Terminal-device Model

The Terminal-device model is a industry-wide standard YANG model from standard bodies, such as IETF and IEEE. The terminal-device model provides a unique way to provision the Cisco NCS 1002 using YANG models that are defined for configuration data and operational data.

The gRPC (google-defined Remote Procedure Calls) and NETCONF (Network Configuration Protocol) communication protocols are used to establish connection between the client and Cisco NCS1002.

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Structure of YANG Models

YANG data models can be represented in a hierarchical, tree-based structure with nodes. This representation makes the models easy to understand.

There are two Terminal-device models for Cisco NCS1002, such as:

- OpenConfig Terminal model
- OpenConfig Platform model

For more details on supported versions, see Supported YANG Models in NCS 1002.

The following is the tree structure of the OpenConfig Terminal model:

```yaml
module: openconfig-terminal-device
  +--rw terminal-device
    +--ro state
    +--rw logical-channels
      | +--rw channel* [index]
      |   | +--rw index
      |   | +--rw config
      |   |   | +--rw index? uint32
      |   |   | +--rw description? string
      |   |   | +--rw admin-state? oc-opt-types:admin-state-type
      |   |   | +--rw rate-class? identityref
      |   |   | +--rw trib-protocol? identityref
      |   |   | +--rw logical-channel-type? identityref
      |   |   | +--rw loopback-mode? oc-opt-types:loopback-mode-type
```
### Terminal-device Model

**Structure of YANG Models**

| ro state |
|---|--|
| ro index? | uint32 |
| ro description? | string |
| ro admin-state? | oc-opt-types:admin-state-type |
| ro rate-class? | identityref |
| ro trib-protocol? | identityref |
| ro logical-channel-type? | identityref |
| ro loopback-mode? | oc-opt-types:loopback-mode-type |
| ro link-state? | enumeration |

**rw otn**

| rw config |
|---|--|
| rw tti-msg-transmit? | string |
| rw tti-msg-expected? | string |
| rw tti-msg-auto? | boolean |

**ro state**

| ro tti-msg-transmit? | string |
| ro tti-msg-expected? | string |
| ro tti-msg-recv? | string |
| ro errored-seconds? | yang:counter64 |
| ro severely-errored-seconds? | yang:counter64 |
| ro unavailable-seconds? | yang:counter64 |
| ro fec-corrected-bits? | yang:counter64 |
| ro background-block-errors? | yang:counter64 |
| ro fec-uncorrectable-words |
| ro pre-fec-ber |
| ro instant? | decimal64 |
| ro avg? | decimal64 |
| ro min? | decimal64 |
| ro max? | decimal64 |
| ro post-fec-ber |
| ro instant? | decimal64 |
| ro avg? | decimal64 |
| ro min? | decimal64 |
| ro max? | decimal64 |

**rw ethernet**

| rw config |
|---|--|
| ro state |
| in-mac-pause-frames? | yang:counter64 |
| in-oversize-frames? | yang:counter64 |
| in-jabber-frames? | yang:counter64 |
| in-fragment-frames? | yang:counter64 |
| in-crc-errors? | yang:counter64 |
| out-mac-pause-frames? | yang:counter64 |

**rw ingress**

| rw config |
|---|--|
| transceiver? | oc-platform:components/component/name |
| physical-channel* |

| ro state |
|---|--|
| transceiver? | oc-platform:components/component/name |
| physical-channel* |

**rw logical-channel-assignments**

| assignment* [index] |
|---|--|
| index | ../config/index |

| rw config |
|---|--|
| index? | uint32 |
| description? | string |
| assignment-type? | enumeration |
| logical-channel? |

| ro state |
|---|--|
| index? | uint32 |
| description? | string |
| assignment-type? | enumeration |

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The following is the tree structure of the OpenConfig Platform model:

```
module: openconfig-platform
  +--rw components
    +--rw component* [name] -> ../config/name
      +--rw config
      | +--rw name? string
      +--ro state
      | +--ro name? string
      | +--ro type? union
      | +--ro id? string
      | +--ro description? string
      | +--ro mfg-name? string
      | +--ro version? string
      | +--ro serial-no? string
      | +--ro part-no? string
      +--rw oc-transceiver:transceiver
        +--rw oc-transceiver:config
        | +--rw oc-transceiver:form-factor? identityref
        | +--ro oc-transceiver:present? enumeration
        | +--ro oc-transceiver:connector-type? identityref
        | +--ro oc-transceiver:internal-temp? int16
        | +--ro oc-transceiver:vendor-part? string
        | +--ro oc-transceiver:vendor-rev? string
        | +--ro oc-transceiver:ethernet-compliance-code? identityref
        | +--ro oc-transceiver:sonet-sdh-compliance-code? identityref
        | +--ro oc-transceiver:otn-compliance-code? identityref
        | +--ro oc-transceiver:serial-no? string
        | +--ro oc-transceiver:date-code? yang:date-and-time
        | +--ro oc-transceiver:fault-condition? boolean
        +--rw oc-transceiver:physical-channels
          +--rw oc-transceiver:index* [index] -> ../config/index
          | +--ro oc-transceiver:output-frequency? oc-opt-types:frequency-type
          | +--ro oc-transceiver:output-power
          | | +--ro oc-transceiver:instant? decimal64
          | | +--ro oc-transceiver:avg? decimal64
          | | +--ro oc-transceiver:min? decimal64
          | +--ro oc-transceiver:input-power
          | | +--ro oc-transceiver:instant? decimal64
          | | +--ro oc-transceiver:avg? decimal64
          | | +--ro oc-transceiver:min? decimal64
          +--ro oc-transceiver:laser-bias-current
```

```
+--rw oc-opt-term:optical-channel
  +--rw oc-opt-term:config
  | +--rw oc-opt-term:frequency? oc-opt-types:frequency-type
  | +--rw oc-opt-term:target-output-power? decimal64
  | +--rw oc-opt-term:operational-mode? uint16
```

