     01.01
HW Status:              CURRENT

Encryption Supported:   FALSE
LLDP Drop Enabled:      FALSE
Client Port -   Trunk Port        CoherentDSP0/0/0/5   CoherentDSP0/0/0/6
Traffic Split Percentage

HundredGigECtrlr0/0/0/0                          100                   0
HundredGigECtrlr0/0/0/1                          100                   0
HundredGigECtrlr0/0/0/3                            0                 100
HundredGigECtrlr0/0/0/4                            0                 100
```

Modify the slice configuration with a different trunk bit rate without deleting the slice.

```
configure
hw-module location 0/RP0/CPU0 slice 0 client bitrate 100G trunk bitrate 250G fec
SoftDecision20
commit
end
```

Verify the slice re-configuration.

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


Fri Jun  1 10:07:45.959 IST
Slice ID:               0
Status:                 Provisioning In Progress
Client Bitrate:         100
Trunk Bitrate:          250
DP FPGA FW Type:        UNKNOWN
DP FPGA FW Version:     00.00
HW Status:              CURRENT

Encryption Supported:   FALSE
LLDP Drop Enabled:      FALSE
Client Port -   Trunk Port        CoherentDSP0/0/0/5   CoherentDSP0/0/0/6
Traffic Split Percentage

HundredGigECtrlr0/0/0/0                              100                 0
HundredGigECtrlr0/0/0/1                              100                 0
HundredGigECtrlr0/0/0/2                               50                50
HundredGigECtrlr0/0/0/3                                0               100
HundredGigECtrlr0/0/0/4                                0               100
```

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

HundredGigECtrlr0/0/0/3                    100
HundredGigECtrlr0/0/0/4                    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

FortyGigECtrlr0/0/0/3                    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

HundredGigECtrlr0/0/0/3                     100
HundredGigECtrlr0/0/0/4                     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

HundredGigECtrlr0/0/0/10                    100
HundredGigECtrlr0/0/0/11                    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

HundredGigECtrlr0/0/0/17                 100
HundredGigECtrlr0/0/0/18                 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

AINS

AINS (Automatic-In-Service) allows the controller to automatically move to automatic-in-service state after the maintenance window is completed. A soak time period is associated with AINS state. The controller automatically moves to In-Service (IS) state after the soak time period is completed. During AINS maintenance window, alarms are not propagated to EMS/NMS monitoring system.

AINS is configured for a specific slice or all the slices. The configuration is applied only to the client ports of the slice. AINS configuration is supported for all the client bitrates (10G/40G/100G) across all the supported slice configurations.

AINS States

State	Description
None	AINS is not enabled on the controller or soak time is completed.
Pending	AINS is configured on the controller; however, soak time is not started because the primary state of controller is in Shutdown/Admin down/Not ready or secondary state is in Maintenance. AINS can also move to Pending state if alarms are raised during the soak period.

State	Description
Running	AINS is enabled on the controller. The primary state of the controller is Up and the secondary state is AINS.

When AINS runs on Ethernet controllers and if there are Service-Affecting alarms on Ethernet controllers such as ETHERNET_SIGLOSS, ETHERNET_SYNCLOSS, ETHERNET_LF, ETHERNET_HIBER, ETHERNET_SQUELCHED, and Carrier Loss on LAN, the AINS state moves to Pending. When the alarms are cleared, the AINS state moves to Running.

When AINS runs on Optics controllers and if there are Service-Affecting alarms on Optics controllers such as MEA and IMPROPRMVL, the AINS state moves to Pending state. When the alarms are cleared, the AINS state moves to Running.

Soak Time

The user can configure the soak time between 1 minute to 48 hours.

All the alarms are suppressed during the AINS state. When the Optical and Ethernet alarms are raised on the port during the soak period, the AINS state moves to Pending. These alarms are not displayed in the output of **show alarms brief card location 0/RP0/CPU0 active** command but in the output of **show alarms brief card location 0/RP0/CPU0 conditions** command. When all the alarms are cleared, the soak time is started and AINS state moves to Running. When the soak time expires, the port moves to IS state.

