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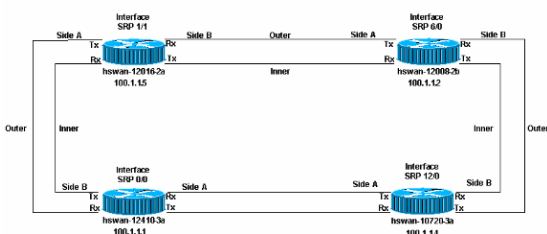
[相关信息](#)

## 简介

本文提供提示排除故障Cisco路由器之间的部分复用协议(SRP)链路。本文也提供SRP故障排除示例在第1层和第2层，并且解释SRP概念并且描述如何使用Cisco IOS命令验证SRP连接。

图1表示设置本文用途。

图1 ? 拓扑



# [先决条件](#)

## [要求](#)

Cisco 建议您了解以下主题：

- [OC-12c DPT概述](#)
- [配置OC-12c DPT端口适配器](#)

## [使用的组件](#)

本文档不限于特定的软件和硬件版本。

## [相关产品](#)

在此列表的硬件当前支持SRP Cisco路由器之间的动态包传输(DPT)链路：

- 在光载波OC12/STM4的12xxx和OC48/STM16和OC192/STM64
- 在OC48的Cisco 10720路由器
- 在OC12和OC48的1519x
- 720x/720xVXR在OC12
- uBR720x/在OC12的uBR720xVXR
- 在OC12的75xx

## [规则](#)

有关文档规则的详细信息，请参阅 [Cisco 技术提示规则](#)。

## [背景信息](#)

这是主要要素在SRP/DPT链路的安装中路由器之间的：

- 端A必须总是连接到B侧。
- Transmit(Tx)必须总是连接接收(Rx)。
- 进入卡的功率电平必须在规格内。
- 距离限制必须在规格内。
- 必须正确地设置时钟频率。
- 必须正确地设置帧。

**注意：**链路能有一阵子出来和运行，即使功率电平不在规格内。然而，如果电源不在规格内，意外问题看上去以后。

## [SRP 概述](#)

此部分提供主要组件的概述在SRP链路的Cisco路由器之间。

## [光纤类型](#)

有光纤的两种类型OC12 SRP卡的：

- 多模(MM)
- 单模(SM)

一般来说，有MM卡和三不同种类的一种类型的SM卡。SM卡之间的唯一的差异是功率电平，翻译成最大距离链路可以在两节点之间。MM和SM卡之间的差异是MM卡使用LED作为光源，当SM卡使用一激光时。OC48 SRP卡进来仅SM。

只有用于the12xxx (GSR)家族的一线卡，呼叫1端口OC-192c/STM-64c DPT，是可用的与Very Short Reach (VSR)，短程(SR)，并且满足您的特定距离的中程(IR)光学需要。虽然SR和IR型号使用SC连接器和SM光纤，VSR型号使用呼叫Multiple Terminations推挽式的(MTP)门插销的一台特殊连接器，捆绑12x 62.5微米MM光纤，并且能简称操作距离至400米以更低成本。VRS光学用特殊MTP电缆连接。所以VRS光学能互联兼容的设备、通常相似的仅线卡在同样屋子里或建立。

## 光纤拓扑

您能获得光纤运行在SRP节点之间用两种方式：

- 一个是一个Telco提供的电路用在两SRP节点(设备之间的电信同步光纤网络(SONET)设备类似复用器(MUX)、光纤再生器或者交叉连接)。这是，当您使用[硬环回测试](#)给Telco时显示出，SRP节点(Cisco路由器)为生成的任何错误不是应负责任的。
- 另一个光纤设置是使用[暗光纤](#)，有时呼叫[direct to fiber](#)。暗光纤是其中任一个唯一的设备提供电源光纤的运行(灯)是电路的终端设备。Telco能提供此种光纤，但是Telco没有任何设备附加对光纤;它是在接地的光纤。暗光纤另一示例是两节点在同一间屋子的地方，并且光纤运行安装在他们之间。

时钟频率和功率电平是暗光纤重要因素。请参阅本文的[时钟频率](#)和[功率电平](#)部分关于详细信息。

## 计时

SRP运行SONET链路。所以，SRP接口有时钟频率规则和Packet-over-SONET (POS)接口一样。类似POS接口，您能设置SRP接口对：

- 内部，链路的提供时钟或者
- 线路，接收从链路的时钟

请使用**srp clock-source [type] [side]**命令下面接口配置模式设置每侧(A和B)与其自己的时钟配置。

时钟频率为电信网络和暗光纤网络是不同的。对于电信网络，您必须以与Telco相似的方式设置接口，一切通常设置为线路计时。

对于暗光纤网络，理想的时钟频率方案是设置所有A侧对内部和所有B端为线路。当时钟启动滑动时，所有侧也设置为内部工作，但是BIP(Bx)错误出现。因为不支持，您不能设置两边为线路计时这。

## 成帧

有帧的两种类型：

1. SONETSONET是北美洲标准。
2. SDHSDH是欧洲标准。

类似时钟频率，如果使用**srp framing [type] [side]**命令，帧可以端独立。默认帧是SONET。

# 排除故障在第1层

SRP运行SONET。排除故障SRP物理层问题是作为排除故障高级数据的相同的(HDLC)或点对点协议(PPP) SONET上的分组(POS)链路。与SRP链路的多数问题归结于不正确的物理配置或电源消除差别规格。

