

Cisco ONS 15454 ML卡故障排除

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簡介

本文使用簡單的測試拓撲來描述如何對Cisco ONS 15454上的多層(ML)卡進行故障排除。[附錄](#)部分提供了一些基本配置命令和詳細的拓撲資訊。

該測試使用經驗方法瞭解與ML卡相關的網路故障。該測試會注入已知故障或配置以捕獲和分析預期結果。故障隔離案例研究提出了這些發現。

本文檔遵循典型的故障排除方法。本文檔提供了一個症狀，討論了相關的故障隔離步驟，並提供了通用的故障排除過程。

必要條件

需求

思科建議您瞭解以下主題：

- Cisco ONS 15454

- 思科ONS 15454 ML系列乙太網卡
- Cisco IOS
- 橋接和IP路由

[採用元件](#)

本文中的資訊係根據以下軟體和硬體版本：

- 執行Cisco IOS®軟體版本12.1(13)E13的Cisco路由器7603
- 運行Cisco ONS 4.1.3版的Cisco ONS 15454
- 執行Cisco IOS軟體版本12.1(19)EO1的ML (捆綁為ONS 4.1.3版本的一部分)

本文中的資訊是根據特定實驗室環境內的裝置所建立。文中使用到的所有裝置皆從已清除 (預設) 的組態來啟動。如果您的網路正在作用，請確保您已瞭解任何指令可能造成的影響。

[慣例](#)

如需文件慣例的詳細資訊，請參閱[思科技術提示慣例](#)。

[基本ML體系結構](#)

用於ONS 15454平台的Cisco ML系列卡在第2層和第3層通過SONET/SDH提供10/100/1000 Mbps乙太網連線。機箱中的每個ML卡運行一個獨立的IOS映像。在ML埠之間的思科傳輸控制器(CTC)中建立交叉連線電路會建立SONET(POS)埠上的虛擬後端資料包。在軟體版本4.6及更高版本中，總是會建立POS埠，但埠只在CTC中發生交叉連線電路時才會開啟。

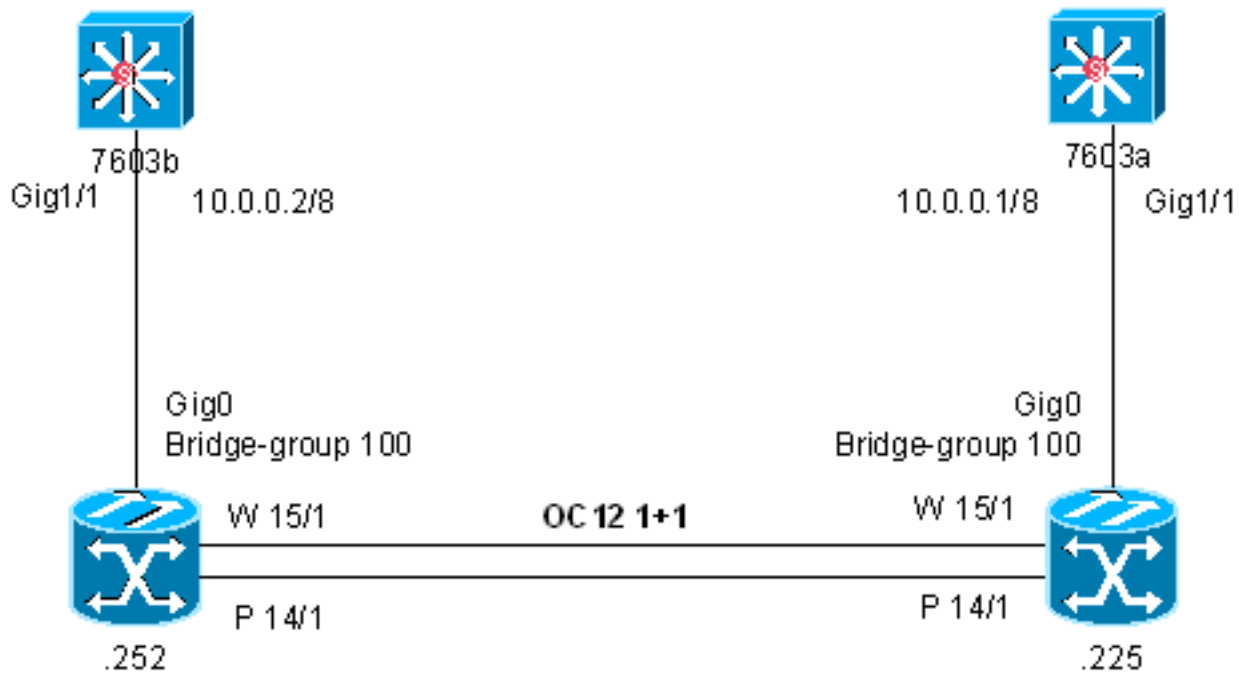
ML1000-2卡具有兩個POS埠 (0和1)。每個埠具有最高同步傳輸訊號(STS)-24c頻寬和每卡總計STS-48c。每個POS埠支援子介面，以允許VLAN中繼。POS埠到光埠的物理對映發生在電路建立階段，並且可能在光跨度變化期間發生改變。因此，電路兩端的兩個POS埠是對等體，其配置需要匹配。

乙太網埠和POS埠之間的對映取決於拓撲要求。第2層交換拓撲將這兩種型別的埠與同一個網橋組編號連線在一起。第3層拓撲在這些介面之間路由資料包。

[基本測試拓撲](#)

[圖1](#)表示測試拓撲：

圖1 — 測試拓撲



要設定測試拓撲：

1. 通過千兆乙太網將兩台Cisco 7603路由器連線到ONS節點，並確保兩台路由器的兩個埠位於同一個IP子網中。這裡，每個ONS節點在插槽12中有一個ML1000-2卡。
2. 為兩個ONS節點上的Gig0和POS0配置網橋組100。**注意：**您無需在此測試中使用POS1。兩個ML POS0埠之間的電路是STS-12c。
3. 禁用ML卡上的IP路由。
4. 在兩個ONS節點之間調配OC12 1+1保護。有關相關資訊，請參見圖1。**注意：**兩個ONS節點都運行Cisco ONS版本4.1.3。

故障插入案例研究

本節將分析各種已知故障和某些常見操作的結果。每個案例分析都描述了這個過程，以及ML和ONS上的結果。

一般資訊

一些用於排除ML IOS問題的相關命令

```
show ons alarm
show ip interface brief
clear counters
show interface summary
show interface
```

確保使用正確的時間戳記錄緩衝區，並檢查計時通訊與控制(TCC)是否使用正確的日期和時間。以下是ML上的配置輸出示例：

```
service timestamps debug uptime
service timestamps log datetime msec localtime
logging buffered 4096 debugging
```

