排除NCS上的接口关闭或抖动问题

目录

简介

本文档介绍如何对接口关闭或接口抖动问题进行故障排除。

本文档特定于Cisco IOS®XR，但不限于特定软件版本。

本文档针对NCS平台。

背景

接口关闭或接口抖动的原因有很多。链路可能会因多个设备而中断，如图1所示。它显示了一台NCS路由器，其中有一个前面板端口通过PHY（物理层）设备连接到NPU（网络处理器单元），位于两者之间（称为基于PHY的端口）。有些平台的前面板端口直接连接到NPU（称为PHYless端口）。单个路由器可以同时具有两种变体。

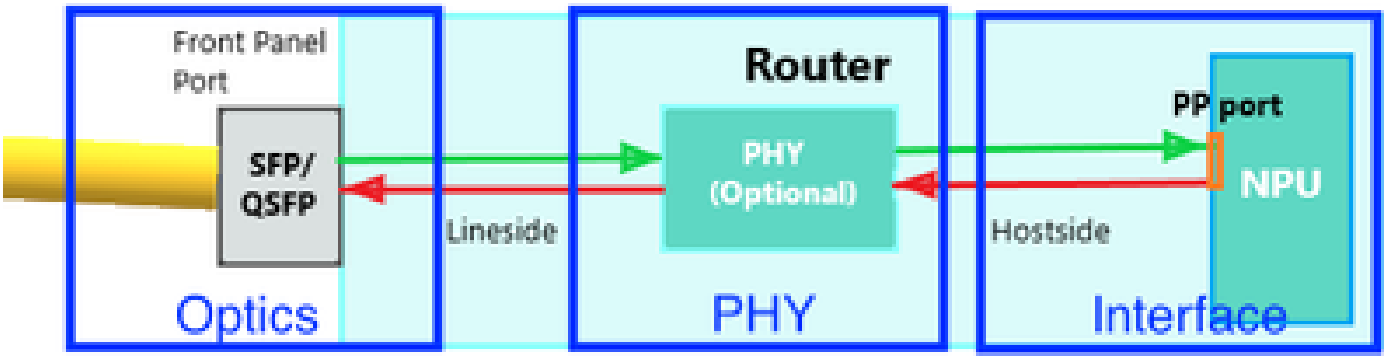

图1

光纤

接口

请注意，在Cisco IOS XR上，接口始终以这种方式描述。

R/S/I/P：机架/插槽/实例/端口/分支

R/S/I/P/B：机架/插槽/实例/端口/

端口速度

某些平台/线卡在某些端口上支持多种速度。示例包括：1/10GE、25/40GE、40/100GE、1/10/25GE。

可在每个端口或每组端口上配置速度。查看NCS上端口映射的硬件文档。检查端口速度是否设置正确。有些端口可以自动检测速度，有些端口需要配置。

有些端口可以按组配置（通常为四端口：四组）。

例如：

```
<#root>
(config)#
hw-module quad 0 location 0/0/CPU0 mode ?

  WORD  10g or 25g
```

某些端口可以单独配置。这通常是100G端口。100G是默认速度，但您可以配置40G。

例如：

```
<#root>
```

```
(config)#
controller optics 0/0/1/0

(config-Optics)#
speed 40g
```