Slice re-provisioning and headless operations restarts the soak time for Optics and Ethernet controllers.

Configure AINS on a Slice

To configure AINS on a slice, 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** }

hw-module location *location* **slice** [*slice_number* | **all**] **client-port-ains-soak hours** *hours* **minutes** *minutes*

commit

The following is a sample in which slice 0 is configured with AINS with soak time as 30 minutes.

```
configure
hw-module location 0/RP0/CPU0 slice 0 client bitrate 100G trunk bitrate 250G fec
SoftDecision20
hw-module location 0/RP0/CPU0 slice 0 client-port-ains-soak hours 0 minutes 30
commit
```

The following is a sample in which all the slices are configured with AINS with soak time as 40 minutes.

```
configure
hw-module location 0/RP0/CPU0 slice all client bitrate 100G trunk bitrate 250G fec
SoftDecision20
hw-module location 0/RP0/CPU0 slice all client-port-ains-soak hours 0 minutes 40
commit
```

Disable AINS on a Slice

To disable AINS on a slice, 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** }

hw-module location *location* **slice** [*slice_number* | **all**] **client-port-ains-soak hours** *hours* **minutes** *minutes*

commit

The following is a sample in which AINS is disabled on slice 0.

```
configure
hw-module location 0/RP0/CPU0 slice 0 client bitrate 100G trunk bitrate 250G fec
SoftDecision20
hw-module location 0/RP0/CPU0 slice 0 client-port-ains-soak hours 0 minutes 0
commit
```

Display AINS Configuration

```
RP/0/RP0/CPU0:ios# show controllers hundredGigECtrlr 0/0/0/4
```

This example displays the Ethernet controller statistics with AINS Soak in Running state.

```
Fri Apr 27 02:49:45.858 UTC
Operational data for interface HundredGigECtrlr0/0/0/4:
State:
    Administrative state: enabled
    Operational state: Up
    LED state: Green On
    Maintenance: Disabled
    AINS Soak: Running
      Total Duration: 0 hour(s) 30 minute(s)
      Remaining Duration: 0 hour(s) 29 minute(s) 50 second(s)
    Laser Squelch: Disabled
```

The AINS Soak field in the output indicates the current state of AINS. The current state can be None, Pending, or Running. The Total Duration field indicates the total soak time that is configured. The Remaining Duration field indicates the soak time that remains, after which, AINS state moves to None.

```
RP/0/RP0/CPU0:ios# show controllers hundredGigECtrlr 0/0/0/4
```

This example displays the Ethernet controller statistics with AINS Soak in Pending state.

```
Fri Feb  1 22:46:26.366 IST
Operational data for interface HundredGigECtrlr0/0/0/3:
State:
    Administrative state: enabled
    Operational state: Down (Reason: State undefined)
    LED state: Red On
    Maintenance: Disabled
    AINS Soak: Pending
      Total Duration: 0 hour(s) 30 minute(s)
      Remaining Duration: 0 hour(s) 30 minute(s) 0 second(s)
    Laser Squelch: Disabled
```

```
Phy:
    Media type: Not known
    Alarms:
        Current:
      Loss of Frequency Sync Data

RP/0/RP0/CPU0:ios# show controllers optics 0/0/0/2
```