Data Models Configuration Guide for Cisco NCS 1002
Inventory Details of Terminal-device Model

The hierarchy of Cisco NCS1002 inventory is shown below:

Figure 1: Hierarchy of Cisco NCS1002 Inventory

The inventory details and the naming convention of the components used in the Cisco NCS1002 Terminal-device model are as follows:

Table 1: Inventory Details

<table>
<thead>
<tr>
<th>Components</th>
<th>Naming Convention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optics Controller</td>
<td>R/S-OpticsCtlrR/S/I/P</td>
</tr>
<tr>
<td>Optics Container</td>
<td>R/S-OpticsContainerR/S/I/P</td>
</tr>
<tr>
<td>Transceivers</td>
<td>R/S-OpticsR/S/I/P</td>
</tr>
<tr>
<td>Optical Channel Module</td>
<td>R/S-OpticalChannelR/S/I/P</td>
</tr>
</tbody>
</table>

The following table lists all the valid transceivers and optical channels that can be used for configuring Cisco NCS1002 using Terminal-device model:
Table 2: Transceiver and Optical Channel Details

<table>
<thead>
<tr>
<th>Components</th>
<th>Applicable Channels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transceivers</td>
<td>0/0-Optics0/0/0/0 to 0/0-Optics0/0/0/28</td>
</tr>
</tbody>
</table>
| Optical Channels    | • 0/0-OpticalChannel0/0/0/5
                   | • 0/0-OpticalChannel0/0/0/6
                   | • 0/0-OpticalChannel0/0/0/12
                   | • 0/0-OpticalChannel0/0/0/13
                   | • 0/0-OpticalChannel0/0/0/19
                   | • 0/0-OpticalChannel0/0/0/20
                   | • 0/0-OpticalChannel0/0/0/26
                   | • 0/0-OpticalChannel0/0/0/27 |

Note: Only the optical channels of trunk ports must be mapped to the line ports. For more information about the port details, see Slice and Port Numbering.

Configuring Cisco NCS1002 Using Terminal-device Model

The Cisco NCS1002 supports the following configurations:

• 10Gx100G
• 10Gx200G
• 40Gx100G
• 40Gx200G
• 100Gx100G
• 100Gx200G
• 100Gx250G
• 10G-100Gx200G

Note: All the logical channels (Ethernet and OTN) should be identified by a unique identifier.
10Gx100G Configuration

For 10G to 100G configuration on slice 0, connect the client ports, Optics0/0/0/0 to Optics0/0/0/4 to the Logical OTN channels (LOTN1 and LOTN2). Each client port has four logical channels such as LC1, LC2, LC3, and LC4 and are identified by a unique identifier. These logical channels are the transceiver physical channels with which the logical channels are connected to the client ports. The LC1, LC2, LC3, and LC4 of client port Optics0/0/0/0 and client port Optics0/0/0/1 and the LC3, and LC4 of client port Optics0/0/0/2 are connected to the LOTN1. The LC1, LC2, LC3, and LC4 of client port Optics0/0/0/3 and client port Optics0/0/0/4 and the LC1, and LC2 of client port Optics0/0/0/2 are connected to the LOTN2. The LOTN1 is connected to the optical channel 5 and LOTN2 is connected to the Optical Channel0/0/0/6. Then the optical channel 5 is connected to the line port, Optics0/0/0/5 and the Optical Channel0/0/0/6 is connected to the line port, Optics0/0/0/6. The bandwidth allocation is 10G each for all the logical channels (LC) and the bandwidth allocation for LOTN1, LOTN2, Optical channel 5 and 6 is 100G.

The following figure explains the 10G to 100G configuration in slice 0.

Figure 2: 10Gx100G Configuration

10Gx200G Configuration

For 10G to 200G configuration on slice 0, connect the 20 logical channels of client ports, Optics0/0/0/0 to Optics0/0/0/4 to the Logical OTN channel (LOTN). The Logical OTN channel is connected to the Optical Channel0/0/0/6. Then the Optical Channel0/0/0/6 is connected to the line port, Optics0/0/0/6. The bandwidth allocation is 10G each for all the logical channels and the bandwidth allocation for logical OTN channel, and Optical Channel0/0/0/6 is 200G.
The following figure explains 10G to 200G configuration in slice 0.

**Figure 3: 10Gx200G Configuration**

**40Gx100G Configuration**

For 40G to 100G configuration on slice 0, connect the client ports, Optics0/0/0/0, Optics0/0/0/1, Optics0/0/0/3, and Optics0/0/0/4 to the corresponding four Logical Channels, LC1, LC2, LC3 and LC4. The client port, Optics0/0/0/2 is not used. The LC1 and LC2 are connected to the first logical OTN channel (LOTN1) and the LC3 and LC4 are connected to the second logical OTN channel (LOTN2). The LOTN1 is connected to the optical channel 5 and LOTN2 is connected to the Optical Channel0/0/0/6. Then the optical channel 5 is connected to the line port, Optics0/0/0/5 and the Optical Channel0/0/0/6 is connected to the line port, Optics0/0/0/6. The bandwidth allocation is 40G each for all the logical channels (LC) and the bandwidth allocation for LOTN1, LOTN2, Optical channel 5 and 6 is 100G.
The following figure explains the 40G to 100G configuration in slice 0.

**Figure 4: 40Gx100G Configuration**

For 40G to 200G configuration on slice 0, connect the Logical Channels, LC1, LC2, LC3, LC4 and LC5 of client ports, Optics0/0/0/0 to Optics0/0/0/4 to the Logical OTN channel (LOTN). The Logical OTN channel is connected to the Optical Channel0/0/0/6. Then the Optical Channel0/0/0/6 is connected to the line port, Optics0/0/0/6. The bandwidth allocation is 40G each for all the logical channels and the bandwidth allocation for logical OTN channel, and Optical Channel0/0/0/6 is 200G.

The following figure explains 40G to 200G configuration in slice 0.