這些警報自動觸發POS連結狀態更改：

```
PAIS
PLOP
PTIM
PUNEQ
PRDI
PPLM
PPDI
BER_SF_B3
```

注意：ONS 15454平台使用兩種格式報告警報。例如，PAIS出現在IOS(ML)中，而AIS-P出現在CTC中。PAIS和AIS-P代表相同型別的警報。

[反恐委員會的共同核查](#)

```
Alarms
Conditions
History
Circuit
Inventory
Port PM counters
Diagnostics file
Audit trail
```

- 在ML卡上：維護/效能Ether埠：檢查錯誤。維護/效能POS埠：檢查錯誤。
- 在OC12工作卡上：在調配/SONET STS上啟用IPPM。效能：檢查錯誤。

[案例研究](#)

本節介紹各種可能的故障點，並說明如何獲取正確的資訊以解決問題。

[乙太網斷開連線](#)

拔下乙太網電纜時。225上會顯示此警報：

```
.225ML12#show ons alarm
Equipment Alarms
Active: None
Port Alarms
  POS0 Active: None
  POS1 Active: None
  GigabitEthernet0 Active: CARLOSS
  GigabitEthernet1 Active: None
```

```
POS0
Active Alarms : None
Demoted Alarms: None
```

POS1 Interface not provisioned

注意：如果強制上行ML GigE介面，ML不會注意到鏈路已關閉。

CTC 0.225中出現相同警報(請參見圖2)。

圖2 - CTC中的警報

Num	Ref	New	Date	Object	Eqpt Type	Slot	Port	Pa...	Sev	ST	SA	Cond	Description
742	742	✓	05/24/04 12:23:37 CDT	FAC-12-0	ML1000	12	0		MJ	R	✓	CARLOSS	Carrier Loss On The LAN

與7603a相鄰的Cisco發現協定(CDP)丟失可確認此問題。

註：GigE 0的狀態不會影響POS 0介面 (該介面仍為Up/Up) 。

OC12保護交換器

OC12保護交換機不會建立任何警報或錯誤。

兩個OC12均停止服務(OOS)

當.252節點上的兩個OC12埠都更改為OOS時，.225會報告AIS-P，這會導致POS 0介面關閉，並導致TPTFAIL。

```
.225ML12#show ons alarm
Equipment Alarms
Active: RUNCFG-SAVENEED
```

```
Port Alarms
  POS0 Active: TPTFAIL
  POS1 Active: None
  GigabitEthernet0 Active: None
  GigabitEthernet1 Active: None
```

```
POS0
Active Alarms : PAIS
Demoted Alarms: None
```

```
POS1
Interface not provisioned
```

XC側交換機

此日誌條目出現在交換XC的節點的ML上。請注意，XCON B是插槽10 XC。

```
May 24 09:55:27.402: %CARDWARE-5-XCON_SWITCH: Switched XCON to B
May 24 09:55:27.406: %CARDWARE-6-BTC_DRV: Init BTC, BTC Rev = 2, Backplane = 0,
Port = 0
```

TCC側交換機

圖3顯示已註冊的警報。

圖3 - TCC側交換機警報

Alarms	Conditions	History	Circuits	Provisioning	Maintenance						
New	Date	Node	Object	Eqpt Type	Slot	Port	ST	Sev	SA	Cond	Description
✓	05/24/04 10:05:37 CDT	R27-1...	SYSTEM				R	MN		DISCONN...	Loss of connection between node and CTC

注意：如果使用CTC或反向telnet連線到ML卡，則會失去與ML卡的連線。

幾分鐘後，警報必須清除。這些日誌條目顯示在ML中：

```
May 24 10:29:09.258: %CARDWARE-5-SOCKET_INFO: closed socket to TCC:
changed active TCC
May 24 10:29:09.766: %ONS-6-VTY: All Vty lines cleared
May 24 10:29:14.762: %CARDWARE-5-SOCKET_INFO: cannot connect socket to TCC: B
May 24 10:29:20.270: %CARDWARE-5-SOCKET_INFO: cannot connect socket to TCC: B
May 24 10:29:25.770: %CARDWARE-5-SOCKET_INFO: cannot connect socket to TCC: B
May 24 10:29:31.270: %CARDWARE-5-SOCKET_INFO: cannot connect socket to TCC: B
May 24 10:29:36.370: %CARDWARE-5-SOCKET_INFO: open socket to TCC: B
May 24 10:29:41.166: %CARDWARE-6-BTC_DRV: Init BTC, BTC Rev = 2, Backplane = 0,
Port = 0.
```

當前活動TCC也出現在此輸出中。插槽11 TCC為TCC B，而插槽7為TCC A。

```
.252ML12#show ons equipment-agent status
EQA ---- phySlot: 12, eqptType: EQPT_L2SC, eqptID: 0x2403 ----
  curTCC: Tcc B
linkStatus:    Full      dbReq/Recv: 7 / 7  msgVerToEQM: 2
  socketFd:    0         pipeMsgAct:  No      hdrSizeToEQM: 28
  connTries:   0         connTimerFast: No    hdrSizeFromEQM: 28
timingProv:    No
clock auto 1
```

電路移除和建立

刪除交叉連線電路將建立以下日誌條目：

```
May 27 17:40:48.459: %VIRTUAL_PA-6-PAREMOVED:
POS interface [0] has been removed due to circuit deletion
May 27 17:40:48.511: %CARDWARE-6-BTC_DRV: Init BTC, BTC Rev = 2,
Backplane = 0, Port = 0.
```

從ML檢視埠配置時，該埠配置會更改。

```
.225ML12#show ons provisioning-agent m ports all
----- Backend Port (00) Data -----
prov: no  sts: xx  vt: xx  type: xxx  name: xxxxxx
----- Backend Port (01) Data -----
prov: no  sts: xx  vt: xx  type: xxx  name: xxxxxx
```

建立STS3c電路可更新ML上的埠資訊。POS 0控制器輸出中也顯示電路大小。

```
.225ML12#show ons provisioning-agent m ports all
----- Backend Port (00) Data -----
prov: yes  sts: 00  vt: 255  type: DOS  name:
----- STS (00) Term Strip -----
Admin State: IS          Direction: TX_RX_EQPT
Type: 3 Sf: 1E-4 Sd: 1E-7 C2 tx/exp: 0x01 / 0x01
PathTrace Format: 64Byte Mode: OFF
  expected: (not valid)
  send: valid: "\000\000\000\000"
```

```
----- VT (255) Term Strip not provisioned -----
----- STS (00) Xc Strip -----
rate: 3 Admin: IS
Src Port/STS: 0x09/0x00 STS Eqpt: 0x01
Dest Port/STS: 0x06/0x00 UPSR STS Cont Dest: 0x00
Prev STS Stich Dest Port/STS: 0xFF/0x00
Next STS Stich Dest Port/STS: 0xFF/0x00
```

```
----- Backend Port (01) Data -----
prov: no sts: xx vt: xx type: xxx name: xxxxxx
```