This example displays the Optics controller statistics with AINS Soak in Running state.

```
Fri Jun  8 18:33:46.027 IST

Controller State: Up

Transport Admin State: Automatic In Service

Laser State: On

LED State: Green

Optics Status

        Optics Type:  100G QSFP28 LR4

        Alarm Status:
        -------------
        Detected Alarms: None


        LOS/LOL/Fault Status:

        Alarm Statistics:

        -------------
        HIGH-RX-PWR = 0           LOW-RX-PWR = 0
        HIGH-TX-PWR = 0           LOW-TX-PWR = 0
        HIGH-LBC = 0              HIGH-DGD = 0
        OOR-CD = 0                OSNR = 0
        WVL-OOL = 0               MEA  = 0
        IMPROPER-REM = 0
        TX-POWER-PROV-MISMATCH = 0

        Performance Monitoring: Enable

        THRESHOLD VALUES
        ----------------

        Parameter                 High Alarm  Low Alarm  High Warning  Low Warning
        -----------------------   ----------  ---------  ------------  -----------
        Rx Power Threshold(dBm)        4.9      -12.0           0.0           0.0
        Tx Power Threshold(dBm)        3.5      -10.1           0.0           0.0
        LBC Threshold(mA)              N/A        N/A          0.00          0.00

        LBC High Threshold = 98 %
        Polarization parameters not supported by optics

       Total TX Power = 7.94 dBm

       Total RX Power = 7.76 dBm

        Lane   Laser Bias    TX Power    RX Power  Output Frequency
        ----   ----------   ----------   ----------   ----------------
          1       28.3 %     1.91 dBm    1.30 dBm   231.39 THz
          2       27.8 %     1.83 dBm    1.05 dBm   230.59 THz
```

```
        3     28.2 %    1.93 dBm    2.14 dBm  229.79 THz
        4     27.3 %    2.00 dBm    2.32 dBm  228.99 THz

Transceiver Vendor Details

        Form Factor          : QSFP28
        Name                 : CISCO-FINISAR
        Part Number          : 10-3146-01
        Rev Number           : B
        Serial Number        : FNS20401P4J
        PID                  : QSFP-100G-LR4-S
        VID                  : V01
        Date Code(yy/mm/dd)  : 16/10/01
        Fiber Connector Type: LC
        Otn Application Code: Undefined
        Sonet Application Code: Undefined
        Ethernet Compliance Code: 100GBASE-LR4


Transceiver Temperature : 25 Celsius



AINS Soak              : Running
AINS Timer             : 0h, 30m
AINS remaining time    : 1791 seconds
```

When soak timer expires, AINS state changes from Running to None. The Transport Admin State of optics controller changes from Automatic In Service to In Service.

```
RP/0/RP0/CPU0:ios# show controllers optics 0/0/0/2


Fri Jun  8 21:47:19.197 IST

Controller State: Up

Transport Admin State: In Service

Laser State: On

LED State: Green

Optics Status

        Optics Type:  100G QSFP28 LR4

        Alarm Status:
        -------------
        Detected Alarms: None


        LOS/LOL/Fault Status:

        Alarm Statistics:

        -------------
        HIGH-RX-PWR = 0           LOW-RX-PWR = 0
        HIGH-TX-PWR = 0           LOW-TX-PWR = 0
        HIGH-LBC = 0              HIGH-DGD = 0
        OOR-CD = 0                OSNR = 0
        WVL-OOL = 0               MEA  = 0
        IMPROPER-REM = 0
        TX-POWER-PROV-MISMATCH = 0

        Performance Monitoring: Enable
```

```
THRESHOLD VALUES
----------------

Parameter                 High Alarm  Low Alarm  High Warning  Low Warning
------------------------- ----------  ---------  ------------  -----------
Rx Power Threshold(dBm)          4.9      -12.0           0.0          0.0
Tx Power Threshold(dBm)          3.5      -10.1           0.0          0.0
LBC Threshold(mA)                N/A        N/A          0.00         0.00

LBC High Threshold = 98 %
Polarization parameters not supported by optics

Total TX Power = 7.94 dBm

Total RX Power = 7.76 dBm

Lane  Laser Bias    TX Power     RX Power  Output Frequency
----  ----------   ----------   ----------  ----------------
  1      28.3 %     1.91 dBm     1.30 dBm  231.39 THz
  2      27.8 %     1.81 dBm     1.04 dBm  230.59 THz
  3      28.4 %     1.96 dBm     2.14 dBm  229.79 THz
  4      27.5 %     2.00 dBm     2.33 dBm  228.99 THz
```

```
Transceiver Vendor Details

    Form Factor          : QSFP28
    Name                 : CISCO-FINISAR
    Part Number          : 10-3146-01
    Rev Number           : B
    Serial Number        : FNS20401P4J
    PID                  : QSFP-100G-LR4-S
    VID                  : V01
    Date Code(yy/mm/dd)  : 16/10/01
    Fiber Connector Type: LC
    Otn Application Code: Undefined
    Sonet Application Code: Undefined
    Ethernet Compliance Code: 100GBASE-LR4

Transceiver Temperature : 25 Celsius




AINS Soak               : None
AINS Timer              : 0h, 0m
AINS remaining time     : 0 seconds
```