**Figure 5: 40Gx200G Configuration**

For 40G to 200G configuration on slice 0, connect the Logical Channels, LC1, LC2, LC3, LC4 and LC5 of client ports, Optics0/0/0/0 to Optics0/0/0/4 to the Logical OTN channel (LOTN). The Logical OTN channel is connected to the Optical Channel0/0/0/6. Then the Optical Channel0/0/0/6 is connected to the line port, Optics0/0/0/6. The bandwidth allocation is 40G each for all the logical channels and the bandwidth allocation for logical OTN channel, and Optical Channel0/0/0/6 is 200G.
100Gx100G Configuration

For 100G to 100G configuration on slice 0, connect the logical channels LC1 and LC2 of the client ports, Optics0/0/0/0 and Optics0/0/0/4 to the Logical OTN channels, LOTN 1 and LOTN2. The client port Optics0/0/0/1, client port Optics0/0/0/2 and client port Optics0/0/0/3 are not used. The LOTN1 is connected to the optical channel 5 and LOTN2 is connected to the Optical Channel0/0/0/6. Then the optical channel 5 is connected to the line port Optics0/0/0/5 and the Optical Channel0/0/0/6 is connected to the line port Optics0/0/0/6. The bandwidth allocation is 100G each for the LC1, LC2, LOTN1, LOTN2, optical channel 5 and Optical Channel0/0/0/6.

The following figure explains 100G to 100G configuration in slice 0.

Figure 6: 100Gx100G Configuration

100Gx200G Configuration

For 100G to 200G configuration on slice 0, connect the client ports, Optics0/0/0/0, Optics0/0/0/1, Optics0/0/0/3, and Optics0/0/0/4 to the corresponding four Logical Channels, LC1, LC2, LC3 and LC4. The client port, Optics0/0/0/2 is not used. The LC1 and LC2 are connected to the first logical OTN channel (LOTN1) and the LC3 and LC4 are connected to the second logical OTN channel (LOTN2). The LOTN1 is connected to the optical channel 5 and LOTN2 is connected to the Optical Channel0/0/0/6. Then the optical channel 5 is connected to the line port, Optics0/0/0/5 and the Optical Channel0/0/0/6 is connected to the line port, Optics0/0/0/6. The bandwidth allocation is 100G each for all the logical channels and the bandwidth allocation for LOTN1, LOTN2, Optical channel 5 and 6 is 200G.
The following figure explains the 100G to 200G configuration in slice 0.

**Figure 7: 100Gx200G Configuration**

For 100G to 250G configuration on slice 0, connect the logical channels, LC1, LC2, LC3, LC4 and LC5 of the client ports, Optics0/0/0/0, Optics0/0/0/1, Optics0/0/0/3, Optics0/0/0/4 and Optics0/0/0/2 to the Logical OTN channels (LOTN1 and LOTN2). The LC1 and LC2 are connected to the first logical OTN channel (LOTN1) and the LC3 and LC4 are connected to the second logical OTN channel (LOTN2). LC5 is divided and connected to LOTN1 and LOTN2. The LOTN1 is connected to the optical channel 5 and LOTN2 is connected to the Optical Channel0/0/0/6. Then the optical channel 5 is connected to the line port, Optics0/0/0/5 and the Optical Channel0/0/0/6 is connected to the line port, Optics0/0/0/6. The bandwidth allocation is 100G each for all the logical channels (LC) and the bandwidth allocation for LOTN1, LOTN2, Optical channel 5 and 6 is 250G.

**100Gx250G Configuration**

For 100G to 250G configuration on slice 0, connect the logical channels, LC1, LC2, LC3, LC4 and LC5 of the client ports, Optics0/0/0/0, Optics0/0/0/1, Optics0/0/0/3, Optics0/0/0/4 and Optics0/0/0/2 to the Logical OTN channels (LOTN1 and LOTN2). The LC1 and LC2 are connected to the first logical OTN channel (LOTN1) and the LC3 and LC4 are connected to the second logical OTN channel (LOTN2). LC5 is divided and connected to LOTN1 and LOTN2. The LOTN1 is connected to the optical channel 5 and LOTN2 is connected to the Optical Channel0/0/0/6. Then the optical channel 5 is connected to the line port, Optics0/0/0/5 and the Optical Channel0/0/0/6 is connected to the line port, Optics0/0/0/6. The bandwidth allocation is 100G each for all the logical channels (LC) and the bandwidth allocation for LOTN1, LOTN2, Optical channel 5 and 6 is 250G.
The following figure explains the 100G to 250G configuration in slice 0.

**Figure 8: 100Gx250G Configuration**

For 10G-100G to 200G(Mixed mode) configuration on slice 0, connect the 11 logical channels (LC1 to LC11) of the client ports Optics0/0/0/0, Optics0/0/0/1, Optics0/0/0/2, Optics0/0/0/3 and Optics0/0/0/4 to the Logical OTN channels (LOTN1 and LOTN2). The LC1 and LC2 are connected to the first logical OTN channel (LOTN1) and the LC3 to LC11 are connected to the second logical OTN channel (LOTN2). The LOTN1 is connected to the Optical Channel 0/0/0/5 and LOTN2 is connected to the Optical Channel 0/0/0/6. Then the Optical Channel 0/0/0/5 is connected to the line port Optics0/0/0/5 and the Optical Channel 0/0/0/6 is connected to the line port Optics0/0/0/6. The bandwidth allocation is 100G for the logical channels LC1 to LC3 and it is 10G for LC4 to LC11. The bandwidth allocation for LOTN1, LOTN2, Optical channels 0/0/0/5 and 0/0/0/6 is 200G.
The following figure explains the 10G-100G to 200G configuration in slice 0.

**Figure 9: 10G-100G to 200G Configuration**

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**Sample Configuration**

The following is a sample in which slice 0 is configured to send the traffic with 100G client rate and 200G trunk rate in .json and .xml format.

