OpenConfig Support for NCS1K4-QXP-K9 Card

The NCS1K4-QXP-K9 card is a single slot line card that is equipped with 16 QSFPDD ports. This chapter briefs the detail configurations, client and trunk optics, supported OpenConfig models for the NCS1K4-QXP-K9 card.

Overview

The NCS1K4-QXP-K9 card is a single slot line card and it is equipped with 16 QSFPDD ports. You can configure eight QSFPDD ports as trunk and eight QSFPDD parts as client.

The NCS1K4-QXP-K9 card supports both transponder (TXP) and muxponder(MXP) configuration and they can coexist on the same line card. The NCS1K4-QXP-K9 card is operational by default and there is no need to configure the line card mode for the card.

Supported Operational modes, Optics, and OpenConfig Models

The NCS1K4-QXP-K9 card supports the following Operating modes, client and trunk optics, and OpenConfig models:

Operational Modes

The following table provides information for Operational modess, related modulation, and FEC:

Operational Modes	Modulation	FEC
400GE TXP	16QAM	CFEC and OFEC
4x100GE MXP	16QAM	CFEC and OFEC
3X100GE MXP	8QAM	OFEC
2X100GE MXP	QPSK	OFEC

Operational Modes	Modulation	FEC
100GE TXP	QPSK	OFEC

Client Optics

The following table provides information for PIDs, and its related payloads:

PID	Payload	Description
QDD-400G-FR4-S	400GE	The combination can be of 4x100GE, 3x100GE, and 2x100GE
QDD-400G-DR4-S	400GE and 100GE	
QDD-400G-AOC	400GE	
QDD-4X100G-LR-S	400GE and 100GE	
QSFP28-DR-S, QSFP28-FR-S, QSFP28-LR4, and QSFP28-LR-S	100GE	For 100G TXP

Note The 400G-DR4-S can be interoperable with QSFP28-DR-S and QSFP28 FR-S 100GE optics and the 4x100G-LR-S can be interoperable with QSFP28-DR-S and QSFP28 FR-S 100GE optics.

Trunk Optics

The following table provides information for PIDs, its related payloads, trunk ports, and inventory details:

PID	Payload	Trunk Port Number	Inventory Details
QDD-400G-ZRP-S	400G, 300G, 200G, and 100G	0, 2, 4, 6, 8, and 10	NAME: "0/0-Optics0/0/0/0", DESCR: "Cisco QSFP DD 400G ZRP Pluggable Optics Module" PID: QDD-400G-ZRP-S , VID: V01, SN: ACA25220033

OpenConfig Models

The NCS1K4-QXP-K9 card supports the following OpenConfig models:

Table 1: Supported OC Models

Model	Feature
openconfig-platform.yang	Inventory
openconfig-platform-transceiver.yang	Pluggable Inventory and Operational Data

Model	Feature
openconfig-terminal-device.yang	Logical and Optical Channels – Datapath and OperData
openconfig-interface.yang	Optical Interface Enable/Disable (shut/no-shut)

Client Configuration Details

The following table explains the different commands that are used for 100G and 400GE client ports.

Table 2: Configuration Details for 100G and 400GE Client Ports

Client Port	Logical Channel	Coherent DSP	Optical Channel
100G	"index":101, "rate-class": "openconfig-transport-types: TRIB_RATE_100G", "description": "Client Logical Channel", "admin-state":"ENABLED", "loopback-mode":"NONE", "trib-protocol": "openconfig-transport-types: PROT_100G_MLG", "logical-channel-type": "openconfig-transport-types: PROT_ETHERNET"	"index": 212, "config": { "index": 212, "admin-state": "ENABLED", "loopback-mode": "NONE", "description": "Coherent DSP", "rate-class": "openconfig-transport-types: TRIB_RATE_400G", "logical-channel-type": "openconfig-transport-types: PROT_OTN"	"name": "0/1-OpticalChannel0/1/0/12", "openconfig-terminal-device: optical-channel": {"config": {"frequency": "193100000", "target-output-power": -700,"operational-mode": 4178, "line-port": "0/1-Optics0/1/0/12"
400GE	"index": 101, "rate-class": "openconfig-transport-types: TRIB_RATE_400G", "description": "Client Logical Channel","admin-state": "ENABLED","loopback-mode": "NONE","trib-protocol": "openconfig-transport-types: PROT_400GE", "logical-channel-type": "openconfig-transport-types: PROT_ETHERNET"	"index":212, "config": { "index": 212, "admin-state": "ENABLED", "loopback-mode": "NONE","description": "Coherent DSP", "rate-class": "openconfig-transport-types: TRIB_RATE_400G", "logical-channel-type": "openconfig-transport-types: PROT_OTN"	"name": "0/1-OpticalChannel0/1/0/12", "openconfig-terminal-device: optical-channel": { "config": { "frequency": "193100000", "target-output-power": -700,"operational-mode": 4178,"line-port": "0/1-Optics0/1/0/12"