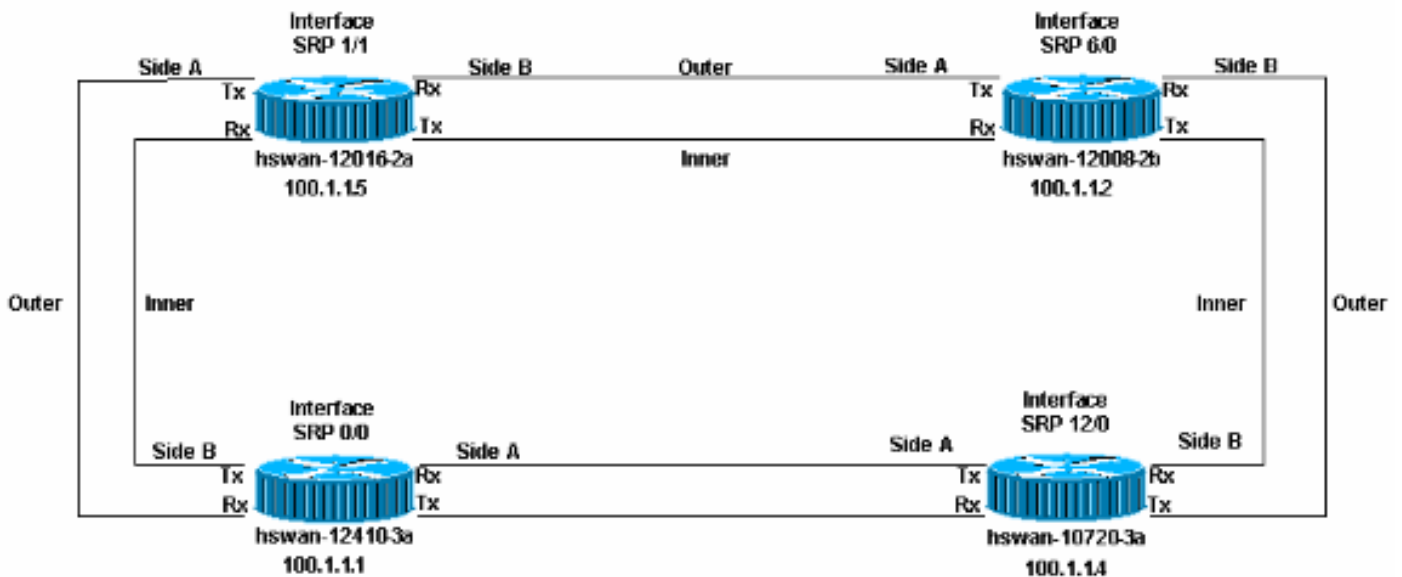
## 排除故障物理配置

用于SRP链路的光纤的物理配置对环是重要正确地工作。验证是否：

- Transmit(Tx)端口连接接收(Rx)端口
- 端A连接对正确邻接B侧

图2显示用于此实验室设置的配置。

图2 ? 配置



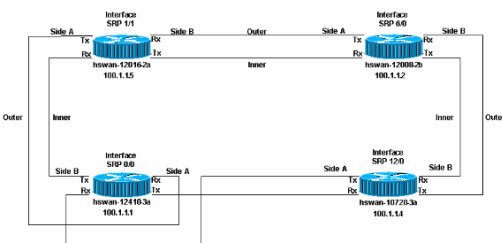
两个可能的物理设置错误在SRP环能出现：

- Transmit(Tx)没有连接到接收(Rx)端口。这是排除故障的最容易的方案，因为SRP接口不激活，当不正确地配置。
- B侧没有连接对邻居的端A (B侧连接支持B)。此方案要求您排除故障不正确地配置的节点。

发出show controllers srp命令证实物理设置是否是错误的。

在本例中，Rx端口在hswan-12410-3a交换。路径跟踪缓冲为被流过的链路是错误的。切记，Tx实际上连接对Rx，因此链路出来。然而，此处B侧连接对B侧，是无效的配置。

图3 ? Invalid配置的示例



```
hswan-12410-3a#show controllers srpSRP0/0 - Side A (Outer Rx, Inner Tx)SECTION LOF = 1
```

```

LOS      = 1                BIP(B1) = 0LINE  AIS = 0                RDI      = 0                FEBE
= 0                BIP(B2) = 0PATH  AIS = 0                RDI      = 0                FEBE = 16                BIP(B3) =
21  LOP = 0                NEWPTR = 0                PSE = 0                NSE      = 0Active Defects: NoneActive
Alarms: NoneAlarm reporting enabled for: SLOS SLOF PLOP Framing                : SONETRx SONET/SDH
bytes: (K1/K2) = 0/0                S1S0 = 0  C2 = 0x16Tx SONET/SDH bytes: (K1/K2) = 0/0                S1S0 = 0
C2 = 0x16  J0 = 0x1 Clock source                : InternalFramer loopback  : NonePath trace buffer :
Stable Remote hostname : hswan-10720-3a Remote interface: SRP1/1 Remote IP addr : 100.1.1.4
Remote side id : A !--- The remote interface is also Side A. !--- This must be Side B. This is
a physical cabling error. BER thresholds: SF = 10e-3 SD = 10e-6IPS BER thresholds(B3): SF = 10e-
3 SD = 10e-6TCA thresholds: B1 = 10e-6 B2 = 10e-6 B3 = 10e-6SRP0/0 - Side B (Inner Rx, Outer
Tx)SECTION LOF = 1                LOS      = 1                BIP(B1) = 0LINE  AIS = 0
RDI      = 0                FEBE = 0                BIP(B2) = 0PATH  AIS = 0                RDI      = 0                FEBE
= 16                BIP(B3) = 18  LOP = 0                NEWPTR = 0                PSE = 0                NSE      =
0Active Defects: NoneActive Alarms: NoneAlarm reporting enabled for: SLOS SLOF PLOP Framing
: SONETRx SONET/SDH bytes: (K1/K2) = 0/0                S1S0 = 0  C2 = 0x16Tx SONET/SDH bytes: (K1/K2) =
0/0                S1S0 = 0  C2 = 0x16  J0 = 0x1 Clock source                : InternalFramer loopback  :
NonePath trace buffer : Stable Remote hostname : hswan-12016-2a Remote interface: SRP12/0
Remote IP addr : 100.1.1.5 Remote side id : B !--- The remote interface is also Side B. !---
This must be Side A. This is a physical cabling error.BER thresholds: SF = 10e-3 SD = 10e-6IPS
BER thresholds(B3): SF = 10e-3 SD = 10e-6TCA thresholds: B1 = 10e-6 B2 = 10e-6 B3 = 10e-6