**Sample .xml file:**

```xml
<rpc message-id="101" xmlns="urn:ietf:params:xml:ns:netconf:base:1.0">
  <edit-config>
    <target>
      <candidate/>
    </target>
    <config xmlns:xc="urn:ietf:params:xml:ns:netconf:base:1.0">
      <terminal-device xmlns="http://openconfig.net/yang/terminal-device">
        <logical-channels>
          <channel>
            <index>201</index>
            <config>
              <index>201</index>
              <rate-class>TRIB_RATE_100G</rate-class>
              <admin-state>ENABLED</admin-state>
              <description>Logical channel 201</description>
              <trib-protocol>PROT_100G_MLG</trib-protocol>
              <logical-channel-type>PROT_ETHERNET</logical-channel-type>
            </config>
            <ingress>
              <config>
                <transceiver>0/0-Optics0/0/0/14</transceiver>
              </config>
            </ingress>
            <logical-channel-assignments>
              <assignment>
                <index>1</index>
                <config>
                  <index>1</index>
                  <allocation>100</allocation>
                  <assignment-type>LOGICAL_CHANNEL</assignment-type>
                  <description>Logical channel assigned 203</description>
                </config>
              </assignment>
            </logical-channel-assignments>
          </channel>
        </logical-channels>
      </terminal-device>
    </config>
  </edit-config>
</rpc>
```

---

**Terminal-device Model**

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Sample .json file:

```json
{
  "openconfig-interfaces:interfaces": {
    "interface": [
      {
        "name": "Optics0/0/0/5",
        "config": {
          "name": "Optics0/0/0/5",
          "type": "iana-if-type:opticalChannel",
          "enabled": false
        }
      },
      {
        "name": "Optics0/0/0/6",
        "config": {
          "name": "Optics0/0/0/6",
          "type": "iana-if-type:opticalChannel",
          "enabled": false
        }
      },
      {
        "name": "Optics0/0/0/12",
        "config": {
          "name": "Optics0/0/0/12",
          "type": "iana-if-type:opticalChannel",
          "enabled": false
        }
      },
      {
        "name": "Optics0/0/0/13",
        "config": {
          "name": "Optics0/0/0/13",
          "type": "iana-if-type:opticalChannel",
          "enabled": false
        }
      },
      {
        "name": "Optics0/0/0/19",
        "config": {
          "name": "Optics0/0/0/19",
          "type": "iana-if-type:opticalChannel",
          "enabled": false
        }
      }
    ]
  }
}
```
"config": {  
  "name": "Optics0/0/0/19",  
  "type": "iana-if-type:opticalChannel",  
  "enabled": false  
},  
},  
{  
  "name": "Optics0/0/0/20",  
  "config": {  
    "name": "Optics0/0/0/20",  
    "type": "iana-if-type:opticalChannel",  
    "enabled": false  
  },  
},  
{  
  "name": "Optics0/0/0/26",  
  "config": {  
    "name": "Optics0/0/0/26",  
    "type": "iana-if-type:opticalChannel",  
    "enabled": false  
  },  
},  
{  
  "name": "Optics0/0/0/27",  
  "config": {  
    "name": "Optics0/0/0/27",  
    "type": "iana-if-type:opticalChannel",  
    "enabled": false  
  }  
}  
],  
"openconfig-terminal-device:terminal-device": {  
  "logical-channels": {  
    "channel": [  
      {  
        "index": 201,  
        "config": {  
          "rate-class": "TRIB_RATE_100G",  
          "admin-state": "ENABLED",  
          "description": "Logical channel 201",  
          "trib-protocol": "PROT_100G_MLG",  
          "logical-channel-type": "PROT_ETHERNET",  
          "loopback-mode": "NONE"  
        },  
        "ingress": {  
          "config": {  
            "transceiver": "0/0-Optics0/0/0/14"  
          }  
        }  
      },  
      {  
        "index": 202,  
        "config": {  
          "rate-class": "TRIB_RATE_100G",  
          "admin-state": "ENABLED",  
          "description": "Logical channel 202",  
          "trib-protocol": "PROT_100G_MLG",  
          "logical-channel-type": "PROT_ETHERNET",  
          "loopback-mode": "NONE"  
        }  
      }  
    ]  
  }  
}
An example configuration for logical channel assignments and OTN settings:

```json
{
  "ingress": {
    "config": {
      "transceiver": "0/0-Optics0/0/0/15"
    }
  },
  "logical-channel-assignments": {
    "assignment": [
      {
        "index": 1,
        "config": {
          "allocation": 100,
          "assignment-type": "LOGICAL_CHANNEL",
          "description": "Logical channel assigned 203",
          "logical-channel": 203
        }
      }
    ]
  },
  "index": 203,
  "config": {
    "admin-state": "ENABLED",
    "description": "Logical channel 203",
    "logical-channel-type": "PROT_OTN",
    "loopback-mode": "NONE"
  },
  "otn": {
    "config": {
      "tti-msg-transmit": "test1",
      "tti-msg-expected": "test1"
    }
  },
  "logical-channel-assignments": {
    "assignment": [
      {
        "index": 1,
        "config": {
          "allocation": 200,
          "assignment-type": "OPTICAL_CHANNEL",
          "description": "Optical channel assigned a",
          "optical-channel": "0/0-OpticalChannel0/0/0/19"
        }
      }
    ]
  },
  "index": 204,
  "config": {
    "admin-state": "ENABLED",
    "description": "Logical channel 204",
    "logical-channel-type": "PROT_OTN",
    "loopback-mode": "NONE"
  },
  "otn": {
    "config": {
      "tti-msg-transmit": "test2",
      "tti-msg-expected": "test2"
    }
  },
  "logical-channel-assignments": {
    "assignment": [
      {
        "index": 1,
        "config": {
          "allocation": 200,
          "assignment-type": "OPTICAL_CHANNEL",
          "description": "Optical channel assigned a"
```
"optical-channel": "0/0-OpticalChannel0/0/0/20"
}
}
}
}
{
"index": 205,
"config": {
"rate-class": "TRIB_RATE_100G",
"admin-state": "ENABLED",
"description": "Logical channel 205",
"trib-protocol": "PROT_100G_MLG",
"logical-channel-type": "PROTETHERNET",
"loopback-mode": "NONE"
},
"ingress": {
"config": {
"transceiver": "0/0-Optics0/0/0/17"
}
},
"logical-channel-assignments": {
"assignment": [
{
"index": 1,
"config": {
"allocation": 100,
"assignment-type": "LOGICAL_CHANNEL",
"description": "Logical channel assigned 204",
"logical-channel": 204
}
}
]