Sample Configurations

Configuring 400 TXP (Client 1 and Slice 0)


```
{
   "openconfig-terminal-device:terminal-device":{
      "logical-channels":{
         "channel":[
            {
               "index":101,
               "config":{
                  "index":101,
                  "rate-class":"openconfig-transport-types:TRIB_RATE_400G",
                  "admin-state":"ENABLED",
                  "description":"Client Logical Channel",
                  "trib-protocol":"openconfig-transport-types:PROT_400GE",
                  "logical-channel-type":"openconfig-transport-types:PROT_ETHERNET"
               },
               "ingress":{
                  "config":{
                     "transceiver":"0/0-Optics0/0/0/1",
                     "physical-channel":[
                        1
                     ]
                  }
               },
               "logical-channel-assignments":{
                  "assignment":[
                     {
                        "index":1,
                        "config":{
                           "index":1,
                           "allocation":"400",
                           "assignment-type":"LOGICAL_CHANNEL",
                           "description":"logical to logical assignemnt",
                           "logical-channel":110
                        }
                     }
                  ]
               }
            },
            {
               "index":110,
               "config":{
                  "index":110,
                  "rate-class":"openconfig-transport-types:TRIB_RATE_400G",
                  "admin-state":"ENABLED",
                  "description":"Coherent DSP",
                  "logical-channel-type":"openconfig-transport-types:PROT_OTN"
               },
               "logical-channel-assignments":{
                  "assignment":[
                     {
                        "index":1,
                        "config":{
                           "index":1,
                           "allocation":"400",
                           "assignment-type":"OPTICAL_CHANNEL",
                           "description":"logical to optical",
                           "optical-channel":"0/0-OpticalChannel0/0/0/0"
                        }
```

```
                    }
                ]
            }
        }
    ]
  }
 },
 "openconfig-platform:components":{
    "component":[
       {
          "name":"0/0-OpticalChannel0/0/0/0",
          "openconfig-terminal-device:optical-channel":{
             "config":{
                "line-port":"0/0-Optics0/0/0/0"
             }
          }
       }
    ]
 }
}
```