```

在这种情况下，hswan-12410-3a看到在日志的下面的错误。另外两节点连接对hswan-12410-3a不显示这些错误。

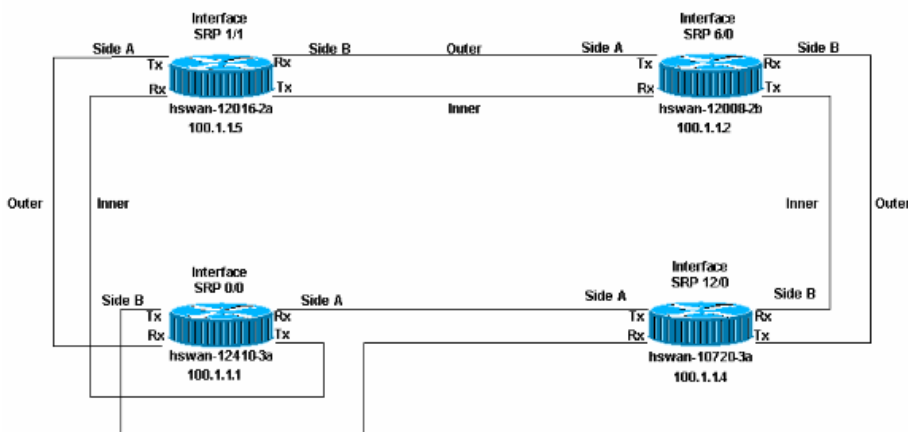
```

hswan-12410-3a#show controllers srpSRP0/0 - Side A (Outer Rx, Inner Tx)SECTION LOF = 1
LOS      = 1                BIP(B1) = 0LINE  AIS = 0                RDI      = 0                FEBE
= 0                BIP(B2) = 0PATH  AIS = 0                RDI      = 0                FEBE = 16                BIP(B3) =
21  LOP = 0                NEWPTR = 0                PSE = 0                NSE      = 0Active Defects: NoneActive
Alarms: NoneAlarm reporting enabled for: SLOS SLOF PLOP Framing                : SONETRx SONET/SDH
bytes: (K1/K2) = 0/0                S1S0 = 0  C2 = 0x16Tx SONET/SDH bytes: (K1/K2) = 0/0                S1S0 = 0
C2 = 0x16  J0 = 0x1 Clock source                : InternalFramer loopback  : NonePath trace buffer :
Stable Remote hostname : hswan-10720-3a Remote interface: SRP1/1 Remote IP addr : 100.1.1.4
Remote side id : A !--- The remote interface is also Side A. !--- This must be Side B. This is
a physical cabling error. BER thresholds: SF = 10e-3 SD = 10e-6IPS BER thresholds(B3): SF = 10e-
3 SD = 10e-6TCA thresholds: B1 = 10e-6 B2 = 10e-6 B3 = 10e-6SRP0/0 - Side B (Inner Rx, Outer
Tx)SECTION LOF = 1                LOS      = 1                BIP(B1) = 0LINE  AIS = 0
RDI      = 0                FEBE = 0                BIP(B2) = 0PATH  AIS = 0                RDI      = 0                FEBE
= 16                BIP(B3) = 18  LOP = 0                NEWPTR = 0                PSE = 0                NSE      =
0Active Defects: NoneActive Alarms: NoneAlarm reporting enabled for: SLOS SLOF PLOP Framing
: SONETRx SONET/SDH bytes: (K1/K2) = 0/0                S1S0 = 0  C2 = 0x16Tx SONET/SDH bytes: (K1/K2) =
0/0                S1S0 = 0  C2 = 0x16  J0 = 0x1 Clock source                : InternalFramer loopback  :
NonePath trace buffer : Stable Remote hostname : hswan-12016-2a Remote interface: SRP12/0
Remote IP addr : 100.1.1.5 Remote side id : B !--- The remote interface is also Side B. !---
This must be Side A. This is a physical cabling error.BER thresholds: SF = 10e-3 SD = 10e-6IPS
BER thresholds(B3): SF = 10e-3 SD = 10e-6TCA thresholds: B1 = 10e-6 B2 = 10e-6 B3 = 10e-6

```

如果放置Rx端口回到正确的配置并且交换hswan-12410-3a的Tx端口，您收到这些错误在节点连接对hswan-12410-3a，但是不在该节点。所以您必须有一个物理图表如何必须设置环。

图4 ? 如何设置环



hswan-12016-2a#%SRP-3-RING\_ID\_ERROR: SRP12/0 : Rx side B, Tx side of fibeBhswan-10720-3a#%SRP-3-

```

RING_ID_ERROR: SRP1/1 : Rx side A, Tx side of fiber originates on A!--- Note that the error
syntax is different !--- on the Cisco 10720 router.hswan-12016-2a#show controllers srpSRP12/0 -
Side A (Outer Rx, Inner Tx)SECTION LOF = 0 LOS = 0
BIP(B1) = 0LINE AIS = 0 RDI = 0 FEBE = 0 BIP(B2) = 0PATH AIS = 0
RDI = 0 FEBE = 0 BIP(B3) = 0 LOP = 0 NEWPTR = 0 PSE = 0
NSE = 0Active Defects: NoneActive Alarms: NoneAlarm reporting enabled for: SLOS SLOF PLOP
Framing : SONETRx SONET/SDH bytes: (K1/K2) = 0/0 S1S0 = 0 C2 = 0x16Tx
SONET/SDH bytes: (K1/K2) = 0/0 S1S0 = 0 C2 = 0x16 J0 = 0x1 Clock source :
InternalFramer loopback : NonePath trace buffer : Stable Remote hostname : hswan-12008-2b
Remote interface: SRP6/0 Remote IP addr : 100.1.1.2 Remote side id : B BER
thresholds: SF = 10e-3 SD = 10e-6IPS BER thresholds(B3): SF = 10e-3 SD = 10e-6TCA
thresholds: B1 = 10e-6 B2 = 10e-6 B3 = 10e-6SRP12/0 - Side B (Inner Rx, Outer
Tx)SECTION LOF = 0 LOS = 0 BIP(B1) = 0LINE AIS = 0
RDI = 0 FEBE = 0 BIP(B2) = 0PATH AIS = 0 RDI = 0 FEBE
= 0 BIP(B3) = 0 LOP = 0 NEWPTR = 0 PSE = 0 NSE =
0Active Defects: NoneActive Alarms: NoneAlarm reporting enabled for: SLOS SLOF PLOP Framing
: SONETRx SONET/SDH bytes: (K1/K2) = 0/0 S1S0 = 0 C2 = 0x16Tx SONET/SDH bytes: (K1/K2) =
0/0 S1S0 = 0 C2 = 0x16 J0 = 0x1 Clock source : InternalFramer loopback :
NonePath trace buffer : Stable Remote hostname : hswan-12410-3a Remote interface: SRP0/0
Remote IP addr : 100.1.1.1 Remote side id : B !--- The remote interface is also Side B. !---
This must be Side A. This is a physical cabling error.BER thresholds: SF = 10e-3 SD = 10e-6IPS
BER thresholds(B3): SF = 10e-3 SD = 10e-6TCA thresholds: B1 = 10e-6 B2 = 10e-6 B3 = 10e-6hswan-
12410-3a#show controllers srpSRP0/0 - Side A (Outer Rx, Inner Tx)SECTION LOF = 0 LOS
= 0 BIP(B1) = 0LINE AIS = 0 RDI = 0 FEBE = 0
BIP(B2) = 0PATH AIS = 0 RDI = 0 FEBE = 0 BIP(B3) = 0 LOP = 0
NEWPTR = 0 PSE = 0 NSE = 0Active Defects: NoneActive Alarms: NoneAlarm
reporting enabled for: SLOS SLOF PLOP Framing : SONETRx SONET/SDH bytes: (K1/K2) = 0/0
S1S0 = 0 C2 = 0x16Tx SONET/SDH bytes: (K1/K2) = 0/0 S1S0 = 0 C2 = 0x16 J0 = 0x1 Clock
source : InternalFramer loopback : NonePath trace buffer : Stable Remote hostname :
hswan-12016-2a Remote interface: SRP12/0 Remote IP addr : 100.1.1.5 Remote side id : B
BER thresholds: SF = 10e-3 SD = 10e-6IPS BER thresholds(B3): SF = 10e-3 SD = 10e-
6TCA thresholds: B1 = 10e-6 B2 = 10e-6 B3 = 10e-6SRP0/0 - Side B (Inner Rx, Outer
Tx)SECTION LOF = 0 LOS = 0 BIP(B1) = 0LINE AIS = 0
RDI = 0 FEBE = 0 BIP(B2) = 0PATH AIS = 0 RDI = 0 FEBE
= 0 BIP(B3) = 0 LOP = 0 NEWPTR = 0 PSE = 0 NSE =
0Active Defects: NoneActive Alarms: NoneAlarm reporting enabled for: SLOS SLOF PLOP Framing
: SONETRx SONET/SDH bytes: (K1/K2) = 0/0 S1S0 = 0 C2 = 0x16Tx SONET/SDH bytes: (K1/K2) =
0/0 S1S0 = 0 C2 = 0x16 J0 = 0x1 Clock source : InternalFramer loopback :
NonePath trace buffer : Stable Remote hostname : hswan-10720-3a Remote interface: SRP1/1
Remote IP addr : 100.1.1.4 Remote side id : A BER thresholds: SF = 10e-3 SD =
10e-6IPS BER thresholds(B3): SF = 10e-3 SD = 10e-6TCA thresholds: B1 = 10e-6 B2 =
10e-6 B3 = 10e-6hswan-10720-3a#show controllers srpInterface SRP1/1Hardware is OC48 SRPSRP1/1 -
Side A (Outer Rx, Inner Tx)OPTICSRx readout values: -6 dBm - Within specificationsSECTION
LOF = 0 LOS = 0 BIP(B1) = 0LINE AIS = 0 RDI
= 0 FEBE = 0 BIP(B2) = 0PATH AIS = 0 RDI = 0 FEBE = 0
BIP(B3) = 0 LOP = 0 NEWPTR = 0 PSE = 0 NSE = 0Active Defects:
NoneActive Alarms: NoneAlarm reporting enabled for: SLOS SLOF PLOP Framing : SONETRx
SONET/SDH bytes: (K1/K2) = 0/0 S1S0 = 0 C2 = 0x16Tx SONET/SDH bytes: (K1/K2) = 0/0
S1S0 = 0 C2 = 0x16 J0 = 0x1 Clock source : InternalFramer loopback : NonePath trace
buffer : Stable Remote hostname : hswan-12410-3a Remote interface: SRP0/0 Remote IP addr :
100.1.1.1 Remote side id : A !--- The remote interface is also Side A. !--- This must be Side
B. This is a physical cabling error.BER thresholds: SF = 10e-3 SD = 10e-6IPS BER thresholds(B3):
SF = 10e-3 SD = 10e-6TCA thresholds: B1 = 10e-6 B2 = 10e-6 B3 = 10e-6SRP1/1 - Side B (Inner Rx,
Outer Tx)OPTICSRx readout values: -5 dBm - Within specificationsSECTION LOF = 0 LOS = 0 BIP(B1)
= 0LINE AIS = 0 RDI = 0 FEBE = 0 BIP(B2) = 0PATH AIS = 0 RDI = 0 FEBE = 0 BIP(B3) = 0 LOP = 0
NEWPTR = 0 PSE = 0 NSE = 0Active Defects: NoneActive Alarms: NoneAlarm reporting enabled for:
SLOS SLOF PLOP Framing : SONETRx SONET/SDH bytes: (K1/K2) = 0/0 S1S0 = 0 C2 = 0x16Tx SONET/SDH
bytes: (K1/K2) = 0/0 S1S0 = 0 C2 = 0x16 J0 = 0x1 Clock source : InternalFramer loopback :
NonePath trace buffer : Stable Remote hostname : hswan-12008-2b Remote interface: SRP6/0 Remote
IP addr : 100.1.1.2 Remote side id : ABER thresholds: SF = 10e-3 SD = 10e-6IPS BER
thresholds(B3): SF = 10e-3 SD = 10e-6TCA thresholds: B1 = 10e-6 B2 = 10e-6 B3 = 10e-6