"index": 206,
"config": {
"rate-class": "TRIB_RATE_100G",
"admin-state": "ENABLED",
"description": "Logical channel 206",
"trib-protocol": "PROT_100G_MLG",
"logical-channel-type": "PROTETHERNET",
"loopback-mode": "NONE"
},
"ingress": {
"config": {
"transceiver": "0/0-Optics0/0/0/18"
}
},
"logical-channel-assignments": {
"assignment": [
{
"index": 1,
"config": {
"allocation": 100,
"assignment-type": "LOGICAL_CHANNEL",
"description": "Logical channel assigned 204",
"logical-channel": 204
}
}
]
}
}
},
"openconfig-platform:components": {
"component": {
"name": "0/0-OpticalChannel0/0/0/19",
"openconfig-terminal-device:optical-channel": {
"config": {
Sample configuration for mixed mode configuration

Sample .json file:

```json
{
  "openconfig-interfaces:interfaces": {
    "interface": {
      "name": "Optics0/0/0/5",
      "config": {
        "name": "Optics0/0/0/5",
        "type": "iana-if-type:opticalChannel",
        "enabled": true
      }
    },
    "name": "Optics0/0/0/6",
    "config": {
      "name": "Optics0/0/0/6",
      "type": "iana-if-type:opticalChannel",
      "enabled": true
    },
    "name": "Optics0/0/0/12",
    "config": {
      "name": "Optics0/0/0/12",
      "type": "iana-if-type:opticalChannel",
      "enabled": true
    },
    "name": "Optics0/0/0/13",
    "config": {
      "name": "Optics0/0/0/13",
      "type": "iana-if-type:opticalChannel",
      "enabled": true
    },
    "name": "Optics0/0/0/19",
    "config": {
      "name": "Optics0/0/0/19",
      "type": "iana-if-type:opticalChannel",
      "enabled": true
    },
    "name": "Optics0/0/0/20",
    "config": {
      "name": "Optics0/0/0/20",
      "type": "iana-if-type:opticalChannel",
      "enabled": true
    }
  }
}
```
"enabled": true
},
{
"name": "Optics0/0/0/26",
"config": {
"name": "Optics0/0/0/26",
"type": "iana-if-type:opticalChannel",
"enabled": true
}
},
{
"name": "Optics0/0/0/27",
"config": {
"name": "Optics0/0/0/27",
"type": "iana-if-type:opticalChannel",
"enabled": true
}
}
],
"openconfig-platform:components": {
"component": [
{
"name": "0/0-OpticalChannel0/0/0/19",
"openconfig-terminal-device:optical-channel": {
"config": {
"target-output-power": -100,
"frequency": 192700000,
"line-port": "0/0-Optics0/0/0/19",
"operational-mode": 1
}
}
},
{
"name": "0/0-OpticalChannel0/0/0/20",
"openconfig-terminal-device:optical-channel": {
"config": {
"target-output-power": -100,
"frequency": 192700000,
"line-port": "0/0-Optics0/0/0/20",
"operational-mode": 1
}
}
}
],
"openconfig-terminal-device:terminal-device": {
"logical-channels": {
"channel": [
{
"index": 1001,
"config": {
"rate-class": "TRIB_RATE_100G",
"admin-state": "ENABLED",
"description": "Logical channel 1001",
"trib-protocol": "PROT_100G_MLG",
"logical-channel-type": "PROT_ETHERNET"
},
"ingress": {
"config": {
"transceiver": "0/0-Optics0/0/0/14"
}
},
"logical-channel-assignments": {
"assignment": [
{
"index": 1,
"config": {
"allocation": 100,
"assignment-type": "LOGICAL_CHANNEL",
"description": "Logical channel assigned 1003",
"logical-channel": 1003
}
]
}
"index": 1003,
"config": {
  "admin-state": "ENABLED",
  "description": "Logical channel 1003",
  "logical-channel-type": "PROT_OTN"
},
"logical-channel-assignments": {
  "assignment": [
    {
      "index": 1,
      "config": {
        "allocation": 200,
        "assignment-type": "OPTICAL_CHANNEL",
        "description": "Optical channel assigned a",
        "optical-channel": "0/0-OpticalChannel0/0/0/19"
      }
    }
  ]
},
"index": 1004,
"config": {
  "admin-state": "ENABLED",
  "description": "Logical channel 1004",
  "logical-channel-type": "PROT_OTN"
},
"otn": {
  "config": {
    "tti-msg-transmit": "abcd",
    "tti-msg-expected": "abcd"
  }
},
"logical-channel-assignments": {
  "assignment": [
    {
      "index": 1,
      "config": {
        "allocation": 200,
        "assignment-type": "OPTICAL_CHANNEL",
        "description": "Optical channel assigned a",
        "optical-channel": "0/0-OpticalChannel0/0/0/20"
      }
    }
  ]
},
"index": 1005,
"config": {
  "rate-class": "TRIB_RATE_100G",
  "admin-state": "ENABLED",
  "description": "Logical channel 1005",
  "trib-protocol": "PROT_100G_MLG",
  "logical-channel-type": "PROTETHERNET"
},
"ingress": {
  "config": {
    "transceiver": "0/0-Optics0/0/0/15"
  }
},
"logical-channel-assignments": {
  "assignment": [
    {
      "index": 1,
      "config": {