故障信令机制

请注意，在排除接口故障时，链路故障信令机制可以发挥作用。在10G及更高版本上，PHY层中包含链路故障信令机制。因此，当检测到本地故障时，会通知远程端。

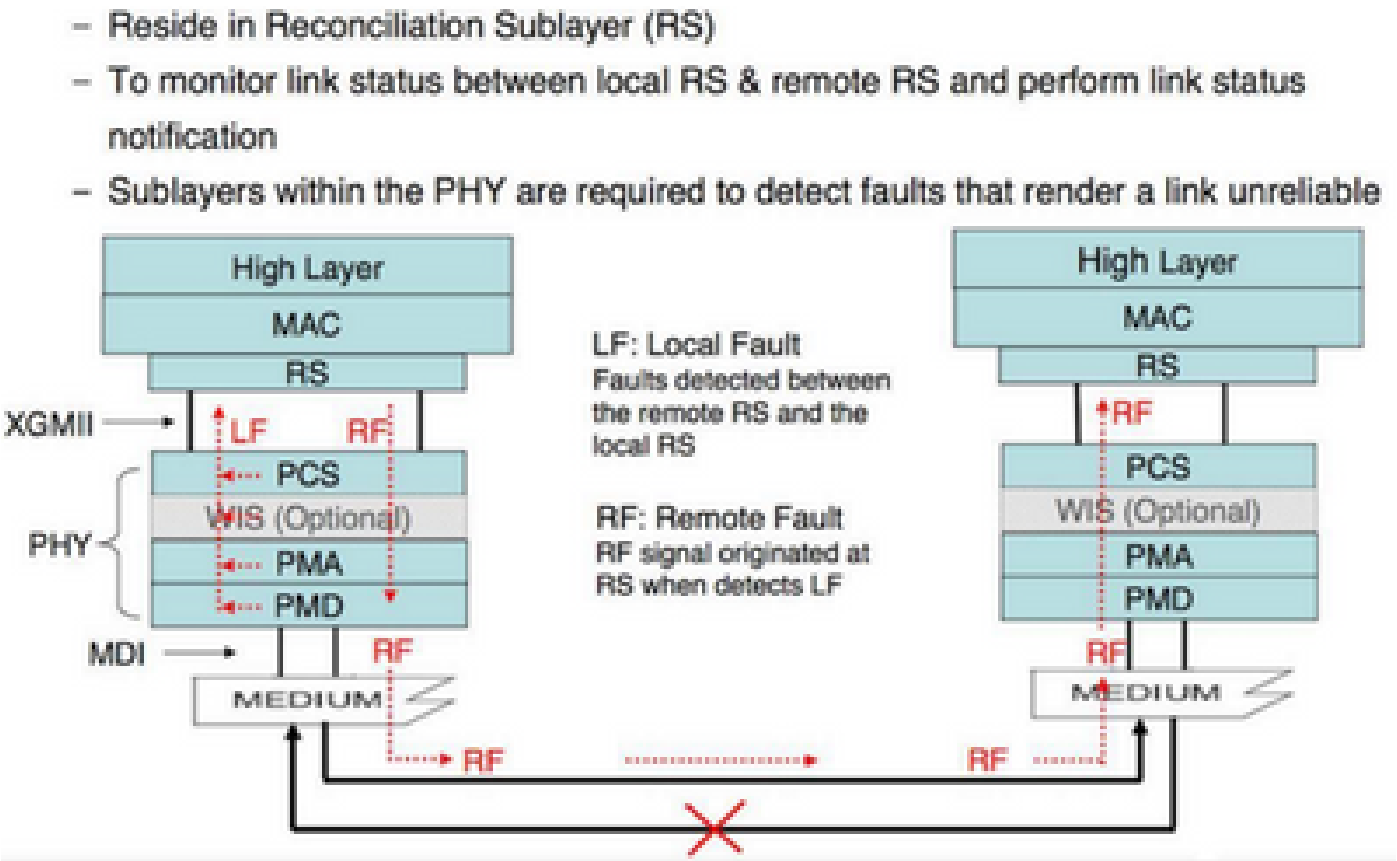

图2

在GigE接口上，没有这样的板载机制。检查是否将“ethernet oam”配置为备用模式。

例如：

```
interface GigabitEthernet0/6/0/2
 ethernet oam
  uni-directional link-fault detection
  action
   uni-directional link-fault efd
```

DWDM可调光纤

在支持频率调谐的DWDM光纤上，使用此配置设置可使用的频率（基于电路提供商设置的DWDM电路）：

请使用以下命令：

```
controller optics 0/6/0/2
 dwdm-carrier {100MHz-grid | 50GHz-grid} frequency {frequency}
```

验证设置：

<#root>

RP/0/RP0/CPU0:NCS-5508#

show controllers optics 0/6/0/2 dwdm-carrier-map

```
DWDM Carrier Band:: OPTICS_C_BAND
MSA ITU channel range supported: 1~96
DWDM Carrier Map table
-----------------------------------------------------
ITU Ch      G.694.1     Frequency     Wavelength
 Num        Ch Num        (THz)          (nm)
-----------------------------------------------------
     1       -35           191.35      1566.723
-----------------------------------------------------
     2       -34           191.40      1566.314
-----------------------------------------------------
     3       -33           191.45      1565.905
-----------------------------------------------------
     4       -32           191.50      1565.496
-----------------------------------------------------
...
-----------------------------------------------------
    95        59           196.05      1529.163
-----------------------------------------------------
    96        60           196.10      1528.773
-----------------------------------------------------
```

在DWDM光纤上，所有DWDM特定调谐均在控制器dwdm配置下完成：

<#root>

RP/0/RP0/CPU0:NCS-5508(config)#

controller dwdm 0/6/0/2 ?

```
  admin-state       Configure the transport admin state of the controller: in-service, out-of-service o
```

```
  g709              Configure G709 parameters
  laser             To be deprecated and removed in 7.5.1 release
  log               Proactive log
  loopback          Configure loopback mode
  network           Configure DWDM network information
  pm                Configure pm parameters
  proactive         Enable Proactive Protection Feature
  rx-los-threshold  Configure transponder receive power LOS threshold
  transmit-power    Configure transponder transmit power
  vtxp-monitor      Enable VTXP monitoring function
  wavelength        Configure ITU Channel, Wavelength and Frequency
  <cr>

RP/0/RP0/CPU0:NCS-5508(config-dwdm)#
```

g709 fec ?

```
  15sdfec                      15%-SD Forward Error Correction
  15sdfecde                    15%-SD Forward Error Correction with Diff
  ci-bch                       Continuously Interleaved BCH FEC
  disable                      Disable FEC
  enhanced                     Enhanced FEC mode
  high-gain                    To be deprecated and removed in 7.5.1 release
  high-gain-hd-fec             7% HD FEC (Staircase FEC)
  high-gain-multivendor-hd-fec  7% HD FEC (Staircase FEC) Multivendor Interoperable
  high-gain-sd-fec             7% CISCO SD FEC (Soft-Decision FEC)
  long-haul                    To be deprecated and removed in 7.5.1 release
  long-haul-hd-fec             20% HD FEC (Staircase FEC)
  long-haul-sd-fec             20% CISCO SD FEC (Soft-Decision FEC)
  standard                     Standard FEC mode
```

IPoDWDM — 相干DSP

相干DSP支持远距离高速率(100/200/400G)。DWDM处理由相干DSP（数字信号处理器）处理。

此类NCS模块的示例：NC55-6X200-DWDM-S或NC55-MPA-2TH-S（带CFP2-WDM-D-1HL）

<#root>

```
RP/0/RP0/CPU0:NCS-5508(config)#
```

controller coherentDSP 0/6/0/0

```
RP/0/RP0/CPU0:NCS-5508(config-CoDSP)#
```

fec ?

```
  CFEC                Forward Error Correction C_FEC
  EnhancedHG20        Forward Error Correction Enhanced_HG20
  EnhancedHG7         Forward Error Correction Enhanced_HG7
  EnhancedI4          Forward Error Correction Enhanced_I_4
  EnhancedI7          Forward Error Correction Enhanced_I_7
  EnhancedSD15        Forward Error Correction Soft-Decision 15
  EnhancedSD15DE      Forward Error Correction Soft-Decision 15 with DE
  EnhancedSD20        Forward Error Correction Soft-Decision 20
  EnhancedSD27        Forward Error Correction Soft-Decision 27
```

```
  EnhancedSD7          Forward Error Correction Soft-Decision 7
  EnhancedStaircaseDE  Forward Error Correction Enhanced Staircase FEC with DE
  EnhancedSwizzle      Forward Error Correction Enhanced_Swizzle
  OFEC                 Forward Error Correction O_FEC
  Standard             Forward Error Correction Standard
  none                 No Forward Error Correction
```