```

## 排除故障功率电平



除Cisco 10720路由器外，正确方式检查功率电平(有时指光级)是第三方光测试器。Cisco 10720路由器有一内置的电源测试程序。您能看到在show controllers srp命令的输出。

要测试功率电平，请采取电源说明在链路的Rx末端。从端口断开Rx光纤并且连接Rx光纤到光测试器。这实际上测试从链路的另一端的发射功率。测验的输出必须属于卡的电源规格。卡的每种类型能有不同的功率范围。检查使用的卡的规格。

功率电平必须在负dbm范围。如果更多电源被添加到链路，dbm是离零较近。如果有太快速)的许多个电源(链路，您能添加衰减到链路用轴向衰减器。这些外部衰减器在5dB增量通常运行。请添加衰减，直到链路在规格内是回到。快链路通常是功率电平问题和通常不指示与光纤或接口的一问题。

如果功率电平太低(有时呼叫“冷”链路)，可以有一问题与：

- 光纤，例如，光纤中断
- 链路的距离
- 光纤连接的接口

首先，请清洗所有光连接并且保证没有与光纤的问题。例如，请保证没有纠缠、中断和严密的弯。如果功率电平不增加，请设法减少光纤连接和接续数量，例如，配线面板连接。如果问题持续和链路以前运作，在此部分可以有问题如列出前。一旦新的安装，请务必检查链路的距离验证链路在规格内。取消在链路的所有衰减。如果链路缓慢仍然运行，可以有一问题与：

- 接口
- 通过Telco不正确地被映射的接口
- 您必须更改到一更加强大大光学的接口(出于距离规格)

## 排除故障SONET错误

发出show controllers srp命令排除故障物理SONET错误。此部分提供命令的输出示例:。

注意有两套环的每侧的统计信息。两边的所有计数器必须是零。这些计数器能有非零值不出问题与链路，当：

- 链路首先出来
- 光纤删除或插入
- 路由器重启

如果查找非零值，您在输出中必须清除计数器，并且复校值从show controllers srp。如果错误计数增加，有问题。

```
hswan-12410-3a#show controllers srp 0/0SRP0/0 - Side A (Outer Rx, Inner Tx) !--- Start of side A
of the node.SECTION LOF = 0          LOS      = 0          BIP(B1) = 0 !---
Section counters must be zero.LINE AIS = 0          RDI      = 0          FEBE = 0
BIP(B2) = 0 !--- Line counters must be zero.PATH AIS = 0          RDI      = 0          FEBE = 0
BIP(B3) = 0 !--- Path counters must be zero. LOP = 0          NEWPTR = 0          PSE = 0
NSE      = 0 !--- Path counters must be zero.Active Defects: None ! -- A stable link should show
"None"Active Alarms: None ! -- A stable link should show "None"Alarm reporting enabled for:
SLOS SLOF PLOPFraming          : SONET !--- Framing type for this side of the node.Rx
SONET/SDH bytes: (K1/K2) = 0/0 S1S0 = 0 C2 = 0x16Tx SONET/SDH bytes: (K1/K2) = 0/0 S1S0 = 0 C2 =
0x16 J0 = 0x1 Clock source : Internal !--- Clock source for this side of the node.Framer
loopback : None !--- Shows whether the node has a software loop enabled. Path trace buffer :
Stable Remote hostname : hswan-12016-2a !--- Name of the remote node to which the SRP link is
connected. Remote interface: SRP12/0 !--- Remote interface to which the SRP link is connected.
Remote IP addr : 100.1.1.5 !--- Remote interface to which the SRP link is connected. Remote side
id : B !--- Remote side to which the link is connected. !--- Must be the opposite to local
side!BER thresholds: SF = 10e-3 SD = 10e-6 !--- Number of errors it has to receive to cause an
```