"allocation": 100,
"assignment-type": "LOGICAL_CHANNEL",
"description": "Logical channel assigned 1003",
"logical-channel": 1003
}
}
}
}

"index": 1013,
"config": {
"rate-class": "TRIB_RATE_10G",
"admin-state": "ENABLED",
"description": "Logical channel 1013",
"trib-protocol": "PROT_10GE_LAN",
"logical-channel-type": "PROT_ETHERNET"
},
"ingress": {
"config": {
"transceiver": "0/0-Optics0/0/0/17",
"physical-channel": [1]
}
}
"logical-channel-assignments": {
"assignment": [

"index": 1,
"config": {
"allocation": 10,
"assignment-type": "LOGICAL_CHANNEL",
"description": "Logical channel assigned 1004",
"logical-channel": 1004
}
]
}

"index": 1014,
"config": {
"rate-class": "TRIB_RATE_10G",
"admin-state": "ENABLED",
"description": "Logical channel 1014",
"trib-protocol": "PROT_10GE_LAN",
"logical-channel-type": "PROT_ETHERNET"
},
"ingress": {
"config": {
"transceiver": "0/0-Optics0/0/0/17",
"physical-channel": [2]
}
}
"logical-channel-assignments": {
"assignment": [

"index": 1,
"config": {
"allocation": 10,
"assignment-type": "LOGICAL_CHANNEL",
"description": "Logical channel assigned 1004",
"logical-channel": 1004
}
]
}

"index": 1015,
"config": {
  "rate-class": "TRIB_RATE_10G",
  "admin-state": "ENABLED",
  "description": "Logical channel 1015",
  "trib-protocol": "PROT_10GE_LAN",
  "logical-channel-type": "PROT_ETHERNET"
},
"ingress": {
  "config": {
    "transceiver": "0/0-Optics0/0/0/17",
    "physical-channel": [3]
  }
},
"logical-channel-assignments": {
  "assignment": [
    {
      "index": 1,
      "config": {
        "allocation": 10,
        "assignment-type": "LOGICAL_CHANNEL",
        "description": "Logical channel assigned 1004",
        "logical-channel": 1004
      }
    }
  ]
},
"index": 1016,
"config": {
  "rate-class": "TRIB_RATE_10G",
  "admin-state": "ENABLED",
  "description": "Logical channel 1016",
  "trib-protocol": "PROT_10GE_LAN",
  "logical-channel-type": "PROT_ETHERNET"
},
"ingress": {
  "config": {
    "transceiver": "0/0-Optics0/0/0/17",
    "physical-channel": [4]
  }
},
"logical-channel-assignments": {
  "assignment": [
    {
      "index": 1,
      "config": {
        "allocation": 10,
        "assignment-type": "LOGICAL_CHANNEL",
        "description": "Logical channel assigned 1004",
        "logical-channel": 1004
      }
    }
  ]
},
"index": 1017,
"config": {
  "rate-class": "TRIB_RATE_10G",
  "admin-state": "ENABLED",
  "description": "Logical channel 1017",
  "trib-protocol": "PROT_10GE_LAN",
  "logical-channel-type": "PROT_ETHERNET"
},
"ingress": {
  "config": {
    "transceiver": "0/0-Optics0/0/0/18",
    "physical-channel": [
Sample Configuration

Data Models Configuration Guide for Cisco NCS 1002

---

```json
1,
}
}
"logical-channel-assignments": {
"assignment": [
{
"index": 1,
"config": {
"allocation": 10,
"assignment-type": "LOGICAL_CHANNEL",
"description": "Logical channel assigned 1004",
"logical-channel": 1004
}
}
}
},
"index": 1018,
"config": {
"rate-class": "TRIB_RATE_10G",
"admin-state": "ENABLED",
"description": "Logical channel 1018",
"trib-protocol": "PROT_10GE_LAN",
"logical-channel-type": "PROT_ETHERNET"
},
"ingress": {
"config": {
"transceiver": "0/0-Optics0/0/0/18",
"physical-channel": [2]
}
},
"logical-channel-assignments": {
"assignment": [
{
"index": 1,
"config": {
"allocation": 10,
"assignment-type": "LOGICAL_CHANNEL",
"description": "Logical channel assigned 1004",
"logical-channel": 1004
}
}
}
},
"index": 1019,
"config": {
"rate-class": "TRIB_RATE_10G",
"admin-state": "ENABLED",
"description": "Logical channel 1019",
"trib-protocol": "PROT_10GE_LAN",
"logical-channel-type": "PROT_ETHERNET"
},
"ingress": {
"config": {
"transceiver": "0/0-Optics0/0/0/18",
"physical-channel": [3]
}
},
"logical-channel-assignments": {
"assignment": [
{
"index": 1,
"config": {
"allocation": 10,
"assignment-type": "LOGICAL_CHANNEL",
"description": "Logical channel assigned 1004",
"logical-channel": 1004
}
}
}
}
```
"description": "Logical channel assigned 1004",
"logical-channel": 1004
}
]

"index": 1007,
"config": {
"rate-class": "TRIB_RATE_100G",
"admin-state": "ENABLED",
"description": "Logical channel 1004",
"trib-protocol": "PROT_100G_MLG",
"logical-channel-type": "PROT_ETHERNET"
},
"ingress": {
"config": {
"transceiver": "0/0-Optics0/0/0/16",
"physical-channel": [
4
]
}
},
"logical-channel-assignments": {
"assignment": [
{
"index": 1,
"config": {
"allocation": 100,
"assignment-type": "LOGICAL_CHANNEL",
"description": "Logical channel assigned 1004",
"logical-channel": 1004
}
]
}
}
## Verifying Terminal-device Configuration

Use the following commands to verify that you have correctly configured terminal-device configuration for Cisco NCS1002.