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

| 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
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.
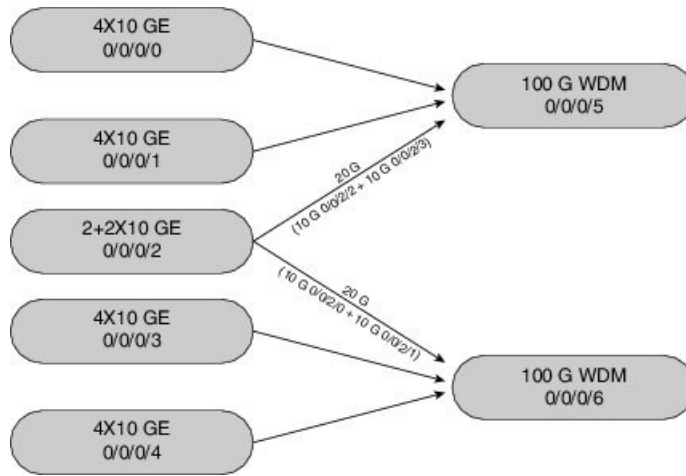
Client: 5 x 100G Trunk: 2 x 250G
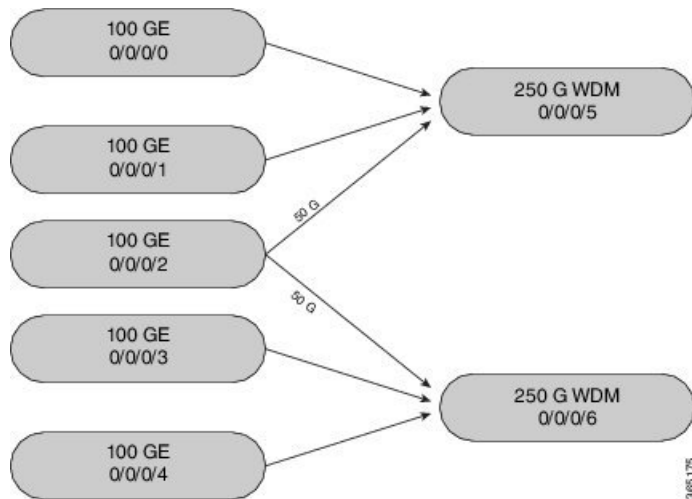
Client: 4 x 100G Trunk: 2 x 200G
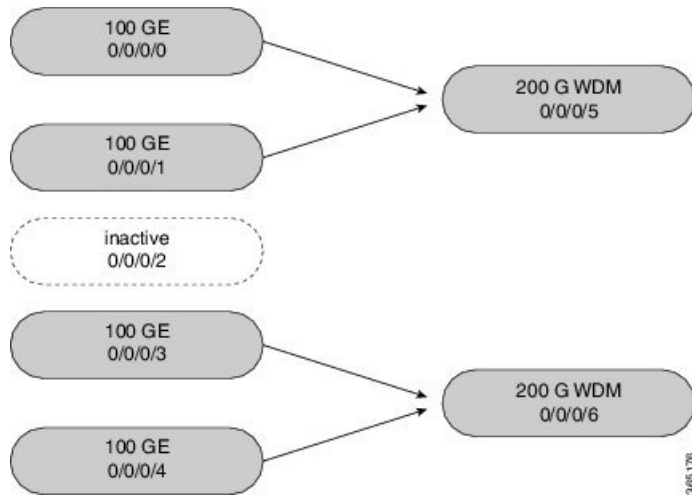
Client: 20 x 10G Trunk: 2 x 100G

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