Alarm.IPS BER thresholds(B3): SF = 10e-3 SD = 10e-6 !--- Number of errors it has to receive to cause an Alarm.TCA thresholds: B1 = 10e-6 B2 = 10e-6 B3 = 10e-6 !--- Number of errors it has to receive to cause an Alarm.SRP0/0 - Side B (Inner Rx, Outer Tx) !--- Start of side B of the node. Same layout/output as side A.SECTION LOF = 0 LOS = 0 BIP(B1) = 0 LINE AIS = 0 RDI = 0 FEBE = 0 BIP(B2) = 0 PATH AIS = 0 RDI = 0 FEBE = 0 BIP(B3) = 0 LOP = 0 NEWPTR = 0 PSE = 0 NSE = 0 Active Defects: None Active Alarms: None Alarm reporting enabled for: SLOS SLOF PLOP Framing : SONET Rx SONET/SDH bytes: (K1/K2) = 0/0 S1S0 = 0 C2 = 0x16 Tx SONET/SDH bytes: (K1/K2) = 0/0 S1S0 = 0 C2 = 0x16 J0 = 0x1 Clock source : Internal Framer loopback : None Path trace buffer : Stable Remote hostname : hswan-10720-3a Remote interface: SRP1/1 Remote IP addr : 100.1.1.4 Remote side id : A BER thresholds: SF = 10e-3 SD = 10e-6 IPS BER thresholds(B3): SF = 10e-3 SD = 10e-6 TCA thresholds: B1 = 10e-6 B2 = 10e-6 B3 = 10e-6

## LOF 和 LOS 错误

帧丢失(LOF)错误出现，当有超过3毫秒严重地在流入的SONET信令的错误状态的帧缺陷。信号丢失(LOS)错误出现，当所有零模式检测在流入的SONET信令19 (+/-3)时微秒或更加长。LOS也报告，如果信号丢失(如果电源在出于规格)。

LOF和LOS是部分错误和通常表明有在节点和下一个SONET设备(通常SONET复用器[MUX]之间的一问题，如果去电信网络)。

## BIP(B1)、BIP(B2) 和 BIP(B3) 错误

B1、B2和B3错误是通常进入接口的部分、线路和路径比特隔行扫描奇偶校验错误。这些值通常指示与链路的一问题或远程设备。要排除故障，请执行在接口的一个硬回送测试。请参阅本文的[硬环回测试](#)部分关于详细信息。

## AIS、RDI 和 FEBE 错误

当SONET网络设备检测LOF或LOS时，设备传送告警指示信号(AIS)消息通知下行设备和远端缺陷指示(RDI)信息通知上行设备。同样真实对B2和B3错误，但是这些错误报告作为Far End Block Error Path (FEBE)错误。

如果show controllers srp命令在路由器A看到FEBE错误，则您能推断在此链路另一端的设备有B2或B3错误，并且报告错误回到路由器A指示来自路由器A或链路的错误。

FEBE或远端缺陷指示(RDI)报警收据必要不指向一问题与本地接口。光纤跨距能导致错误。再次，一硬环回测试指示是否有错误。请参阅本文的[硬环回测试](#)部分关于详细信息。

## LOP、NEWPTR、PSE 和 NSE 错误

指针损失(LOP)，新建的SONET指针(NEWPTR)，有效填充事件(PSE)和无效填充事件(NSE)错误指示与链路的时钟错误。这些错误注视着SONET帧的零件是H1和H2字节。如果其中任一节点报告这些错误，检查电路计时问题。即使在链路的两节点正确地配置，在Telco SONET网络内的计时问题能导致这些错误。

## 硬环回测试

执行一硬环回测试为了排除一问题用路由器。这是前提对于此测验：

- 您一定能中断您需要测试的间距。
- 您必须访问路由器。
- 您必须有连接的光纤串Tx端口和Rx端口。



- 您让接口进入的musthave满足的衰减与光纤串的规格。

完成这些步骤：

1. 隔离您要从环的其余工作的间距。**注意：这是非常重要!**如果间距没有从环的其余被中断，SONET环路创建在环的完全停止，并且环不再通过流量。此断点有可能性杀害在环四处走动的的所有IPS数据包。为了隔离间距，思科建议您从环的其余测试。完成这些步骤：进入将有SONET环路的节点的接口配置模式。发出**srp ips request forced-switch [side]**命令将有SONET环路侧的手动绕接的。例如，如果在节点的端A要放置SONET环路，请发出**srp ips request forced-switch a**命令。这造成B侧包裹。B侧仍然是环的零件和仍然通过流量。当B侧包裹，您在节点的端A能仍然工作，没有效果到环的其余。
2. 从环隔离在间距的另一侧的节点以与在Step1 (a)和(b)相似的方式。
3. 拔掉从接口的电路。
4. 放光纤串的一端到Tx端口。
5. 检查从光纤串出来肯定的功率电平级别在该接口的规格内。如果功率电平太高，请使用衰减器削减功率电平，直到级别在规格内。
6. 把光纤串的另一端插入卡的Rx端口。
7. 更改此接口的时钟源对内部。
8. 清除计数器。
9. 等两三分种。
10. 运行**show controllers srp**命令并且检查错误。

这是从**show controllers srp**命令的输出，采取，当有在端A的一条硬环路。路径跟踪缓冲反映信息和端A一样，并且确认端口循环(同样主机名、接口、IP地址和侧ID)。

这是重要，因为多数环路测试要求**show interface**命令发现接口是否up/up (循环)。SRP不报告象这样的信息，因此您不能使用**show interface**命令发现端口是否循环。

当接口被确认如循环时，您能检查接口错误。如果接口报告错误，复核功率电平和光纤串。在您执行此后，如果接口仍然报告错误，请替换接口：

```
hswan-12008-2b#show controllers srp 1/0SRP1/0 - Side A (Outer RX, Inner TX)SECTION LOF = 0
LOS = 0 BIP(B1) = 0LINE AIS = 0 RDI = 0 FEBE
= 0 BIP(B2) = 0PATH AIS = 0 RDI = 0 FEBE = 0 BIP(B3) = 0
LOP = 0 NEWPTR = 0 PSE = 0 NSE = 0Active Defects: NoneActive
Alarms: NoneAlarm reporting enabled for: SLOS SLOF PLOPFraming : SONETRx SONET/SDH
bytes: (K1/K2) = 0/0 S1S0 = 0 C2 = 0x16Tx SONET/SDH bytes: (K1/K2) = 0/0 S1S0 = 0
C2 = 0x16 J0 = 0x1Clock source : InternalFramer loopback : NonePath trace buffer :
Stable Remote hostname : hswan-12008-2b !--- Check that host name is matched to verify that
interface is looped. Remote interface: SRP1/0 !--- Check that interface matches to verify that
interface is looped. Remote IP addr : 150.150.150.3 !--- Check that IP address matches to verify
that interface is looped. Remote side id : A !--- Check that remote side ID matches to verify
that interface is looped.BER thresholds: SF = 10e-3 SD = 10e-6IPS BER thresholds (B3): SF = 10e-3
SD = 10e-6TCA thresholds: B1 = 10e-6 B2 = 10e-6 B3 = 10e-6
```