To view the configuration layout of channels, use the following command:

```
Router#show terminal-device layout
```

<table>
<thead>
<tr>
<th>Slice Id</th>
<th>Status</th>
<th>Client Bitrate</th>
<th>Line Bitrate</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Config Accepted</td>
<td>100G</td>
<td>200G</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Logical Channel</th>
<th>Optical Channel</th>
<th>Line Bitrate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet</td>
<td>(Coherent)</td>
<td></td>
</tr>
<tr>
<td>Optics0/0/0/0</td>
<td>2001</td>
<td>200G</td>
</tr>
<tr>
<td>Optics0/0/0/1</td>
<td>2005</td>
<td>2005</td>
</tr>
<tr>
<td>Optics0/0/0/3</td>
<td>2006</td>
<td>2006</td>
</tr>
<tr>
<td>Optics0/0/0/4</td>
<td>2002</td>
<td>2002</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Logical Channel</th>
<th>Optical Channel</th>
<th>Line Bitrate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet</td>
<td>(Coherent)</td>
<td></td>
</tr>
<tr>
<td>Optics0/0/0/21</td>
<td>4001</td>
<td>4001</td>
</tr>
<tr>
<td>Optics0/0/0/22</td>
<td>4005</td>
<td>4005</td>
</tr>
<tr>
<td>Optics0/0/0/24</td>
<td>4006</td>
<td>4006</td>
</tr>
<tr>
<td>Optics0/0/0/25</td>
<td>4002</td>
<td>4002</td>
</tr>
</tbody>
</table>

To view the logical channel information, use the following command:

```
Router#show terminal-device logical-channel number 2001
```

```
Logical Channel Index: 2001
Name: HundredGigECtrlr0/0/0/0
Admin-State: Enable
Loopback-Mode: None
Type of Logical Channel: Logical Level 1
Trib-Rate: 100G tributary signal rate
Trib-Protocol: 100G MLG protocol
Protocol-Type: Ethernet protocol framing
Ingress Client Port: Optics0/0/0/0
Ingress Physical Channel: 0
Logical Assignment Index: 1
Logical Assignment Name: NA
Logical Channel: 2003
Optical Channel: NA
Allocation: 100G
Assignment Type: Logical
```

To view all the logical channels information, use the following command:

```
Router#show terminal-device logical-channel all
```

```
Logical Channel Index: 2001
Name: HundredGigECtrlr0/0/0/0
Admin-State: Enable
Loopback-Mode: None
Type of Logical Channel: Logical Level 1
Trib-Rate: 100G tributary signal rate
Trib-Protocol: 100G MLG protocol
Protocol-Type: Ethernet protocol framing
Ingress Client Port: Optics0/0/0/0
Ingress Physical Channel: 0
Logical Assignment Index: 1
Logical Assignment Name: NA
Logical Channel: 2003
```
| Logical Channel Index | Name | Admin-State | Loopback-Mode | Type of Logical Channel | Trib-Rate | Trib-Protocol | Protocol-Type | Ingress Client Port | Ingress Physical Channel | Logical Assignment Index | Logical Assignment Name | Logical Channel | Optical Channel | Allocation | Assignment Type | Type of Logical Channel | Trib-Rate | Trib-Protocol | Protocol-Type | Ingress Client Port | Ingress Physical Channel | Logical Assignment Index | Logical Assignment Name | Logical Channel |
|-----------------------|------|-------------|---------------|--------------------------|-----------|--------------|--------------|-------------------|----------------------|------------------------|------------------------|------------------------|----------------|----------------|-----------|----------------|--------------------------|-----------|--------------|--------------|-------------------|----------------------|------------------------|------------------------|----------------|
| 2002                  | HundredGigECtrlr0/0/0/4 | Enable       | None          | Logical Level 1          | 100G tributary signal rate | 100G MLG protocol | Ethernet protocol framing | Optics0/0/0/4 | 0                     | 1                      | NA                    | NA | NA | 100G         | Logical               | Logical Level 1 | 100G tributary signal rate | 100G MLG protocol | Optics0/0/0/4 | 0                     | 1                      | NA                    | NA | NA |
| 2003                  | CoherentDSP0/0/0/5       | Enable       | None          | Logical Level 2          | Unknown tributary signal rate | Unknown protocol | OTN protocol framing | NA | 0                     | 1                      | NA                    | NA | NA | Unknown tributary signal rate | Unknown protocol | Unknown protocol | OTN protocol framing | NA | NA | 1                      | NA                    | NA | NA |
| 2004                  | CoherentDSP0/0/0/6       | Enable       | None          | Logical Level 2          | Unknown tributary signal rate | Unknown protocol | OTN protocol framing | NA | 0                     | 1                      | NA                    | NA | NA | Unknown tributary signal rate | Unknown protocol | Unknown protocol | OTN protocol framing | NA | NA | 1                      | NA                    | NA | NA |
| 2005                  | HundredGigECtrlr0/0/0/1  | Enable       | None          | Logical Level 1          | 100G tributary signal rate | 100G MLG protocol | Ethernet protocol framing | Optics0/0/0/1 | 0                     | 1                      | NA                    | NA | NA | 2003         | NA | NA | 2003         | NA | NA | NA | NA | NA | NA | NA | NA |

Optical Channel: NA
Allocation: 100G
Assignment Type: Logical

Optical Channel: NA
Allocation: 100G
Assignment Type: Logical

Optical Channel: NA
Allocation: 200G
Assignment Type: Optical

Optical Channel: NA
Allocation: 200G
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Allocation: 200G
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Optical Channel: NA
Allocation: 200G
Assignment Type: Optical

Optical Channel: NA
Allocation: 200G
Assignment Type: Optical
Allocation: 100G
Assignment Type: Logical