详细的故障排除

本节从光学角度介绍基本的调试/技术。

首先要检查的事项

检查资产中是否显示了光纤。如果光纤未显示，请检查光纤是否正确插入R/S/I/P以及电缆是否没有问题。

```
++++++++++ show inventory details [18:06:56.572 UTC Thu Apr 06 2023] ++++++++++

NAME: "0/RP0", DESCR: "NC55A1 24Q6H SS Route Processor Card"
PID: NCS-55A1-24Q6H-SS , VID: V01, SN: FOC2528002Q
MFG_NAME: Cisco Systems, Inc., SNMP_IDX: 1 , Type: Module
PN: 73-20057-02

NAME: "TenGigE0/0/0/0", DESCR: "Cisco SFP+ 10G ZR Pluggable Optics Module"
PID: SFP-10G-ZR , VID: V02, SN: BD211218N1T
MFG_NAME: CISCO-PRE , SNMP_IDX: 2129921 , Type: Module
PN: TSFP10G-1558.17

NAME: "TenGigE0/0/0/1", DESCR: "Cisco SFP+ 10G ZR Pluggable Optics Module"
PID: SFP-10G-ZR , VID: V02, SN: BD211218N3K
MFG_NAME: CISCO-PRE , SNMP_IDX: 2134017 , Type: Module
PN: TSFP10G-1557.36
```

```
<#root>

RP/0/RP0/CPU0:NCS-5501#

show controllers te0/0/0/14 internal


Internal data for interface: TenGigE0/0/0/14
Subport Number      : 255
Port Number         : 14 *
Bay Number          : 0 *
Board Type          : 0x60020201 *

Port Type           : 10GE *


Bandwidth(Kbps)     : 10000000 *
Transport mode      : LAN *
BIA MAC addr        : 008a:9617:4838
Oper. MAC addr      : 008a:9617:4838
```

```
Egress MAC addr     : 008a:9617:4838
Port Available      : true *

Status polling is   : disabled *
Status events are   : disabled
I/F Handle          : 0x00000158 *
Cfg Link Enabled    : enabled
H/W Tx Enable       : yes

MTU                 : 1514 *
H/W Speed           : 10 Gbps *
H/W Duplex          : Full *
H/W Loopback Type   : None *
FEC                 : Not Configured *
H/W FlowCtrl Type   : Disabled *
H/W AutoNeg Enable  : Off *
H/W Link Defects    : No Fault *
Link Up             : yes *

Link Led Status     : Green ON *

Pluggable Present   : Yes *

Pluggable Type      : SFP+ 10G CU3M

Pluggable PID       : SFP-H10GB-CU3M *

Pluggable Compl.    : Failed - Bad Vendor CRC
```

如果无法识别收发器，请在此处检查是否支持收发器类型：https://tmgmatrix.cisco.com/。

供应商CRC应该正确。

检查信号强度。

需要收发器支持DOM（数字光纤监控）！

<#root>

```
RP/0/RP0/CPU0:BRU-SPCORE-P2#
show controllers hundredGigE0/0/0/10 phy

QSFP8636 EEPROM port: 10
```

Xcvr Type: QSFP28

```
        Ext Type: 3.5W, CLEI, TX CDR, RX CDR,
        Connector Type: MPO
        Ethernet Compliance Codes: 100G BASE-SR4,
        BR, nominal: 25500 Mbps
        Length SMF: 0KM, OM3: 70M, OM2: 0M, OM1: 0M, Cable: 50M
        Deice Tech: 850nm VCSEL,
        Vendor Name: CISCO-FINISAR
        Vendor OUI: 00.90.65
        Vendor Part Number: FTLC9555REPM-C1   (rev.: A )
        Wavelength: 850.000 nm
        Wavelength Tolerance: 10.000 nm
        Vendor Serial Number: FIW2638016W
        Date Code (yy/mm/dd): 22/09/13  lot code:
        Diagnostic Monitoring Type: RX Avg, TX,
        Enhanced Options: Init Complete Flag Impl,
        Extended Module Codes:
        Options:
        L-Tx/Rx LOS:
        L-Tx Fault:
        L-Tx/Rx LOL:
        Module DDM: Volt, Temp, TX Power, TX Bias, RX Power,
MSA Data (Lower Memory)
0x0000: 11 07 00 00 00 00 00 00 : 00 00 00 00 00 00 00 00
0x0010: 00 00 00 00 00 00 1d 75 : 00 00 81 2f 00 00 00 00
0x0020: 00 00 20 b6 2e 9a 2d ba : 27 44 0d ed 0e 0c 0e 0c
0x0030: 0e 0c 28 46 2a dc 29 1f : 2a 72 00 00 00 00 00 00
0x0040: 00 00 00 00 00 00 00 00 : 00 00 00 00 00 00 00 00
0x0050: 00 00 00 00 00 00 00 00 : 00 00 00 00 00 01 00 00
0x0060: 00 00 ff 00 00 00 00 00 : 00 01 1f 00 00 00 00 00
0x0070: 00 00 00 00 00 00 00 00 : 00 00 00 00 00 00 00 00


MSA Data (Upper Memory Page 00)
0x0080: 11 dc 0c 80 00 00 00 00 : 00 00 00 05 ff 00 00 23
0x0090: 00 00 32 00 43 49 53 43 : 4f 2d 46 49 4e 49 53 41
0x00a0: 52 20 20 20 00 00 90 65 : 46 54 4c 43 39 35 35 35
0x00b0: 52 45 50 4d 2d 43 31 20 : 41 20 42 68 07 d0 46 ef
0x00c0: 02 07 ff f6 46 49 57 32 : 36 33 38 30 31 36 57 20
0x00d0: 20 20 20 20 32 32 30 39 : 31 33 20 20 0c 10 68 3a
0x00e0: 00 00 02 3c c0 ff c6 b6 : 3b 05 e6 30 86 bb 80 05
0x00f0: df 65 71 00 00 00 00 00 : 00 00 00 00 79 eb c1 06

        CLEI Code: CMUIATKCAA
        Part Number: FTLC9555REPM-C1 (ver.: V03)
        Product Id: QSFP-100G-SR4-S

MSA Data (Upper Memory Page 02)
0x0180: 43 4d 55 49 41 54 4b 43 : 41 41 31 30 2d 33 31 34
0x0190: 32 2d 30 33 56 30 33 20 : 01 00 00 31 20 20 20 20
0x01a0: 20 66 00 00 00 00 00 00 : 00 00 00 00 00 00 00 00
0x01b0: 00 00 00 00 00 00 00 00 : 00 00 00 00 00 00 aa aa
0x01c0: 51 53 46 50 2d 31 30 30 : 47 2d 53 52 34 2d 53 20
0x01d0: 20 20 20 20 00 00 00 00 : 00 00 00 00 00 00 00 65
0x01e0: 31 33 33 39 39 37 31 36 : 31 d8 00 00 00 00 00 00
0x01f0: 00 00 00 00 00 00 00 00 : 00 00 00 00 00 00 00 00

        Module
        Thresholds:                    Alarm High          Warning High          Warning Low          Al
              Temperature:             +75.000 C             +70.000 C             +0.000 C
                  Voltage:            3.630 Volt            3.465 Volt            3.135 Volt
```

```
        Temperature: +29.457 C
        Voltage: 3.315 Volt
```