一旦间距准备放置回到环，请务必关闭牵强的换行。

## 排除故障在Layer2

请使用此部分排除故障与SRP的Layer2。

### SRP IPS

SRP通信的用途智能保护交换(IPS)对在SRP环的其他节点。IPS提供SRP环给他们从光纤设备或节

点故障自动地恢复通过包裹在发生故障的段的流量的强大的自愈功能。

在SRP环的每个节点在外环附近发送结构信息包，因此在环的所有节点知道与谁他们能传达。发出 **show srp topology**命令验证结构信息包是否在环附近被发送并且接收：

```
hswan-12008-2b#show srp topology Topology Map for Interface SRP6/0 Topology pkt. sent every 5
sec. (next pkt. after 1 sec.) Last received topology pkt. 00:00:03 !--- If this value is higher
than the topology packet sent value !--- (5 seconds), topology packet drops occur somewhere on
the ring. Nodes on the ring: 4 Hops (outer ring) MAC IP Address Wrapped Name 0 0003.a09f.5700
100.1.1.2 No hswan-12008-2b 1 0001.c9ec.d300 100.1.1.5 No hswan-12016-2a 2 0000.5032.3037
100.1.1.1 No hswan-12410-3a 3 0006.d74a.f900 100.1.1.4 No hswan-10720-3a
```

此示例有在环的四节点，第一个节点(跳0)是本地节点。**show srp topology**命令更改的输出用环，只要环仍然收到结构信息包。

重要地，当最后结构信息包接收，此输出**show srp topology**命令指示：

```
hswan-12008-2b#show srp topology Topology Map for Interface SRP6/0 Topology pkt. sent every 5
sec. (next pkt. after 1 sec.) Last received topology pkt. 00:00:03 !--- If this value is higher
than the topology packet sent value !--- (5 seconds), topology packet drops occur somewhere on
the ring. Nodes on the ring: 4 Hops (outer ring) MAC IP Address Wrapped Name 0 0003.a09f.5700
100.1.1.2 No hswan-12008-2b 1 0001.c9ec.d300 100.1.1.5 No hswan-12016-2a 2 0000.5032.3037
100.1.1.1 No hswan-12410-3a 3 0006.d74a.f900 100.1.1.4 No hswan-10720-3a
```

此信息不随着时间的推移老化。因此，如果此计数器是任何在默认五秒，结构信息包在环丢失某处。

注意：您能更换此计时器用 [srp topology-timer](#)命令。

如果环丢失结构信息包，节点信息可以是错误的，因为收到的节点保存最后结构信息包。要验证哪节点一起连接，请使用**show controllers srp path**命令跟踪缓冲区信息发现节点物理的连接邻居。

此部分显示如何为错误的配置排除故障用**show srp ips**命令。保证IPS不报告环换行，并且有IDLE，在IPS消息报告的短的状态传送和接收。报告的IPS请求必须也是IDLE。所有其它状态指示与SONET链路的一问题。

这是好**show srp ips**命令输出示例：

```
hswan-12008-2b#show srp ips srp 6/0 IPS Information for Interface SRP6/0 MAC Addresses Side A
(Outer ring Rx) neighbor 0006.d74a.f900 Side B (Inner ring Rx) neighbor 0001.c9ec.d300 Node
MAC address 0003.a09f.5700 IPS State Side A not wrapped !--- Must be in a "not wrapped" state.
Side B not wrapped !--- Must be in a "not wrapped" state. Side A (Inner ring Tx) IPS pkt. sent
every 1 sec. (next pkt. after 1 sec.) Side B (Outer ring Tx) IPS pkt. sent every 1 sec. (next
pkt. after 1 sec.) inter card bus enabled IPS WTR period is 60 sec. (timer is inactive) Node
IPS State: idle !--- Must be idle. IPS Self Detected Requests IPS Remote Requests Side A IDLE Side A
IDLE !--- Side A reports good IDLE status. Side B IDLE Side B IDLE !--- Side B reports good IDLE
status. IPS messages received Side A (Outer ring Rx) {0006.d74a.f900,IDLE,SHORT}, TTL 255 !---
Side A receives good "IDLE,SHORT" status. Side B (Inner ring Rx) {0001.c9ec.d300,IDLE,SHORT},
TTL 255 !--- Side B receives good "IDLE,SHORT" status. IPS messages transmitted Side A (Outer
ring Rx) {0003.a09f.5700,IDLE,SHORT}, TTL 128 !--- Side A transmits good "IDLE,SHORT" status.
Side B (Inner ring Rx) {0003.a09f.5700,IDLE,SHORT}, TTL 128 !--- Side B transmits good
"IDLE,SHORT" status.
```

这是示例一环**show srp ips**命令(其中B侧包裹，因为端A发生故障)：

```
hswan-12008-2b#show srp ips IPS Information for Interface SRP1/0 MAC Addresses Side A (Outer
ring Rx) neighbor 0003.a09f.5480 Side B (Inner ring Rx) neighbor 0048.dc8b.b300 Node MAC
address 0003.a09f.5480 IPS State Side A not wrapped Side B wrapped !--- Side B is wrapped
because A is down. Side A (Inner ring Tx) IPS pkt. sent every 1 sec. (next pkt. after 1 sec.)
Side B (Outer ring Tx) IPS pkt. sent every 1 sec. (next pkt. after 1 sec.) inter card bus
enabled IPS WTR period is 60 sec. (timer is inactive) Node IPS State: wrapped !--- One side is
```

wrapped. IPS Self Detected Requests                      IPS Remote Requests    Side A **SF**  
 Side A IDLE *!--- Side A reports SF instead of IDLE. This indicates !--- an error condition on the ring.* Side B IDLE Side B IDLE IPS messages received Side A (Outer ring Rx) **none !--- Side A is down, and does not receive any IPS messages.** Side B (Inner ring Rx) {00b0.8e96.b41c,**SF, LONG**}, TTL 253 *!--- Side B reports SF, LONG instead of IDLE, SHORT.* IPS messages transmitted Side A (Outer ring Rx) {0003.a09f.5480,**SF, SHORT**}, TTL 128    Side B (Inner ring Rx) {0003.a09f.5480,**SF, LONG**}, TTL 128