將顯示以下日誌條目：

```
May 27 17:47:08.711: %VIRTUAL_PA-6-PAPLUGGEDIN:
POS interface [0] has been created due to circuit creation
May 27 17:47:08.715: %CARDWARE-6-BTC_DRV: Init BTC, BTC Rev = 2,
Backplane = 0, Port = 0.
May 27 17:47:08.915: %LINK-3-UPDOWN:
Interface POS0, changed state to up
May 27 17:47:09.927: %LINEPROTO-5-UPDOWN:
Line protocol on Interface POS0, changed state to up
```

[環回](#)

對。225上的活動OC12埠應用設施環路會導致。225 ML報告TPTFAIL警報。此警報也會顯示在ML警報清單中。

注意：如果在活動路徑上啟用環回，則會發生流量丟失。

```
.225ML12#show ons alarm
Equipment Alarms
Active: None
Port Alarms
  POS0 Active: TPTFAIL
  POS1 Active: None
  GigabitEthernet0 Active: None
  GigabitEthernet1 Active: None
POS0
Active Alarms : PAIS
Demoted Alarms: None
```

```
POS1
Interface not provisioned
```

注意：使用彈性分組環(RPR)而不是本測試中的1+1 OC-12時，請在啟用環回之前關閉POS介面。RPR上的此類環回會導致流量丟失，因為保護路徑不會重新路由流量。

[日期和時間更改](#)

TCC上的錯誤日期和時間設定將在日誌中建立此條目：

```
2d23h: %CARDWARE-5-CLOCK_ERR: cannot set time-of-day,
(invalid IOS time set on TCC)
```

更改日期和時間後，此條目將出現在ML日誌中。

```
2d23h: %CARDWARE-5-CLOCK_INFO: system clock, timezone,
```

and summertime configured

根據TCC的時鐘，在IOS系統時鐘上進行自動更新。您可以通過show clock命令驗證此更新。

注意：可以使用service timestamps命令配置調試和記錄時間戳以使用新的時鐘資訊。

一個POS介面關閉

.225 ML上的POS 0介面關閉時，會發生一些報警和情況(請參見圖4)。

圖4 - POS 0介面關閉時的警報和情況

05/24/04 10:51:51 CDT	252	STS-14-1-1	OC12	14	1	12	NR		AIS-P	Alarm Indication Signal - Path	
05/24/04 10:51:51 CDT	252	STS-15-1-1	OC12	15	1	12	NR		AIS-P	Alarm Indication Signal - Path	
05/24/04 10:51:51 CDT	252	VFAC-12-0	ML1000	12	0			MJ	✓	TPTFAIL	Transport layer failure
05/24/04 10:52:04 CDT	225	STS-14-1-1	OC12	14	1	12	NA		PDI-P	Payload Defect Indication - Path	
05/24/04 10:52:04 CDT	225	STS-15-1-1	OC12	15	1	12	NR		RFI-P	One-Bit Remote Failure Indication - Path	
05/24/04 10:52:04 CDT	225	STS-15-1-1	OC12	15	1	12	NA		PDI-P	Payload Defect Indication - Path	

AIS-P用於。252上的兩個OC12埠。然後。252上的ML發生TPTFAIL。在返回路徑上，.225報告兩個OC-12埠的路徑負載缺陷指示 (PPDI ，也稱為PDI-P) ，並報告工作OC-12埠的RFI-P。

在。225 ML上，會出現以下警報：

```
.225ML12#show ons alarm
Equipment Alarms
Active: RUNCFG-SAVENEED
```

```
Port Alarms
  POS0 Active: None
  POS1 Active: None
  GigabitEthernet0 Active: None
  GigabitEthernet1 Active: None
```

```
POS0
Active Alarms : PRDI PPDI
Demoted Alarms: None
```

```
POS1
Interface not provisioned
```

這些日誌條目也會顯示在。225上：

```
May 24 10:52:01.802: %LINK-5-CHANGED: Interface POS0,
changed state to administratively down
May 24 10:52:02.801: %LINEPROTO-5-UPDOWN: Line protocol on Interface POS0,
changed state to down
May 24 10:52:04.021: %SONET-4-ALARM: POS0: PRDI
May 24 10:52:04.269: %SONET-4-ALARM: POS0: PPDI
```

在。252上，會發生以下警報：

```
.252ML12#show ons alarm
Equipment Alarms
Active: None
```

```
Port Alarms
  POS0 Active: TPTFAIL
  POS1 Active: None
  GigabitEthernet0 Active: None
```


GigabitEthernet1 Active: None

POS0

Active Alarms : **PAIS**

Demoted Alarms: None

POS1

Interface not provisioned

同樣，.252上的日誌條目表示POS 0關閉事件的原因是PAIS。這與反恐委員會報告的警報或情況相符。

```
May 24 10:51:48.969: %VIRTUAL_PA-6-UPDOWN:
POS0 changed to down due to PAIS defect trigger changing state
May 24 10:51:49.169: %LINK-3-UPDOWN:
Interface POS0, changed state to down
May 24 10:51:50.169: %LINEPROTO-5-UPDOWN:
Line protocol on Interface POS0, changed state to down
May 24 10:51:51.169: %SONET-4-ALARM: POS0: PAIS
```

您可以透過以下輸出確認此事實：

```
.252ML12#show contro pos 0 | inc Active
Active Alarms : PAIS
Active Defects: PAIS
```

啟動POS 0介面時，這些日誌條目顯示在。252 ML上：

```
May 24 11:16:17.509: %VIRTUAL_PA-6-UPDOWN:
POS0 changed to up due to PAIS defect trigger changing state
May 24 11:16:17.709: %LINK-3-UPDOWN:
Interface POS0, changed state to up
May 24 11:16:18.709: %LINEPROTO-5-UPDOWN:
Line protocol on Interface POS0, changed state to up
May 24 11:16:27.309: %SONET-4-ALARM:
POS0: PAIS cleared
```

以下是。225 ML上的日誌條目：

```
May 24 11:16:30.607: %VIRTUAL_PA-6-UPDOWN:
POS0 changed to up due to PPDI defect trigger changing state
May 24 11:16:30.807: %LINK-3-UPDOWN:
Interface POS0, changed state to up
May 24 11:16:31.555: %SYS-5-CONFIG_I:
Configured from console by vty0 (127.0.0.100)
May 24 11:16:31.807: %LINEPROTO-5-UPDOWN:
Line protocol on Interface POS0, changed state to up
May 24 11:16:40.175: %SONET-4-ALARM: POS0: PRDI cleared
May 24 11:16:40.415: %SONET-4-ALARM: POS0: PPDI cleared
```

現在流量恢復正常。

[POS CRC不匹配](#)

當同一電路的兩個POS埠上的CRC不匹配（例如，一端16位，而另一端32位）時，TCC和ML上都不會出現警報。兩個POS埠仍處於開啟狀態，但流量不會流動。以下是一些症狀：