Lanes

```
        Thresholds:                    Alarm High          Warning High          Warning Low          Al
                     Bias:          15.000 mAmps          14.000 mAmps          3.000 mAmps           2
           Transmit Power:  3.46740 mW (5.40004 dBm)   1.73780 mW (2.40000 dBm)   0.14450 mW (-8.40132
            Receive Power:  3.46740 mW (5.40004 dBm)   1.73780 mW (2.40000 dBm)   0.09330 mW (-10.30118

        TxRxIOMagId:

        RxOpAmpSupprt:
```

Lane	Temp	Bias	Tx Power	Rx Po
0	N/A	7.130 mAmps	1.03100 mW (0.13259 dBm)	1.18990 mW (0.75510 d
1	N/A	7.192 mAmps	1.09760 mW (0.40444 dBm)	1.19300 mW (0.76640 d
2	N/A	7.192 mAmps	1.05440 mW (0.23005 dBm)	1.17110 mW (0.68594 d
3	N/A	7.192 mAmps	1.08020 mW (0.33504 dBm)	1.00480 mW (0.02080 d

```
MSA Data (Upper Memory Page 03)
0x0200: 4b 00 fb 00 46 00 00 00 : 00 00 00 00 00 00 00 00
0x0210: 8d cc 74 04 87 5a 7a 76 : 00 00 00 00 00 00 00 00
0x0220: 00 00 00 00 00 00 00 00 : 00 00 00 00 00 00 00 00
0x0230: 87 72 01 74 43 e2 03 a5 : 1d 4c 03 e8 1b 58 05 dc
0x0240: 87 72 02 3f 43 e2 05 a5 : 00 00 00 00 00 00 00 00
0x0250: 00 00 00 00 00 00 00 00 : 00 00 00 00 00 00 00 00
0x0260: a6 0f 00 00 00 00 00 00 : 00 00 66 66 00 00 33 33
0x0270: 00 00 00 00 00 00 00 00 : 00 00 00 00 00 00 00 00
```

使用此命令可验证是否存在任何问题。

<#root>

```
RP/0/RP0/CPU0:BRU-SPCORE-P2#
```

show controllers optics 0/0/0/10 summary

```
Port               Controller State        Admin State            LED State         Lane   Laser Bias
```

```
------------------  ----------------------  ---------------------  ----------------  -----  -----------
Optics 0/0/0/10

Up                       In Service

             Green              0      7.1mA        0.12         0.75         850.00         QSFP28-100G
                                                                                        1      7.2mA
                                                                                        2      7.2mA
                                                                                        3      7.2mA
```