验证您是否有一个正确地址解析服务(ARP)表用**show arp**命令：

```
hswan-12008-2b#show arp
Protocol Address                      Age (min) Hardware Addr    Type
InterfaceInternet 100.1.1.4                      59    0006.d74a.f900    SRP-A    SRP6/0Internet 100.1.1.1
234    0000.5032.3037    SRP-B    SRP6/0Internet 100.1.1.2                      -    0003.a09f.5700    SRP2
SRP6/0Internet 150.150.150.4                      3    00b0.8e96.b41c    SRP-B    SRP1/0Internet 150.150.150.2
30    0048.dc8b.b300    SRP-B    SRP1/0Internet 150.150.150.3                      -    0003.a09f.5480    SRP
SRP1/0Internet 150.150.150.1                      30    0030.b660.6700    SRP-B    SRP1/0
```

- SRP ? SRP版本1 (OC12 SRP)
- SRP2?SRP版本2 (OC48 SRP)
- SRP-A ? 节点连接对SRP接口的端A
- SPR-B ? 节点连接对SRP接口的B侧

**注意：**SRP1/0的所有条目有一种类SRP-B。这是因为端A发生故障，因此节点从接口的B侧学习一切。

SRP接口可以也在直通模式。为了查明此，请发出**show interface**命令。直通模式是，当接口的两边不能通过流量时。例如，当接口管理性时关闭或两边未命中SRP Keepalive。这造成卡变为在环的一个光放大器。关于直通模式的一重点是单独此模式不造成环包裹。所以，节点的关闭不引起IPS问题(这是好排除故障环问题)。这是输出示例: **show interface**命令：

```
hswan-12008-2b#show interface srp 1/0SRP1/0 is administratively down, line protocol is down
Hardware is SRP over SONET, address is 0003.a09f.5480 (bia 0003.a09f.5480) Internet address is
150.150.150.3/24 MTU 4470 bytes, BW 622000 Kbit, DLY 100 usec, rely 255/255, load 1/255
Encapsulation SRP, Side A: loopback not set Side B: loopback not set 4 nodes on the ring
MAC passthrough set Side A: not wrapped IPS local: IDLE IPS remote: IDLE Side
B: not wrapped IPS local: IDLE IPS remote: IDLE Last input 00:00:10, output 00:00:09,
output hang never Last clearing of "show interface" counters 00:00:03 Queueing strategy: fifo
Output queue 0/40, 0 drops; input queue 0/75, 0 drops 5 minute input rate 0 bits/sec, 1
packets/sec 5 minute output rate 0 bits/sec, 0 packets/sec 0 packets input, 0 bytes, 0 no
buffer Received 0 broadcasts, 0 runts, 0 giants, 0 throttles 0 input errors, 0 CRC, 0
frame, 0 overrun, 0 ignored, 0 abort 0 packets output, 0 bytes, 0 underruns 0 output
errors, 0 collisions, 0 interface resets 0 output buffer failures, 0 output buffers swapped
out Side A received errors: 0 input errors, 0 CRC, 0 ignored, 0 framer runts,
0 framer giants, 0 framer aborts, 0 mac runts, 0 mac giants, 0 mac aborts Side B
received errors: 0 input errors, 0 CRC, 0 ignored, 0 framer runts, 0 framer
giants, 0 framer aborts, 0 mac runts, 0 mac giants, 0 mac aborts
```

## SRP 报警

对于与SRP警报信息的帮助，参考[Cisco 10720互联网路由器安装和配置指南的警报信息](#)部分。

## SRP 调试

显示命令是足够通常排除故障SRP问题。然而，有您必须接通调试的情况。这是两个频繁地使用的调试指令：

- debug srp ips
- debug srp topology

请使用debug srp ips显示在环四处走动的IPS数据包。和用show srp ips命令，两边必须有IDLE状态，短。

这是成功调试srp ips示例节点收到从两个的数据包环的地方(前两条线路)的A和B端。它也传达(Tx) IDLE , 短的消息给邻接节点(为时两线路)。

```
hswan-12008-2b#show interface srp 1/0SRP1/0 is administratively down, line protocol is down
Hardware is SRP over SONET, address is 0003.a09f.5480 (bia 0003.a09f.5480) Internet address is
150.150.150.3/24 MTU 4470 bytes, BW 622000 Kbit, DLY 100 usec, rely 255/255, load 1/255
Encapsulation SRP, Side A: loopback not set Side B: loopback not set 4 nodes on the ring
MAC passthrough set Side A: not wrapped IPS local: IDLE IPS remote: IDLE Side
B: not wrapped IPS local: IDLE IPS remote: IDLE Last input 00:00:10, output 00:00:09,
output hang never Last clearing of "show interface" counters 00:00:03 Queueing strategy: fifo
Output queue 0/40, 0 drops; input queue 0/75, 0 drops 5 minute input rate 0 bits/sec, 1
packets/sec 5 minute output rate 0 bits/sec, 0 packets/sec 0 packets input, 0 bytes, 0 no
buffer Received 0 broadcasts, 0 runts, 0 giants, 0 throttles 0 input errors, 0 CRC, 0
frame, 0 overrun, 0 ignored, 0 abort 0 packets output, 0 bytes, 0 underruns 0 output
errors, 0 collisions, 0 interface resets 0 output buffer failures, 0 output buffers swapped
out Side A received errors: 0 input errors, 0 CRC, 0 ignored, 0 framer runts,
0 framer giants, 0 framer aborts, 0 mac runts, 0 mac giants, 0 mac aborts Side B
received errors: 0 input errors, 0 CRC, 0 ignored, 0 framer runts, 0 framer
giants, 0 framer aborts, 0 mac runts, 0 mac giants, 0 mac aborts
```

这是一环示例debug srp ips命令B侧发生故障的地方 , 并且端A包裹 :

```
hswan-12008-2b#show interface srp 1/0SRP1/0 is administratively down, line protocol is down
Hardware is SRP over SONET, address is 0003.a09f.5480 (bia 0003.a09f.5480) Internet address is
150.150.150.3/24 MTU 4470 bytes, BW 622000 Kbit, DLY 100 usec, rely 255/255, load 1/255
Encapsulation SRP, Side A: loopback not set Side B: loopback not set 4 nodes on the ring
MAC passthrough set Side A: not wrapped IPS local: IDLE IPS remote: IDLE Side
B: not wrapped IPS local: IDLE IPS remote: IDLE Last input 00:00:10, output 00:00:09,
output hang never Last clearing of "show interface" counters 00:00:03 Queueing strategy: fifo
Output queue 0/40, 0 drops; input queue 0/75, 0 drops 5 minute input rate 0 bits/sec, 1
packets/sec 5 minute output rate 0 bits/sec, 0 packets/sec 0 packets input, 0 bytes, 0 no
buffer Received 0 broadcasts, 0 runts, 0 giants, 0 throttles 0 input errors, 0 CRC, 0
frame, 0 overrun, 0 ignored, 0 abort 0 packets output, 0 bytes, 0 underruns 0 output
errors, 0 collisions, 0 interface resets 0 output buffer failures, 0 output buffers swapped
out Side A received errors: 0 input errors, 0 CRC, 0 ignored, 0 framer runts,
0 framer giants, 0 framer aborts, 0 mac runts, 0 mac giants, 0 mac aborts Side B
received errors: 0 input errors, 0 CRC, 0 ignored, 0 framer runts, 0 framer
giants, 0 framer aborts, 0 mac runts, 0 mac giants, 0 mac aborts
```