1. 由於CRC，兩個POS介面輸入錯誤計數器均以100%遞增。在這種情況下，.225 ML上的CRC更改為16位，而。252 ML仍具有預設的32位CRC。 .252 ML上的POS0介面顯示類似的輸

入和CRC錯誤計數。

```
.225ML12#show int pos 0
POS0 is up, line protocol is up
  Hardware is Packet/Ethernet over Sonet,
  address is 000f.2475.8c00 (bia 000f.2475.8c00)
  MTU 1500 bytes, BW 622080 Kbit, DLY 100 usec,
    reliability 149/255, txload 1/255, rxload 1/255
  Encapsulation ONS15454-G1000, crc 16, loopback not set
  Keepalive set (10 sec)
  Scramble enabled
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 00:06:57, output never, output hang never
  Last clearing of "show interface" counters 00:04:28
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue: 0/40 (size/max)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
    0 packets input, 11190 bytes
    Received 0 broadcasts (0 IP multicast)
    0 runs, 0 giants, 0 throttles
    0 parity      138 input errors,
138 CRC, 0 frame, 0 overrun, 0 ignored
    0 input packets with dribble condition detected
    178 packets output, 15001 bytes, 0 underruns
    0 output errors, 0 applique, 0 interface resets
    0 babbles, 0 late collision, 0 deferred
    0 lost carrier, 0 no carrier
    0 output buffer failures, 0 output buffers swapped out
    0 carrier transitions
```

2. POS控制器輸入CRC錯誤計數遞增。

```
.225ML12#show contro pos 0 | inc input
8841 total input packets, 46840204 post-HDLC bytes
0 input short packets, 46840993 pre-HDLC bytes
0 input long packets , 3893 input runt packets
2165 input CRCerror packets , 0 input drop packets
0 input abort packets
0 input packets dropped by ucode
```

3. 整個光路徑的CDP鄰居丟棄。即使POS0已啟動且CDP正常工作，但POS0上的鄰居仍然沒有顯示。

```
225ML12#show cdp neighbor
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone
Device ID         Local Intrfce   Holdtme    Capability Platform Port ID
7603a             Gig 0           170        R S I      Cat 6000  Gig 1/1
```

```
.225ML12#show cdp int | be POS0
POS0 is up, line protocol is up
  Encapsulation
  Sending CDP packets every 60 seconds
  Holdtime is 180 seconds
```

[POS擾頻不匹配](#)

使用PPP封裝時，可以啟用SPE加擾（預設情況下，SPE加擾處於禁用狀態）。在本示例中，.225ML POS0已啟用擾碼，而.252ML POS0具有預設設定。

```
.225ML12#show int pos 0 | in Scramble
```

Scramble enabled

加擾不匹配會改變C2值。如果啟用擾碼，POS介面使用C2值0x16。如果禁用擾碼，POS介面使用C2值0xCF。在。252 POS 0埠上啟用加擾時，結果如下 (.225 POS 0配置不會更改)：

```
.252ML12#show contr pos 0 | in C2
C2 (tx / rx)          : 0x16 / 0xCF
```

在。252節點上，對CTC中的活動OC12埠執行PLM-P，然後對POS0埠執行PLM-P。這會觸發POS0埠關閉，從而引發TPTFAIL警報。

```
.252ML12#show ons alarm
Equipment Alarms
Active: RUNCFG-SAVENEED
```

```
Port Alarms
  POS0  Active: TPTFAIL
  POS1  Active: None
  GigabitEthernet0  Active: None
  GigabitEthernet1  Active: None
```

```
POS0
Active Alarms : PPLM
Demoted Alarms: None
```

```
POS1
Interface not provisioned
```

在。225節點上，CTC中的兩個OC12埠都發生PDI-P。此警報是。252中POS0關閉的結果。對於POS0，會出現相同的警報 (在IOS中稱為Path Payload Defect Indication [PPDI])，這是因為介面收到C2值0xFC (有關此的詳細資訊將在本文檔後面介紹)。

```
.225ML12#show control pos 0 | inc C2
C2 (tx / rx)          : 0xCF / 0xFC
```

PPDI警報會關閉POS0介面。關閉的POS0介面將引發TPTFAIL。

```
.225ML12#show ons alarm
Equipment Alarms
Active: RUNCFG-SAVENEED
```

```
Port Alarms
  POS0  Active: TPTFAIL
  POS1  Active: None
  GigabitEthernet0  Active: None
  GigabitEthernet1  Active: None
```

```
POS0
Active Alarms : PPDI
Demoted Alarms: None
```

```
POS1
Interface not provisioned
```

[POS C2位元組更改](#)

LEX封裝的預設C2值為0x01 (POS的預設封裝)，PPP/HDLC封裝的預設C2值為0xCF。如果您將此值更改不一致的值為任何其他值，可能會發生PLM-P和TPTFAIL警報，從而影響服務。同一電路上的兩個POS埠可以使用相同的C2值。例外是0xFC。值0xFC表示路徑負載缺陷。因此，即使C2值匹配(0xFC/0xFC)，也會發生PDI-P。

您可以使用以下命令更改POS C2值：

```
pos c2 flag <value in decimal>
```

您可以表示此處所示的實際C2值（以十六進位制格式表示）：

```
.225ML12#show contro pos 0 | inc C2  
C2 (tx / rx) : 0x16 / 0x16
```

在這種情況下，兩個C2值都匹配。因此，不會發出警報。

將電路狀態更改為OOS

將OC-12電路更改為OOS時，TCC或ML上不會立即出現警報。電路狀態在CTC中的電路視窗顯示OOS。日誌條目將插入ML：

```
.225ML12#show log ...  
May 27 14:22:15.114: %CARDWARE-6-CIRCUIT_STATE:  
Circuit state on POS 0 change from IS to OOS_AS  
May 27 14:22:15.114: %CARDWARE-6-BTC_DRV:  
Init BTC, BTC Rev = 2, Backplane = 0, Port = 0.
```

POS埠可以更改為開啟/關閉狀態。因此，兩端都會發生TPTFAIL警報。流量不會像您預期的那樣流動。

PDI-P警報停滯

有時，警報會卡住，並且不會自動清除，即使在導致警報清除的情況之後。PPDI（或PDI-P）示例如下所示：

```
May 27 18:41:15.339: %CARDWARE-6-CIRCUIT_STATE:  
Circuit state on POS 0 change from IS to OOS_AS  
May 27 18:42:11.871: %LINEPROTO-5-UPDOWN:  
Line protocol on Interface POS0, changed state to down  
May 27 19:17:48.507: %SYS-5-CONFIG_I:  
Configured from console by vty2 (127.0.0.100)  
May 28 11:57:33.387: %CARDWARE-6-CIRCUIT_STATE:  
Circuit state on POS 0 change from OOS_AS to IS  
May 28 11:57:33.391: %CARDWARE-6-BTC_DRV:  
Init BTC, BTC Rev = 2, Backplane = 0, Port = 0.  
May 28 11:57:35.879: %VIRTUAL_PA-6-UPDOWN:  
POS0 changed to down due to PPDI defect trigger changing state  
May 28 11:57:36.079: %LINK-3-UPDOWN:  
Interface POS0, changed state to down  
May 28 11:57:36.279: %SONET-4-ALARM:  
POS0: PPDI
```