警报

检查主题条目的警报。

<#root>

```
RP/0/RP0/CPU0:NCS#

show alarms brief



--------------------------------------------------------------------------------
Active Alarms for 0/0
--------------------------------------------------------------------------------
Location        Severity     Group            Set Time                   Description
--------------------------------------------------------------------------------
0/0/CPU0        Major        Software         04/26/2023 15:50:19 CEST    Optics0/0/0/35 - hw_optics:
0/0/CPU0        Major        Software         04/26/2023 15:50:19 CEST    Optics0/0/0/35 - hw_optics:
0/0/CPU0        Major        Software         04/26/2023 15:50:19 CEST    Optics0/0/0/35 - hw_optics:
0/0/CPU0        Major        Software         04/26/2023 15:50:19 CEST    Optics0/0/0/35 - hw_optics:
0/0/CPU0        Major        Software         04/26/2023 15:50:19 CEST    Optics0/0/0/35 - hw_optics:
0/0/CPU0        Major        Software         04/26/2023 15:50:19 CEST    Optics0/0/0/35 - hw_optics:
0/0/CPU0        Major        Software         04/26/2023 15:50:19 CEST    Optics0/0/0/35 - hw_optics:
0/0/CPU0        Major        Software         04/26/2023 15:50:19 CEST    Optics0/0/0/35 - hw_optics:
0/0/CPU0        Major        Software         04/26/2023 15:50:19 CEST    Optics0/0/0/35 - hw_optics:
0/0/CPU0        Major        Software         04/26/2023 15:50:19 CEST    Optics0/0/0/35 - hw_optics:
0/0/CPU0        Major        Software         04/26/2023 15:50:19 CEST    Optics0/0/0/35 - hw_optics:
0/0/CPU0        Major        Software         04/26/2023 15:50:19 CEST    Optics0/0/0/35 - hw_optics:
0/0/CPU0        Minor        Software         04/26/2023 15:50:19 CEST    Optics0/0/0/35 - hw_optics:
0/0/CPU0        Minor        Software         04/26/2023 15:50:19 CEST    Optics0/0/0/35 - hw_optics:
0/0/CPU0        Minor        Software         04/26/2023 15:50:19 CEST    Optics0/0/0/35 - hw_optics:
0/0/CPU0        Minor        Software         04/26/2023 15:50:19 CEST    Optics0/0/0/35 - hw_optics:
0/0/CPU0        Major        Software         05/02/2023 11:18:17 CEST    Optics0/0/0/26 - hw_optics:
0/0/CPU0        Major        Software         05/02/2023 11:18:17 CEST    Optics0/0/0/26 - hw_optics: P
0/0/CPU0        Major        Software         05/02/2023 11:18:23 CEST    Optics0/0/0/26 - hw_optics:
0/0/CPU0        Major        Software         05/02/2023 11:18:23 CEST    Optics0/0/0/26 - hw_optics:
…
```

Show Controller Optics

使用“show controller optics <r/s/i/p>”命令检查是否检测到SFP/QSFP。

检查以下内容：

- 检查插入的光学设备是否显示正确（检查PID和VID）。
- 检查是否启用了激光。
- 检查电源级别是否正常。
- 检查是否出现任何警报/故障。

如果检测到光纤并处于使用状态，则这是输出示例。

检查“Controller State”是打开还是关闭。

检查激光状态是打开还是关闭。当接口关闭时，会显示Off状态。如果情况并非如此，请收集以下信息：

- show tech-support光纤
- show tech-support of a

<#root>

```
RP/0/RP0/CPU0:ios#
```

show controllers optics 0/0/0/12

```
Controller State: Up
 Transport Admin State: In Service
 Laser State: Off
```

检查LED状态。当接口关闭时，会显示Off状态。当接口未关闭时，状态可以是Down-Yellow或Up-Green。

如果存在端口分支：即使有一个子端口处于打开状态，所有子端口都会显示为绿色。如果至少一个子端口为admin up(no shut)，则所有子端口都显示黄色。如果所有子端口都为admin down（关闭），则Led状态为Off。

检查FEC状态。某些平台类型可能禁用了FEC。则不会显示FEC部分。如果在PHY上启用了FEC，则它应该显示PHY FEC状态而不是NPU。如果FEC状态不正确，请检查“show controller <speed> <r/s/i/p>”中的FEC状态。

阅读本文了解有关FEC的更多信息：[了解FEC及其在思科光纤中的实施]

请下载此表，了解有关每个思科光纤的FEC类型的详细信息：https://www.cisco.com/c/dam/en/us/products/se/2022/4/Collateral/fec-summary-table.pdf

检查“Detected Alarms”旁边是否引发任何警报。如果出现链路问题，请检查是否在此处显示任何RX-LOS/RX-LOL/TX-LOS/TX-LOL警报，或是在链路抖动时显示接口和时间戳的“show alarms brief/history”中。如果出现RX警报，请检查对等设备是否有TX警报。如果对等设备有TX警报，请转至下一步。如果没有对等体TX警报，请尝试重新连接电缆和/或可插拔项目。如果需要，请尝试用其他设备替换它们。

检查TX功率。如果端口预期为Up，但其–40 Tx功率，请进入下一步。检查RX电源。如果端口预期

为Up，但其Rx功率为–40dBm，请检查对等体是否有TX警报。如果对等设备没有TX警报，请尝试重新连接电缆和/或可插拔项目。如果需要，请尝试用其他设备替换它们。

<#root>

RP/0/RP0/CPU0:ios#

show controllers optics 0/0/0/13

Controller State: Down
 Transport Admin State: In Service
 Laser State: Off

Optics not present

Optics Type: Unavailable

         DWDM Carrier Info: Unavailable, MSA ITU Channel= Unavailable, Frequency= Unavailable , Wavelen
         TX Power = Unavailable
         RX Power = Unavailable

LED State: Off

FEC State: FEC ENABLED

  Optics Status
              Optics Type: SFP28 25G SR-S
               Wavelength = 850.00 nm

Alarm Status:

               Detected Alarms: None

               LOS/LOL/Fault Status:
               Laser Bias Current = 0.0 mA Actual

TX Power = -40.00 dBm

RX Power = -0.93

               Performance Monitoring: Disable
               THRESHOLD VALUES

               Parameter   High Alarm Low Alarm High Warning Low Warning
               -------------------------   ---------- --------- ------------ -----------
               Rx Power Threshold(dBm)   5.4   -14.2   2.3   -10.3
               Tx Power Threshold(dBm)   5.4   -12.4   2.3   -8.4

```
              LBC Threshold(mA)                    10.00        2.00             8.00         3.00
              Temp. Threshold(celsius)             75.00       -5.00            70.00         0.00
              Voltage Threshold(volt)               3.63        2.97             3.46         3.13
              Polarization parameters not supported by optics
              Temperature = 28.00 Celsius               Voltage = 3.28 V

Transceiver Vendor Details
         Form Factor              : SFP28
         Optics type              : SFP28 25G SR-S
         Name                      : CISCO-AVAGO
         OUI Number               : 00.17.6a
         Part Number              : SFBR-725SMZ-CS1
         Rev Number               : 01
         Serial Number            : AVD2227E1FU
         PID                       : SFP-25G-SR-S
         VID                       : V01
         Date Code(yy/mm/dd) : 18/07/07
```