另一-debug命令您能使用是debug srp topology。调试显示结构信息包的流在环附近。注意在封装的节点node\_wrapped状态是一1。

这是debug srp topology好的实例没有在环的换行 :

```
*Jan 3 23:34:01.846: srp_input: pkt_hdr=0x0F002007, flags=0x00000002 *Jan 3 23:34:01.846:
srp_forward_topology_map_packet: SRP12/0, len 20*Jan 3 23:34:01.846: srp_input:
pkt_hdr=0x0F002007, flags=0x00000003 *Jan 3 23:34:01.846: srp_forward_topology_map_packet:
SRP12/0, len 20*Jan 3 23:34:02.266: srp_send_topology_map_packet: SRP12/0 on side B - Not
Wrapped*Jan 3 23:34:02.266: srp_send_topology_map_packet: SRP12/0 on side A - Not Wrapped*Jan 3
23:34:02.266: srp_input: pkt_hdr=0x0F002007, flags=0x00000002 *Jan 3 23:34:02.266:
srp_consume_topology_map_packet: SRP12/0, len 34*Jan 3 23:34:02.266: 0, src node_wrapped 0, src
mac_addr 0001.c9ec.d300 !--- If the node is not wrapped, the node_wrapped bit should be zero
(0).*Jan 3 23:34:02.266: 1, src node_wrapped 0, src mac_addr 0000.5032.3037 *Jan 3 23:34:02.266:
2, src node_wrapped 0, src mac_addr 0006.d74a.f900*Jan 3 23:34:02.266: 3, src node_wrapped 0,
src mac_addr 0003.a09f.5700topology changed = No*Jan 3 23:34:02.266: 0, src node_wrapped 0, src
mac_addr 0001.c9ec.d300*Jan 3 23:34:02.266: 1, src node_wrapped 0, src mac_addr
0000.5032.3037*Jan 3 23:34:02.266: 2, src node_wrapped 0, src mac_addr 0006.d74a.f900*Jan 3
23:34:02.266: 3, src node_wrapped 0, src mac_addr 0003.a09f.5700topology updated = No*Jan 3
23:34:02.266: srp_input: pkt_hdr=0x0F002007, flags=0x00000003 *Jan 3 23:34:02.930: srp_input:
pkt_hdr=0x0F002007, flags=0x00000002 *Jan 3 23:34:02.930: srp_forward_topology_map_packet:
SRP12/0, len 13*Jan 3 23:34:02.930: srp_input: pkt_hdr=0x0F002007, flags=0x00000003 *Jan 3
23:34:02.930: srp_forward_topology_map_packet: SRP12/0, len 27*Jan 3 23:34:04.194: srp_input:
pkt_hdr=0x0F002007, flags=0x00000003 *Jan 3 23:34:04.194: srp_forward_topology_map_packet:
```

```
SRP12/0, len 13*Jan 3 23:34:04.194: srp_input: pkt_hdr=0x0F002007, flags=0x00000002 *Jan 3 23:34:04.194: srp_forward_topology_map_packet: SRP12/0, len 27
```

这是debug srp topology一坏示例与包裹的节点的：

```
*Jan 3 23:44:47.042: srp_input: pkt_hdr=0x0F002007, flags=0x00000002 *Jan 3 23:44:47.042: srp_forward_topology_map_packet: SRP12/0, len 20*Jan 3 23:44:47.058: srp_input: pkt_hdr=0x0F002007, flags=0x00000002 *Jan 3 23:44:47.058: srp_forward_topology_map_packet: SRP12/0, len 20*Jan 3 23:44:47.486: srp_send_topology_map_packet: SRP12/0 on side B - Wrapped*Jan 3 23:44:47.486: srp_send_topology_map_packet: SRP12/0 on side A - Wrapped*Jan 3 23:44:47.486: srp_input: pkt_hdr=0x0F002007, flags=0x00000002 *Jan 3 23:44:47.486: srp_consume_topology_map_packet: SRP12/0, len 34*Jan 3 23:44:47.486: 0, src node_wrapped 1, src mac_addr 0001.c9ec.d300 !--- If the node is wrapped, the node_wrapped bit should be one (1).*Jan 3 23:44:47.486: 1, src node_wrapped 1, src mac_addr 0000.5032.3037 *Jan 3 23:44:47.486: 2, src node_wrapped 0, src mac_addr 0006.d74a.f900*Jan 3 23:44:47.486: 3, src node_wrapped 0, src mac_addr 0003.a09f.5700topology changed = No*Jan 3 23:44:47.486: 0, src node_wrapped 1, src mac_addr 0001.c9ec.d300*Jan 3 23:44:47.486: 1, src node_wrapped 1, src mac_addr 0000.5032.3037*Jan 3 23:44:47.486: 2, src node_wrapped 0, src mac_addr 0006.d74a.f900*Jan 3 23:44:47.486: 3, src node_wrapped 0, src mac_addr 0003.a09f.5700topology updated = No*Jan 3 23:44:47.486: srp_input: pkt_hdr=0x0F002007, flags=0x00000002 *Jan 3 23:44:48.182: srp_input: pkt_hdr=0x0F002007, flags=0x00000002 *Jan 3 23:44:48.182: srp_forward_topology_map_packet: SRP12/0, len 13*Jan 3 23:44:48.186: srp_input: pkt_hdr=0x0F002007, flags=0x00000002 *Jan 3 23:44:48.186: srp_forward_topology_map_packet: SRP12/0, len 27*Jan 3 23:44:49.362: srp_input: pkt_hdr=0x0F002007, flags=0x00000002 *Jan 3 23:44:49.362: srp_forward_topology_map_packet: SRP12/0, len 27*Jan 3 23:44:49.362: srp_input: pkt_hdr=0x0F002007, flags=0x00000002 *Jan 3 23:44:49.362: srp_forward_topology_map_packet: SRP12/0, len 13
```

## SRP 常问问题

这是一些常见问题：

- **问题1**：能否使用与MM卡的一条SM链路或与SM卡的一条MM链路？**答案**：不，但记住Rx端口只于正确功率电平的收据有关。
- **问题2**：能否连接OC12 SRP卡到OC48 SRP卡？**答案**：不不仅是速度不同的，但是OC12也使用SRP版本1，当OC48使用SRP版本2时。
- **问题3**：我看到我在我的路径跟踪缓冲的自己的信息。这是怎么回事？**答案**：有指向回到节点的该侧的环路某处。如果环路不能在那里，请查找环路并且删除环路。

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