當以前的電路狀態更改為OOS時，即使在電路返回到In-Service(IS)狀態後，.225 POS也會報告PPDI。因此POS0介面處於關閉狀態。CTC還報告.225節點上的PDI-P。225上OC12介面的PM計數器顯示沒有錯誤，並表示OC-12路徑是乾淨的。

此輸出報告PPDI停滯不前：

```
.225ML12#show contro pos 0  
Interface POS0
```

```

Hardware is Packet/Ethernet over Sonet
PATH
  PAIS      = 0          PLOP      = 0          PRDI      = 0          PTIM = 0
  PPLM      = 0          PUNEQ    = 0          PPDI      = 0
  BER_SF_B3 = 0          BER_SD_B3 = 0          BIP(B3)   = 0          REI = 0
  NEWPTR    = 0          PSE      = 0          NSE      = 0
Active Alarms : PPDI
Demoted Alarms: None
Active Defects: PPDI
Alarms reportable to CLI:
PAIS PRDI PLOP PUNEQ PPLM PTIM PPDI BER_SF_B3 BER_SD_B3
Link state change defects:
PAIS PLOP PTIM PUNEQ PRDI PPLM PPDI BER_SF_B3

Link state change time   : 200 (msec)

DOS FPGA channel number : 0
Starting STS (0 based)   : 0
VT ID (if any) (0 based) : 255
Circuit size             : STS-3c
RDI Mode                 : 1 bit
C2 (tx / rx)             : 0xCF / 0xFC
Framing                  : SONET

```

回想一下本文檔前面的內容，C2值0xFC會導致POS報告PPDI。

注意：.252節點沒有警報和錯誤，並且其POS0的C2值匹配0xCF/0xFC時，必須考慮警報停滯問題。如果重置。225節點上的POS0介面，警報將清除，包括CTC中報告的PDI-P。此異常應在後續版本中修復。

```

May 28 14:34:16.967: %LINK-5-CHANGED:
Interface POS0, changed state to administratively down
May 28 14:34:18.675: %LINK-3-UPDOWN:
Interface POS0, changed state to down
May 28 14:34:18.939: %VIRTUAL_PA-6-UPDOWN:
POS0 changed to up due to PPDI defect trigger changing state
May 28 14:34:19.139: %LINK-3-UPDOWN:
Interface POS0, changed state to up
May 28 14:34:20.127: %SYS-5-CONFIG_I:
Configured from console by vty2 (127.0.0.100)
May 28 14:34:20.147: %LINEPROTO-5-UPDOWN:
Line protocol on Interface POS0, changed state to up
May 28 14:34:28.739: %SONET-4-ALARM:
POS0: PPDI cleared

```

現在C2值匹配，節點無警報。

```

.225ML12#show control pos 0
Interface POS0
Hardware is Packet/Ethernet over Sonet
PATH
  PAIS      = 0          PLOP      = 0          PRDI      = 1          PTIM = 0
  PPLM      = 0          PUNEQ    = 0          PPDI      = 0
  BER_SF_B3 = 0          BER_SD_B3 = 0          BIP(B3)   = 0          REI = 16
  NEWPTR    = 0          PSE      = 0          NSE      = 0
Active Alarms : None
Demoted Alarms: None
Active Defects: None
Alarms reportable to CLI:
PAIS PRDI PLOP PUNEQ PPLM PTIM PPDI BER_SF_B3 BER_SD_B3
Link state change defects:

```

PAIS PLOP PTIM PUNEQ PRDI PPLM PPDI BER_SF_B3
 Link state change time: 200 (msec)

DOS FPGA channel number : 0
 Starting STS (0 based) : 0
 VT ID (if any) (0 based) : 255
 Circuit size : STS-3c
 RDI Mode : 1 bit
 C2 (tx / rx) : 0xCF / 0xCF
 Framing : SONET

注意：有時，一個或多個警報也可能卡在光纖卡上。您需要重置活動TCC以清除這些停滯的警報。因此，備用TCC會變為活動狀態，並且操作是無中斷的（即，沒有流量影響），儘管您可能會丟失管理流量（例如CTC會話）幾分鐘。

Bridge-group Number Mismatch

此測試在兩個ONS ML卡上使用相同的100網橋組。但是，網橋組不必相同，只要POS 0和GigE 0位於同一個ML上或位於同一個網橋組中。例如，對252 ML上的網橋組101的更改不會影響流量。

```
.252ML12#show bridge ver
Total of 300 station blocks, 298 free
Codes: P - permanent, S - self

Maximum dynamic entries allowed: 1000
Current dynamic entry count: 0

Flood ports

Maximum dynamic entries allowed: 1000
Current dynamic entry count: 2
BG Hash      Address      Action  Interface  VC    Age    RX count  TX count
101 02/0     000b.45b0.484a forward  Gi0
101 BC/0     0009.b7f4.76ca forward  POS0
-

Flood ports
GigabitEthernet0
POS0
```

未完成的ML錯誤的部分清單

以下是適用於本檔案中組態的錯誤部分清單：

注意：這些錯誤已記錄為cisco.com上版本說明的一部分。

DDTS ID	狀態	找到版本	已修復版本	*****Release*Notes* *****
CSCeb56287	五	4.1	4.6	當您將ML系列電路的狀態從服務中(IS)設定為服務外(OOS)，然後又設定回IS時，資料流量不會恢復。為了避免此問題，請在從IS更改狀態之前，在CLI上將POS埠設定為shutdown。從OOS將狀態恢復為IS後，請將