如果未检测到光纤或未在运行，则这是输出示例。

```
<#root>

RP/0/RP0/CPU0:ios# RP/0/RP0/CPU0:ios#

show controllers optics 0/0/0/13


  UTC Controller State: Down
  Transport Admin State: In Service
  Laser State: Off


Optics not present


         Optics Type: Unavailable

          DWDM Carrier Info: Unavailable, MSA ITU Channel= Unavailable, Frequency= Unavailable , Wavele
          TX Power = Unavailable          RX Power = Unavailable
```

相干DSP

如果QDD-400G-ZR-S / QDD-400G-ZRP-S的链路已断开，同时验证来自“show controller optics”的警报和数据，请检查“show controller coherentDSP <R/S/I/P>”中的警报。

```
<#root>

RP/0/RP0/CPU0:ios#

show controllers coherentDSP 0/0/1/0


Port : CoherentDSP 0/0/1/0
Controller State : Up
Inherited Secondary State : Normal
```

```
Configured Secondary State : Normal
Derived State : In Service
Loopback mode : None
BER Thresholds : SF = 1.0E-5 SD = 1.0E-7
Performance Monitoring : Enable
Bandwidth : 400.0Gb/s

Alarm Information:LOS = 0 LOF = 0 LOM = 0
OOF = 0 OOM = 0 AIS = 0IAE = 0 B
IAE = 0 SF_BER = 0
SD_BER = 0 BDI = 0 TIM = 0
FECMISMATCH = 0 FEC-UNC = 0 FLEXO_GIDM = 0
FLEXO-MM = 0 FLEXO-LOM = 0 FLEXO-RDI = 0
FLEXO-LOF = 0
Detected Alarms : None
```

如果看到LOS/LOF/BER，则检查光纤连接、远程端TX值以及本地端和对等端ZR/ZRP的操作模式。

ZR/ZRP支持多种操作模式。查看此链接配置指南。

配置模式、FEC、DAC和调制需要与接口配置和对等体配置匹配。

使用以下命令：show optics-driver debug optics port <fp_port> instance <bayinst> location <LC>。

<#root>

```
RP/0/RP0/CPU0:ios#

show optics-driver debug optics port 0 instance 0 location 0/0/CPU0

flexcoh_hdlr : [0x0]
R_S_I_P : [0.0.1.0]
module_type : [400G-ZRPLUS:Cisco-Qualified-Module]
Traffic-Setup : [Requested/Programmed]
client_rate : [100_GAUI_2_KP4_FEC/100_GAUI_2_KP4_FEC]

<- needs to match the configured interface speed

trunk_rate : [400G Muxponder/400G Muxponder] line_fec_mode : [oFEC/oFEC]

<- needs to match the peer end for link up

dac_rate : [1x1.25 => pulse_shaping On/1x1.25 => pulse_shaping On]

<- needs to match the peer end for link up

modulation : [16QAM/16QAM]

<- needs to match the peer end for link up

framing_format : [400G_ZR/400G_ZR]
framing_mode : [Enhanced/Enhanced]
hw_cfg_in_progress : [False]
hw transactions : [3]
polling enabled : [True]
pm_notify enabled : [True]
alarms_notify enabled : [True]
sdk laser oper state : [Enabled]
sdk hw laser oper state : [Enabled]
hw laser oper state : [Enabled]
```

```
sdk channel-frequency : [1931000]
hw channel-frequency : [1931000]
sdk tx-power : [-100 0.1dBm]
hw tx-power : [-113 0.1dBm]
hw tx-power-range : [-2289, -65135 0.01dBm]
sdk cd-min : [-13000]hw cd-min : [-13000]
sdk cd-max : [13000]hw cd-max : [13000]
sdk baud-rate : [60.138546]
hw baud-rate : [60.138546]
sdk hw thresholds : [Valid]
config-thresh-flags : [0x0]
trf-cfg-lsr-pm-flags : [0x0]
polling_mask : [0xf]
is_fw_dl_in_progress : [False]
is_fw_commit_in_progress: [False]
sdk dsp-internal-loopback: [Disabled]
hw dsp-internal-loopback: [Disabled]
sdk dsp-line-loopback : [Disabled]
hw dsp-line-loopback : [Disabled]
Flexcoh SDK API execution status
-------------------------------------------------------------------------------------------------
traffic | tx-power | cd-min | cd-max | frequency | laser-set | pm-set | alarm-set | poll_set |
=================================================================================================
Success | Success  | Success| Success| Success   | Success   | Success| Success   | Success  |

<- No failure to be seen in any of the status

-------------------------------------------------------------------------------------------------
```