Logical Channel Index: 2006
Name: HundredGigECtrlr0/0/0/3
Admin-State: Enable
Loopback-Mode: None
Type of Logical Channel: Logical Level 1
Trib-Rate: 100G tributary signal rate
Trib-Protocol: 100G MLG protocol
Protocol-Type: Ethernet protocol framing
Ingress Client Port: Optics0/0/0/3
Ingress Physical Channel: 0
Logical Assignment Index: 1
Logical Assignment Name: NA
Logical Channel: 2004
Optical Channel: NA
Allocation: 100G
Assignment Type: Logical

Logical Channel Index: 4001
Name: HundredGigECtrlr0/0/0/21
Admin-State: Enable
Loopback-Mode: None
Type of Logical Channel: Logical Level 1
Trib-Rate: 100G tributary signal rate
Trib-Protocol: 100G MLG protocol
Protocol-Type: Ethernet protocol framing
Ingress Client Port: Optics0/0/0/21
Ingress Physical Channel: 0
Logical Assignment Index: 1
Logical Assignment Name: NA
Logical Channel: 4003
Optical Channel: NA
Allocation: 100G
Assignment Type: Logical

Logical Channel Index: 4002
Name: HundredGigECtrlr0/0/0/25
Admin-State: Enable
Loopback-Mode: None
Type of Logical Channel: Logical Level 1
Trib-Rate: 100G tributary signal rate
Trib-Protocol: 100G MLG protocol
Protocol-Type: Ethernet protocol framing
Ingress Client Port: Optics0/0/0/25
Ingress Physical Channel: 0
Logical Assignment Index: 1
Logical Assignment Name: NA
Logical Channel: 4004
Optical Channel: NA
Allocation: 100G
Assignment Type: Logical

Logical Channel Index: 4003
Name: CoherentDSP0/0/0/26
Admin-State: Enable
Loopback-Mode: None
Type of Logical Channel: Logical Level 2
Trib-Rate: Unknown tributary signal rate
Trib-Protocol: Unknown protocol
Protocol-Type: OTN protocol framing
Ingress Client Port: NA
Ingress Physical Channel: 0
TTI Transmit: NA
TTI Expected: NA
Logical Assignment Index: 1
Logical Assignment Name: NA
Logical Channel: 0
Optical Channel: 0_0-OpticalChannel0_0_0_26
Allocation: 200G
Assignment Type: Optical
Logical Channel Index: 4004
Name: CoherentDSP0/0/0/27
Admin-State: Enable
Loopback-Mode: None
Type of Logical Channel: Logical Level 2
Trib-Rate: Unknown tributary signal rate
Trib-Protocol: Unknown protocol
Protocol-Type: OTN protocol framing
Ingress Client Port: NA
Ingress Physical Channel: 0
TTI Transmit: NA
TTI Expected: NA
Logical Assignment Index: 1
Logical Assignment Name: NA
Logical Channel: 0
Optical Channel: 0_0-OpticalChannel0_0_0_27
Allocation: 280G
Assignment Type: Optical

Logical Channel Index: 4005
Name: HundredGigECtrlr0/0/0/22
Admin-State: Enable
Loopback-Mode: None
Type of Logical Channel: Logical Level 1
Trib-Rate: 100G tributary signal rate
Trib-Protocol: 100G MLG protocol
Protocol-Type: Ethernet protocol framing
Ingress Client Port: Optics0/0/0/22
Ingress Physical Channel: 0
Logical Assignment Index: 1
Logical Assignment Name: NA
Logical Channel: 4003
Optical Channel: NA
Allocation: 100G
Assignment Type: Logical

Logical Channel Index: 4006
Name: HundredGigECtrlr0/0/0/24
Admin-State: Enable
Loopback-Mode: None
Type of Logical Channel: Logical Level 1
Trib-Rate: 100G tributary signal rate
Trib-Protocol: 100G MLG protocol
Protocol-Type: Ethernet protocol framing
Ingress Client Port: Optics0/0/0/24
Ingress Physical Channel: 0
Logical Assignment Index: 1
Logical Assignment Name: NA
Logical Channel: 4004
Optical Channel: NA
Allocation: 100G
Assignment Type: Logical

To view specific optical channel details, use the following command:

Router#show terminal-device optical-channel name 0_0-OpticalChannel0_0_0_5
Optical Channel Name: 0_0-OpticalChannel0_0_0_5
Index: 0
Frequency: 0
Power: 0
Operational Mode: 7
Line Port: Optics0/0/0/5

To view all the optical channels details, use the following command:

Router#show terminal-device optical-channel all
Optical Channel Name: 0_0-OpticalChannel0_0_0_26
Index: 0
Frequency: 0
Power: 0
Operational Mode: 7
Line Port: Optics0/0/0/26
Migrating CLI to Terminal-device Configuration

Cisco NCS1002 supports migration from CLI to OC configuration only, vice-versa is not supported. The transition from CLI to terminal-device must be done via merge-config operation in gRPC.

To migrate from CLI configuration to the terminal-device configuration, perform the following:

**Step 1**
Enable the transition from CLI configuration to the terminal-device configuration, using the following command:

```
terminal-device transition cli-to-yang enable
```

**Step 2**
You must configure a slice using the CLI configuration command. For more details, see Configure the Slice.

**Note**
Do not use all keyword to configure all slices, instead you must configure each slice individually.

**Note**
Configure the trunk port frequencies with 100MHz spacing as after the migration to OC Models only 100MHz spacing is supported.

**Note**
Ignore this step if you are migrating a configured slice. You cannot change the slice configuration while performing migration. For example, if you have configured 100G to 200 G traffic on a slice using CLI, then you can perform OC configuration for the same 100G to 200G slice configuration.

**Step 3**
Apply OC configuration using Netconf or gRPC. For more details, see Configuring Cisco NCS1002 Using Terminal-device Model, on page 5.

**Step 4**
Remove the slice configuration for the migrated slice. This configuration does not impact the traffic as OC configuration is already applied.

To disable the transition from CLI configuration to the terminal-device configuration, use the following command:

```
terminal-device transition cli-to-yang disable
```
terminal-device transition cli-to-yang disable