				POS埠設定為no shutdown。
CSCeb 24757	五	4.1	4.6	如果斷開ML1000埠上的傳輸光纖連線，則僅相鄰埠斷開鏈路。理想情況下，兩個連線埠都必須識別連結已關閉，以便上層通訊協定可以將流量重新路由到不同的連線埠。要解決這種情況，請對傳輸光纖已斷開連線或發生故障的埠發出shutdown和no shutdown。
CSCdy 31775	五	4	4.6	無丟棄計數包括由於輸出隊列擁塞而被丟棄的資料包。在以下任一情況下會發生此問題： <ul style="list-style-type: none"> • 乙太網和SONET埠之間的ML系列卡上的流量，以及配置的可用電路頻寬的超訂用，會導致輸出隊列擁塞。 • 從SONET到乙太網的流量，具有可用乙太網頻寬的超訂用。
CSCdz 49700	思	4	-	ML系列卡始終在相連裝置之間轉發動態中繼協定(DTP)資料包。如果在連線的裝置上啟用DTP（可以是預設設定），DTP可能會協商ML系列卡不支援的引數，例如ISL。ML系列卡會統計協商使用ISL作為組播資料包的鏈路上的所有資料包，並且STP和CDP資料包會在使用ISL的已連線裝置之間橋接，而無需處理。為了避免此問題，請在連線的裝置上禁用DTP和ISL。此功能與設計相同。
CSCdz 68649	思	4	-	在某些條件下，流量控制狀態可以指示流量控制正在工作，當流量控制不起作用時。只有在配置埠級管制器時，ML系列卡上的流量控制才起作用。埠級管制器是預設和輸入策略對映的唯一類的管制器。流量控制也僅用於將源速率限制為已配置的策略器丟棄速率。流量控制不會防止由於輸出隊列擁塞而丟棄資料包。因此，如果您沒有埠級監察器，或者如果發生輸出隊列擁塞，則策略不起作用。但是，在這些情況下，策略仍可能錯誤地顯示為已啟用。為了避免此問題，請配置埠級管制器並防止輸出隊列擁塞。
CSCdz 69700	思	4	-	如果在ML1000埠上發出shutdown/no shutdown命令序列，計數器會清除。這是啟動過程

				的正常部分，此功能不會更改。
CSCea 11742	五	4	4.6	當您將兩個ML POS埠之間的電路設定為OOS時，其中一個埠可能錯誤地報告TPTFAIL。ML100T-12和ML1000-2卡都存在此問題。如果發生此問題，請開啟每個ML卡的控制檯視窗，並將POS埠配置為shutdown。
CSCea 20962	五	4	5	將OOS應用於電路調配視窗上的ML丟棄埠時，不會出現警告。
CSCdy 47284	思	4	-	ML-100 FastEthernet MTU未強制執行。但是，大於9050位元組的幀可能被丟棄，並導致Rx和Tx錯誤。
狀態代碼： <ul style="list-style-type: none"> • V — 已驗證（修復已在實驗室中驗證） • C — 已關閉（由於各種原因無法修復錯誤） • 找到的版本：首次報告錯誤的軟體版本 • 已修復版本：錯誤已修復的軟體版本 				

排查和隔離故障

利用到目前為止已提供的資訊，本章旨在構建故障隔離案例。根據系統報告的症狀，本節提供解決該問題的逐步提示。這些案例研究與ONS 15454上的ML卡有關的一些常見症狀有關。

通常，您必須按照以下步驟對問題進行故障排除：

- 收集一般資訊和故障症狀。
- 分析資訊。
- 找出問題。
- 找出問題。
- 解決問題。

這些步驟中的某些步驟被多次迭代。

一般資訊

基本資訊收集

在由於錯誤而重新載入或重置ML卡之前收集資訊。手動重新載入會丟棄潛在的重要資訊。手動重新載入重置所有計數器，並且會丟失儲存在記憶體中的所有日誌。在路由器上發出任何故障排除命令之前，思科建議您發出**show tech-support**命令和任何其他資料收集命令來恢復日誌資訊。如果重新啟動或重置ML卡，您可能會失去控制檯/telnet訪問以及相關資訊。

指向事件的控制檯日誌可以提供導致錯誤或崩潰的圖片。發生錯誤時，您必須嘗試儲存記錄到控制檯或緩衝區的所有消息。最後幾條控制檯消息對於發現問題可能至關重要。根據問題的型別，並非所有消息都會寫入系統日誌伺服器。

使用**show tech-support**命令收集各種資料。此命令通常是在給定時間點發生錯誤後獲取路由器狀態的最佳工具。

以下是show tech-support命令執行的基本命令清單。您捕獲的內容會根據IOS版本、硬體和您選擇的選項而有所不同。

```
show version
show running-config
show stacks
show interfaces
show controllers
show file systems
dir nvram:
show flash: all
show process memory
show process cpu
show context
show sdm internal all-regions
show sdm ip-adjacency all
show sdm ip-mcast all
show sdm ip-prefix all
show sdm l2-switching forwarding
show sdm l2-switching interface-macs
show sdm qos all
show ons alarm defect
show ons alarm failure
show ons hwp defects
show ons hwp reframe
show ons hwp tci
show ons hwp xcon
show ons equipment-agent status
show ons provisioning-agent message ports all
show ons provisioning-agent message node-element
test mda conn dump connections
test mda ppe global reg dump 0
test mda ppe global reg dump 1 Mempool statistics
show region
show buffers
```

除了這些命令外，請捕獲與ML卡具有特殊關聯性的其他命令輸出，如本文檔前面的部分所述。例如，show log、show ons alarm等。從CTC捕獲並匯出先前描述的相關資訊，例如警報、條件、電路、庫存和PM計數器。

[用於排除故障的一些實用IOS工具](#)

收集所需資訊後，需要解密資訊以發現錯誤。使用show-tech命令的輸出時，此任務可能會很困難。這些工具可以破解show-tech命令和許多其他命令的輸出。

- [輸出直譯器工具](#)([僅限註冊客戶](#)):將show tech-support命令的輸出貼上到此工具中。此工具將快速總結發現的所有問題。這是一個非常好的工具，可以快速總結您遇到的更簡單的問題。此工具解釋各種輸入。您可以使用「技術」選單下拉框進行瀏覽。然而，該工具並不完善，仍然需要解釋來驗證資訊。
- [命令查詢工具](#):選擇以下任一參考指南來查詢命令和語法：IOS命令參考IOS配置指南Catalyst命令參考PIX防火牆命令參考
- [錯誤消息解碼器](#):此工具可幫助您研究和解決Cisco IOS軟體、Catalyst交換機軟體和Cisco Secure PIX防火牆軟體的錯誤消息。貼上日誌檔案中的錯誤消息，並確保選中結果內的**建議相關文檔**覈取方塊。
- [Bug Toolkit](#):根據以下一個或多個選項搜尋結果：IOS版本。功能或元件。關鍵字。錯誤嚴重性

(您可以選擇特定嚴重性或指定範圍)。

- [TAC案件收集](#): 您可以使用TAC工程師提供的解決方案，以互動方式診斷涉及硬體、配置和效能問題的常見問題。

注意： 某些工具與ML卡不相容100%。

案例研究

本節介紹一些常見故障條件以及可以採取的隔離這些條件的可能步驟。有關詳細的警報資訊，請參閱[Cisco ONS 15454故障排除指南4.1.x和4.5版](#)。

[ML乙太網埠上報告了CARLOSS警報](#)

主要(MJ)和影響服務(SA),ML系列乙太網 (流量) 卡上的載波丟失警報相當於「LOS(OC-N)」警報的資料。乙太網埠已丟失鏈路，並且未收到有效訊號。

當乙太網埠從IOS CLI配置為no shutdown埠時，就會發生CARLOSS警報，並且還會滿足以下條件之一：

- 電纜未正確連線到近埠或遠埠。
- 自動交涉失敗。
- 速度 (僅適用於10/100埠) 設定不正確。

如本測試所示，在7603b和。252節點ML卡之間，請停用自動交涉功能以啟動連線埠。

[POS的TPTFAIL警報報告](#)