Show Controllers PHY

收集正确接口的此信息。此命令转储EEPROM信息。

<#root>

```
RP/0/RP0/CPU0:ios#

show controllers tenGigE 0/0/1/0 phy


SFP EEPROM port: 32
Xcvr Type: SFP
Xcvr Code: SFP+ 10G SR
Encoding: 64B66B
Bit Rate: 10300 Mbps
Link Reach 50u fiber: 80 meter
Link Reach 62.5u fiber: 20 meter
Vendor Name: CISCO-SUMITOMO
Vendor OUI: 00.00.5f
Vendor Part Number: SPP5100SR-C5 (rev.: A )
Laser wavelength: 850 nm (fraction: 0.00 nm)
Optional SFP Signal: Tx_Disable, Tx_Fault, LOS
Vendor Serial Number: SPC17050AZ0
Date Code (yy/mm/dd): 13/01/31 lot code: MA
Diagnostic Monitoring: DOM, Int. Cal.,
Enhanced Options: SW RX LOS Mon., SW TX Fault Mon, SW TX Disable, Alarm/Warning Flags

MSA Data
0x0000: 03 04 07 10 00 00 00 00 : 00 00 00 06 67 00 00 00
```

```
0x0010: 08 02 00 1e 43 49 53 43 : 4f 2d 53 55 4d 49 54 4f
0x0020: 4d 4f 20 20 00 00 00 5f : 53 50 50 35 31 30 30 53
0x0030: 52 2d 43 35 20 20 20 20 : 41 20 20 20 03 52 00 e6
0x0040: 00 1a 00 00 53 50 43 31 : 37 30 35 30 41 5a 30 20
0x0050: 20 20 20 20 31 33 30 31 : 33 31 4d 41 68 f0 03 7a
0x0060: 00 00 0b ea 11 8a 3a 43 : 9d 9c 2b 0d 84 89 fd c5
0x0070: a4 0e 5b 00 00 00 00 00 : 00 00 00 00 8b 64 8d fc

Thresholds: Alarm High Warning High Warning Low Alarm Low
Temperature: +75.000 C +70.000 C +0.000 C -5.000 C
Voltage: 3.630 Volt 3.465 Volt 3.135 Volt 2.970 Volt
Bias: 10.500 mAmps 9.000 mAmps 2.500 mAmps 2.000 mAmps
Transmit Power: 1.47910 mW (1.69998 dBm) 0.74130 mW (-1.30006 dBm) 0.18620 mW (-7.30020 dBm) 0.07410 mW
Receive Power: 1.58490 mW (2.00002 dBm) 0.79430 mW (-1.00015 dBm) 0.10230 mW (-9.90124 dBm) 0.04070 mW
Temperature: 24.012
Voltage: 3.304 Volt
Tx Bias: 0.000 mAmps
Tx Power: 0.000 mW (<-40.00 dBm)
Rx Power: 0.000 mW (<-40.00 dBm)
Oper. Status/Control: Tx Disabled, Rx Rate Select, LOS,
EEPROM Memory (A2 lower)
0x0100: 4b 00 fb 00 46 00 00 00 : 8d cc 74 04 87 5a 7a 75
0x0110: 14 82 03 e8 11 94 04 e2 : 39 c7 02 e5 1c f5 07 46
0x0120: 3d e9 01 97 1f 07 03 ff : 00 00 00 00 00 00 00 00
0x0130: 00 00 00 00 00 00 00 00 : 00 00 00 00 00 00 00 00
0x0140: 00 00 00 00 3f 80 00 00 : 00 00 00 00 01 00 00 00
0x0150: 01 00 00 00 01 00 00 00 : 01 00 00 00 00 00 00 27
0x0160: 18 03 81 13 00 00 00 00 : 00 00 00 00 00 00 b2 00
0x0170: 00 40 00 00 00 40 00 00 : 00 00 00 00 00 00 00 00

CLEI Code: COUIA8NCAA
Part Number: 10-2415-03 (ver.: V03 )
Temp/Alarm/Power Flags: COM, commercial 0C to 70C
Minimum Temperature: 0
Maximum Temperature: 70
Calibration Constants: LBC Scale, Temperature, Laser bias current, Output power,
Product Id: SFP-10G-SR
EEPROM Memory (A2 upper)
0x0180: 43 4f 55 49 41 38 4e 43 : 41 41 31 30 2d 32 34 31
0x0190: 35 2d 30 33 56 30 33 20 : 01 00 46 00 00 00 00 c6
0x01a0: 00 00 00 00 00 00 00 00 : 00 00 85 99 8f 00 a8 3b
0x01b0: d4 4b 00 00 1e 00 0a ff : 16 93 0f 8e 00 00 aa aa
0x01c0: 53 46 50 2d 31 30 47 2d : 53 52 20 20 20 20 20 20
0x01d0: 20 20 20 20 32 33 00 00 : 00 00 00 00 00 00 00 35
0x01e0: 14 1b 20 20 20 26 20 26 : 00 00 00 00 00 00 00 00
0x01f0: 00 00 00 00 00 fb 00 00 : ff ff ff ff 00 00 00 aa


MSA Data LOWER PAGE (QSA)
0x0000: 0d 00 02 01 00 00 01 00 : 00 00 00 00 00 00 00 00
0x0010: 00 00 00 00 00 01 00 00 : 00 00 00 00 00 00 00 00
0x0020: 00 00 00 00 00 00 00 00 : 00 00 00 00 00 00 00 00
0x0030: 00 00 00 00 00 00 00 00 : 00 00 00 00 00 00 00 00
0x0040: 00 00 00 00 00 00 00 00 : 00 00 00 00 00 00 00 00
0x0050: 00 00 44 32 50 30 0f 00 : 00 00 00 00 00 00 00 00
0x0060: 00 00 00 00 01 01 00 00 : 00 00 00 00 00 00 00 00
0x0070: 00 00 00 00 00 00 00 00 : 00 00 00 00 00 00 00 00

MSA Data UPPER PAGE (QSA)
0x0080: 0d 9b 80 00 00 00 00 00 : 00 00 00 00 00 00 00 00
0x0090: 00 00 00 00 43 49 53 43 : 4f 2d 44 4e 49 20 20 20
0x00a0: 20 20 20 20 00 30 30 30 : 43 41 5a 41 44 45 52 4f
```

```
0x00b0: 2d 30 32 20 20 20 20 20 : 30 33 00 00 00 00 46 32
0x00c0: 00 00 00 00 44 54 59 32 : 32 32 31 30 36 47 38 20
0x00d0: 20 20 20 20 32 30 31 38 : 30 35 33 30 00 00 f2 c2
0x00e0: f2 00 07 d0 45 c2 18 57 : 2b 29 67 3f 51 03 49 be
0x00f0: 37 c4 da 00 00 00 00 00 : 00 00 00 00 81 96 b0 b1
```