Configuring 4x100G MXP (Client 1 and Slice 0)

```
{
   "openconfig-terminal-device:terminal-device":{
      "logical-channels":{
         "channel":[
            {
               "index":101,
               "config":{
                  "index":101,
                  "rate-class":"openconfig-transport-types:TRIB_RATE_100G",
                  "admin-state":"ENABLED",
                  "description":"Client Logical Channel",
                  "trib-protocol":"openconfig-transport-types:PROT_100GE",
                  "logical-channel-type":"openconfig-transport-types:PROT_ETHERNET"
               },
               "ingress":{
                  "config":{
                     "transceiver":"0/0-Optics0/0/0/1",
                     "physical-channel":[
                        1
                     ]
                  }
               },
               "logical-channel-assignments":{
                  "assignment":[
                     {
                        "index":1,
                        "config":{
                           "index":1,
                           "allocation":"100",
                           "assignment-type":"LOGICAL_CHANNEL",
                           "description":"logical to logical assignemnt",
                           "logical-channel":110
                        }
                     }
                  ]
               }
            },
            {
               "index":102,
               "config":{
                  "index":102,
```

```
            "rate-class":"openconfig-transport-types:TRIB_RATE_100G",
            "admin-state":"ENABLED",
            "description":"Client Logical Channel",
            "trib-protocol":"openconfig-transport-types:PROT_100GE",
            "logical-channel-type":"openconfig-transport-types:PROT_ETHERNET"
         },
         "ingress":{
            "config":{
               "transceiver":"0/0-Optics0/0/0/1",
               "physical-channel":[
                  2
               ]
            }
         },
         "logical-channel-assignments":{
            "assignment":[
               {
                  "index":1,
                  "config":{
                     "index":1,
                     "allocation":"100",
                     "assignment-type":"LOGICAL_CHANNEL",
                     "description":"logical to logical assignemnt",
                     "logical-channel":110
                  }
               }
            ]
         }
      },
      {
         "index":103,
         "config":{
            "index":103,
            "rate-class":"openconfig-transport-types:TRIB_RATE_100G",
            "admin-state":"ENABLED",
            "description":"Client Logical Channel",
            "trib-protocol":"openconfig-transport-types:PROT_100GE",
            "logical-channel-type":"openconfig-transport-types:PROT_ETHERNET"
         },
         "ingress":{
            "config":{
               "transceiver":"0/0-Optics0/0/0/1",
               "physical-channel":[
                  3
               ]
            }
         },
         "logical-channel-assignments":{
            "assignment":[
               {
                  "index":1,
                  "config":{
                     "index":1,
                     "allocation":"100",
                     "assignment-type":"LOGICAL_CHANNEL",
                     "description":"logical to logical assignemnt",
                     "logical-channel":110
                  }
               }
            ]
         }
      },
      {
         "index":104,
```

```
                "config":{
                   "index":104,
                   "rate-class":"openconfig-transport-types:TRIB_RATE_100G",
                   "admin-state":"ENABLED",
                   "description":"Client Logical Channel",
                   "trib-protocol":"openconfig-transport-types:PROT_100GE",
                   "logical-channel-type":"openconfig-transport-types:PROT_ETHERNET"
                },
                "ingress":{
                   "config":{
                      "transceiver":"0/0-Optics0/0/0/1",
                      "physical-channel":[
                         4
                      ]
                   }
                },
                "logical-channel-assignments":{
                   "assignment":[
                      {
                         "index":1,
                         "config":{
                            "index":1,
                            "allocation":"100",
                            "assignment-type":"LOGICAL_CHANNEL",
                            "description":"logical to logical assignemnt",
                            "logical-channel":110
                         }
                      }
                   ]
                }
             },
             {
                "index":110,
                "config":{
                   "index":110,
                   "rate-class":"openconfig-transport-types:TRIB_RATE_400G",
                   "admin-state":"ENABLED",
                   "description":"Coherent DSP",
                   "logical-channel-type":"openconfig-transport-types:PROT_OTN"
                },
                "logical-channel-assignments":{
                   "assignment":[
                      {
                         "index":1,
                         "config":{
                            "index":1,
                            "allocation":"400",
                            "assignment-type":"OPTICAL_CHANNEL",
                            "description":"logical to optical",
                            "optical-channel":"0/0-OpticalChannel0/0/0/0"
                         }
                      }
                   ]
                }
             }
          ]
       }
    },
    "openconfig-platform:components":{
       "component":[
          {
             "name":"0/0-OpticalChannel0/0/0/0",
             "openconfig-terminal-device:optical-channel":{
                "config":{
```

```
                    "line-port":"0/0-Optics0/0/0/0"
                }
            }
        }
    ]
  }
}
```

Configuring 400G TXP (Client 11 and Slice 5)

```
{
   "openconfig-terminal-device:terminal-device":{
      "logical-channels":{
         "channel":[
            {
               "index":1111,
               "config":{
                  "index":1111,
                  "rate-class":"openconfig-transport-types:TRIB_RATE_100G",
                  "admin-state":"ENABLED",
                  "loopback-mode":"NONE",
                  "description":"Client Logical Channel",
                  "trib-protocol":"openconfig-transport-types:PROT_100GE",
                  "logical-channel-type":"openconfig-transport-types:PROT_ETHERNET"
               },
               "ingress":{
                  "config":{
                     "transceiver":"0/0-Optics0/0/0/11"
                  }
               },
               "logical-channel-assignments":{
                  "assignment":[
                     {
                        "index":1,
                        "config":{
                           "index":1,
                           "allocation":"100",
                           "assignment-type":"LOGICAL_CHANNEL",
                           "description":"logical to logical assignemnt",
                           "logical-channel":1110
                        }
                     }
                  ]
               },
               "ethernet":{
                  "config":{
                     "client-als":"LASER_SHUTDOWN"
                  }
               }
            },
            {
               "index":1110,
               "config":{
                  "index":1110,
                  "rate-class":"openconfig-transport-types:TRIB_RATE_100G",
                  "admin-state":"ENABLED",
                  "loopback-mode":"NONE",
                  "description":"Coherent DSP",
                  "logical-channel-type":"openconfig-transport-types:PROT_OTN"
               },
               "logical-channel-assignments":{
                  "assignment":[
                     {
                        "index":1,
```

```
                        "config":{
                           "index":1,
                           "allocation":"100",
                           "assignment-type":"OPTICAL_CHANNEL",
                           "description":"logical to optical",
                           "optical-channel":"0/0-OpticalChannel0/0/0/10"
                        }
                     }
                  ]
               }
            }
         ]
      }
   },
   "openconfig-platform:components":{
      "component":[
         {
            "name":"0/0-OpticalChannel0/0/0/10",
            "openconfig-terminal-device:optical-channel":{
               "config":{
                  "line-port":"0/0-Optics0/0/0/10"
               }
            }
         }
      ]
   }
}
```