這是一個嚴重警報(MJ)，對服務有影響(SA)。 TPT層故障警報表示ML系列POS卡的端到端POS鏈路完整性功能中斷。TPTFAIL表示POS連線埠的遠端狀態或設定不正確。

TPTFAIL警報表示SONET路徑、遠端POS埠或POS埠配置錯誤導致整個端到端POS路徑無法正常工作。

如果POS埠使用的電路中存在任何SONET路徑警報，例如「AIS-P」、「LOP-P」、「PDI-P」或「UNEQ-P」，則受影響的埠可以報告TPTFAIL警報。

如果管理性停用遠端ML系列POS連線埠，則連線埠會插入近端連線埠偵測到的「AIS-P」條件。在此事件中，近端連線埠可以報告TPTFAIL。遠端POS連線埠報告PRDI和PPDI。您可以使用**show ons alarm**命令檢視所有這些警報。如果POS埠在IOS CLI級別配置不正確，配置錯誤將導致埠關閉，並報告TPTFAIL。

完成以下步驟即可清除TPTFAIL (ML系列) 警報：

1. 如果POS埠電路未發生SONET警報，請確認是否正確配置了兩個POS埠。
2. 如果僅對POS埠電路發出「PLM-P」警報，請驗證是否正確配置了兩個POS埠。
3. 如果POS埠電路僅發生「PDI-P」條件，並且電路由G系列卡終止，請驗證G系列卡是否發生「CARLOSS (G系列乙太網)」警報。如果是，請完成「Clear the CARLOSS(G-Series Ethernet)Alarm」過程。
4. 如果存在「AIS-P」警報、「LOP-P」警報或「UNEQ-P」警報，請排除SONET路徑 (同一電路上兩個POS介面之間的路徑) 故障，以清除這些警報。

[Gigabit乙太網路介面停止運作](#)

請參見[ML乙太網埠上的CARLOSS Alarm Reported](#)。

[POS介面報告CRC錯誤](#)

此問題通常是由於POS配置上的CRC不匹配。

[POS報告PPDI](#)

PDI-P是ONS節點生成的STS路徑開銷(POH)中包含的一組特定於應用的代碼。該警報向下游裝置指示該STS同步有效載荷包封中包含的一個或多個直接對映有效載荷中存在缺陷

支援ML系列卡電路的OC-N卡埠上的PDI-P條件可能源於ML系列卡的端到端乙太網鏈路完整性特徵。如果問題是由鏈路完整性引起的，也會發生「TPTFAIL (G系列乙太網)」警報，或對終止電路的一個或兩個POS埠報告警報。如果對一個POS埠或兩個POS埠發生TPTFAIL，請排除TPTFAIL附帶的警報故障，清除PDI-P情況。PDI-P警報也可能是警報停滯的症狀。

以下是由於。225上的POS0管理性關閉而發生的警報示例：

.225 POS 0 (關閉)	0.252 POS
PPDI、PRDI	PAIS、TPTFAIL

在本例中，PAIS表示問題的根源是。225節點。如果清除PAIS，TPTFAIL、PPDI和PRDI也會清除。

[POS報告PRDI](#)

PRDI表示問題出在遠端。之所以會出現此問題，是因為遠端收到AIS警報。有關詳細資訊，請參閱[POS報告PPDI](#)。

[POS報告PAIS](#)

AIS Path條件表示此節點檢測到傳入路徑中的AIS。

通常，任何AIS都是一種特殊的SONET訊號，告知接收節點傳送方節點沒有有效的訊號可供傳送。AIS不是錯誤。接收節點在每個輸入上提高故障條件AIS，其中節點看到訊號AIS而不是真實訊號。在大多數情況下，當這種情況發生時，上游節點發出警報以指示訊號故障；所有下游節點僅產生某種型別AIS。當您在上游節點上解決問題時，此條件將清除。

[POS報告PPLM](#)

此問題是關鍵(CR)和影響服務(SA)

節點上的路徑負載標籤不匹配警報表示傳入訊號與本地調配的標籤不匹配。出現這種情況的原因是SONET路徑開銷中的C2位元組值無效。加擾和封裝會改變C2值。

[POS介面處於關閉狀態](#)

各種警報可能會使POS介面關閉。預設情況下，這些警報會導致POS連結關閉：PAIS、PLOP、PTIM、PUNEQ、PRDI、PPLM、PPDI、BER_SF_B3。要修改清單，請使用**pos trigger defects interface**命令。當POS介面開啟或關閉時，將記錄原因(**show log**)。您可以使用**show ons alarm**命令檢索所有活動的警報或缺陷。排除故障，開啟POS介面。當POS介面關閉時，會發生TPTFAIL警報。

連線到其他供應商POS介面時，請確保以下專案在兩端都匹配：

1. 置亂
2. C2值
3. CRC

POS介面報告輸入錯誤

在POS介面上累積的輸入錯誤(**show interface POS**和CTC PM計數器)表示入站資料包的格式不正確。多種原因可能導致輸入錯誤資料包。

如果警報存在，請對其進行故障排除。

如果CRC錯誤隨著輸入錯誤的增加而增加，則CRC錯誤可能是輸入錯誤的原因。排除CRC配置故障。

檢驗POS介面配置。

對兩個POS埠之間的路徑元件進行故障排除。如果輸入錯誤增加，而任何其他元件錯誤中沒有相應的增加，請考慮硬體問題。在更換硬體之前，請在電路的兩端（一次一個）執行以下步驟，檢視問題是否仍然存在：

- TCC側交換機
- XC側交換機
- SONET埠上的保護交換機（如果存在保護）
- ML卡軟重置
- ML卡重新拔插

CDP鄰居未顯示

驗證是否已在兩個介面上啟用CDP。

排除警報和介面錯誤（如果存在）。

無端到端流量

檢驗兩台終端裝置上的配置。

如果警報和錯誤存在，請對其進行故障排除。

附錄：基本測試配置和命令資訊

本節捕獲此測試中所有裝置的基本配置資訊，這些資訊用作排除問題的基線。

7603a

7603a#**show run**

Building configuration...