NPU

本节介绍接口直接连接到NPU的具体情况。所以，没有PHY。这些端口是无PHY端口。

<#root>

```
RP/0/RP0/CPU0:ios#

show controllers twentyFiveGigE 0/0/0/12 (partial output)

Operational data for interface TwentyFiveGigE0/0/0/12:

State:    Administrative state: disabled

==> Check if admin state display is correct

    Operational state: Down (Reason: Link is shutdown)

==> Check if link state display is correct. If interface is down with Remote fault/Link Loss (local faul


MAC address information:
    Operational address: fc58.9a01.8e10
    Burnt-in address: fc58.9a01.8e10

Autonegotiation disabled.
Priority flow control information for interface TwentyFiveGigE0/0/0/12:
    Forward error correction: Standard (Reed-Solomon)

==> Check if FEC status is correct.
```

<#root>

```
RP/0/RP0/CPU0:ios#

show controllers tenGigE 0/0/0/14


    Operational data for interface TenGigE0/0/0/14:

State:    Administrative state: enabled
    Operational state: Down (Reason: Link loss or low light, no loopback)

==> This router has a Local Fault/Down.

    LED state: Yellow On
```

<#root>

```
RP/0/RP0/CPU0:ios#
show controllers tenGigE 0/0/0/15

    Operational data for interface TenGigE0/0/0/15:
    State:
        Administrative state: enabled
        Operational state:
Down (Reason: Remote Fault)


==> The peer has a Fault

        LED state: Yellow On
```

摘要

- 检查接口的管理状态是否为down。如果是，则使用命令“no shut”在接口上使其进入管理启动状态。
- 检查路由器和对等设备上的FEC状态。如果存在任何不匹配，请尝试更正这些错误。
- 检查路由器和对等设备上的自动协商状态。如果存在任何不匹配，请尝试更正这些错误。
- 如果FEC和自动协商配置正确，请在“show controller optics”输出中检查路由器和对等设备上的警报状态。

RX-LOS、RX-LOL：信号接收方向有问题。

TX-LOS、TX-LOL:SFP/QSFP从NPU或PHY接收的信号存在问题。

如果存在带有RX-LOL/RX-LOS的链路关闭/摆动：

- 检查对等体是否具有TX-LOS/TX-LOL。
- 如果没有TX警报，请尝试更改电缆/可插拔(SFP/QSFP)。

如果存在带TX-LOL/TX-LOS的链路关闭/摆动：

您可以应用外部环回以排除远程对等体，并将光纤应用到远程对等体。在本地使用光缆将发射(Tx)信号物理地环回到接收(Rx)端口中。或者，使用衰减器，以实现以下目的：

```
<#root>

RP/0/RSP0/CPU0:NCS(config)#
int Hu0/3/0/31


RP/0/RSP0/CPU0:NCS(config-if)#
loopback ?


external Enable external loopback (requires loopback connector)
internal Enable internal loopback
line Enable line loopback
```

```
RP/0/RSP0/CPU0:NCS(config-if)#
loopback external ?

<cr>
RP/0/RSP0/CPU0:NCS(config-if)#
loopback external
RP/0/RSP0/CPU0:NCS(config-if)#
commit
```

您可以在路由器和对等设备上应用环回内部配置，以通过光纤/光纤旁路检验光纤。这意味着如果接口仍未打开，则表明问题不是与光纤部件有关！

```
<#root>
RP/0/RP0/CPU0:BRU-SPCORE-P2(config)#
int hundredGigE 0/0/0/10

RP/0/RP0/CPU0:BRU-SPCORE-P2(config-if)#
loopback internal ?

  <cr>
RP/0/RP0/CPU0:BRU-SPCORE-P2(config-if)#
loopback internal

RP/0/RP0/CPU0:BRU-SPCORE-P2(config-if)#
commit
```

收集日志

路由器和对等设备上的这些命令都可能导致问题。

- show ip interface brief
- show alarms brief

- show controller optics <r/s/i/p>
- show tech-support光纤

这将显示警报、LED状态、激光状态和其他光学信息

- show controller <tengige/hundredgige/other> <r/s/i/p> internal of interface with the issue。

显示FEC、AN、打开/关闭、本地故障/远程故障等。

- show controllers npu voq-usage interface all instance all location all

提供前面板端口到pp端口、npu和核心的映射。

接口问题的完整日志集合：

- show version
- show running-config
- show install active
- show platform
- show tech-support ethernet platform location 0/x/CPU0
- show tech-support ethernet interface
- show tech-support ethernet controllers location 0/x/CPU0
- show tech-support dpa location 0/x/CPU0
- show tech-support for a location 0/x/CPU0
- show tech-support optics location 0/x/CPU0
- show tech-support coherent location 0/x/CPU0
- show tech-support pfi location all
- show tech-support qos platform location 0/x/CPU0
- show tech-support交换矩阵
- show controllers npu voq-usage interface all instance 0 location all
- show optics trace all
- show ethernet infra trace location 0/x/cpu0
- show ethernet v-ether trace location 0/x/CPU0
- show vether-ea trace all location 0/x/CPU0
- show portmapper trace all location 0/0/CPU0

关于此翻译
思科采用人工翻译与机器翻译相结合的方式将此文档翻译成不同语言，希望全球的用户都能通过各自的语言得到支持性的内容。

请注意：即使是最好的机器翻译，其准确度也不及专业翻译人员的水平。

Cisco Systems, Inc. 对于翻译的准确性不承担任何责任，并建议您总是参考英文原始文档（已提供链接）。