Current configuration : 3136 bytes

```
!  
version 12.1  
service timestamps debug uptime  
service timestamps log uptime  
no service password-encryption  
!  
hostname 7603a  
!  
!  
ip subnet-zero  
!  
!  
mls flow ip destination  
mls flow ipx destination  
spanning-tree extend system-id  
!  
redundancy  
  mode rpr-plus  
  main-cpu  
    auto-sync running-config  
    auto-sync standard  
!  
!  
!  
interface GigabitEthernet1/1  
  ip address 10.0.0.1 255.0.0.0  
!  
router ospf 1  
  log-adjacency-changes  
  network 10.0.0.1 0.0.0.0 area 0  
!  
ip classless  
no ip http server  
!  
!  
!  
!  
line con 0  
line vty 0 4  
!  
end
```

7603a#**show ip int bri**

Interface	IP-Address	OK?	Method	Status	Protocol
Vlan1	unassigned	YES	unset	administratively down	down
GigabitEthernet1/1	10.0.0.1	YES	manual	up	up

7603a#**show ip route**

Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP

D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP

i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area

* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is not set

7603a#show int gigabitEthernet 1/1

GigabitEthernet1/1 is up, line protocol is up (connected)
Hardware is C6k 1000Mb 802.3, address is 0009.b7f4.76ca (bia 0009.b7f4.76ca)
Internet address is 10.0.0.1/8
MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA, loopback not set
Keepalive set (10 sec)
Full-duplex mode, link type is autonegotiation, media type is SX
output flow-control is unsupported, input flow-control is unsupported, 1000Mb/s
Clock mode is auto
input flow-control is off, output flow-control is off
ARP type: ARPA, ARP Timeout 04:00:00
Last input 00:00:01, output 00:00:45, output hang never
Last clearing of "show interface" counters never
Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
Queueing strategy: fifo
Output queue :0/40 (size/max)
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
L2 Switched: ucast: 5482 pkt, 516472 bytes - mcast: 1 pkt, 64 bytes
L3 in Switched: ucast: 0 pkt, 0 bytes - mcast: 0 pkt, 0 bytes mcast
L3 out Switched: ucast: 0 pkt, 0 bytes
5145 packets input, 405866 bytes, 0 no buffer
Received 5107 broadcasts, 0 runts, 0 giants, 0 throttles
0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
0 input packets with dribble condition detected
332 packets output, 111641 bytes, 0 underruns
0 output errors, 0 collisions, 2 interface resets
0 babbles, 0 late collision, 0 deferred
0 lost carrier, 0 no carrier
0 output buffer failures, 0 output buffers swapped out

7603a#show ip ospf neig

Neighbor ID	Pri	State	Dead Time	Address	Interface
10.0.0.2	1	FULL/DR	00:00:38	10.0.0.2	GigabitEtherne

t1/1

7603b

7603b#show run

Building configuration...

Current configuration : 1102 bytes

```
!  
version 12.1  
service timestamps debug uptime  
service timestamps log uptime  
no service password-encryption  
!  
hostname 7603b  
!  
enable password cisco  
!  
ip subnet-zero
```

```

!
!
!
mls flow ip destination
mls flow ipx destination
spanning-tree extend system-id
!
redundancy
 mode rpr-plus
 main-cpu
   auto-sync running-config
   auto-sync standard
!
!
!
interface GigabitEthernet1/1
 ip address 10.0.0.2 255.0.0.0
 speed nonegotiate
!
router ospf 1
 log-adjacency-changes
 network 10.0.0.2 0.0.0.0 area 0
!
ip classless
no ip http server
!
!
!
!
line con 0
line vty 0 4
 no login
!
end

```

Note that if GigE link does not come up, auto-negotiation may not be working. Auto-negotiation can be turned off to force the link to come up. Ensure both sides of the link are matching.

```
7603b#show ip int bri
```

Interface	IP-Address	OK?	Method	Status	Protocol
Vlan1	unassigned	YES	NVRAM	administratively down	down
GigabitEthernet1/1	10.0.0.2	YES	manual	up	up

```
7603b#show int gig 1/1
```

```

GigabitEthernet1/1 is up, line protocol is up (connected)
 Hardware is C6k 1000Mb 802.3, address is 000b.45b0.484a (bia 000b.45b0.484a)
 Internet address is 10.0.0.2/8
 MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
   reliability 255/255, txload 1/255, rxload 1/255
 Encapsulation ARPA, loopback not set
 Keepalive set (10 sec)
 Full-duplex mode, link type is force-up, media type is SX
 output flow-control is unsupported, input flow-control is unsupported, 1000Mb/s
 Clock mode is auto
 input flow-control is off, output flow-control is off
 ARP type: ARPA, ARP Timeout 04:00:00
 Last input 00:00:01, output 00:00:04, output hang never
 Last clearing of "show interface" counters never
 Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
 Queueing strategy: fifo
 Output queue :0/40 (size/max)
 5 minute input rate 0 bits/sec, 0 packets/sec

```

```
5 minute output rate 0 bits/sec, 0 packets/sec
L2 Switched: ucast: 5695 pkt, 534143 bytes - mcast: 3 pkt, 192 bytes
L3 in Switched: ucast: 0 pkt, 0 bytes - mcast: 0 pkt, 0 bytes mcast
L3 out Switched: ucast: 0 pkt, 0 bytes
5319 packets input, 395772 bytes, 0 no buffer
Received 5172 broadcasts, 4 runts, 0 giants, 0 throttles
4 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
0 input packets with dribble condition detected
413 packets output, 139651 bytes, 0 underruns
0 output errors, 0 collisions, 2 interface resets
0 babbles, 0 late collision, 0 deferred
0 lost carrier, 0 no carrier
0 output buffer failures, 0 output buffers swapped out
```

7603b#show ip route

```
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route
```

Gateway of last resort is not set

```
C    10.0.0.0/8 is directly connected, GigabitEthernet1/1
```

7603b#ping 10.0.0.1

```
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.0.0.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/1 ms
```

.225毫升

.225ML12#show run

```
Building configuration...
Current configuration : 580 bytes
!
version 12.1
no service pad
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname .225ML12
!
logging buffered 4096 debugging
enable password cisco
!
ip subnet-zero
no ip routing
no ip domain-lookup
!
!
bridge 100 protocol ieee
!
!
interface GigabitEthernet0
no ip address
```



```

no ip route-cache
bridge-group 100
!
interface GigabitEthernet1
no ip address
no ip route-cache
shutdown
!
interface POS0
no ip address
no ip route-cache
crc 32
bridge-group 100
!
ip classless
no ip http server
!
!
!
!
line con 0
line vty 0 4
exec-timeout 0 0
no login
!
end

```

.225ML12#show ip int bri

Interface	IP-Address	OK?	Method	Status	Protocol
GigabitEthernet0	unassigned	YES	unset	up	up
GigabitEthernet1	unassigned	YES	unset	administratively down	down
POS0	unassigned	YES	unset	up	up

.225ML12#show int gig 0

```

GigabitEthernet0 is up, line protocol is up
Hardware is xpif_port, address is 000f.2475.8c04 (bia 000f.2475.8c04)
MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
    reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA, loopback not set
Keepalive set (10 sec)
Full-duplex, 1000Mb/s, 1000BaseSX, Auto-negotiation
output flow-control is off, input flow-control is on
ARP type: ARPA, ARP Timeout 04:00:00
Last input 00:00:53, output 00:00:01, output hang never
Last clearing of "show interface" counters never
Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
Queueing strategy: fifo
Output queue: 0/40 (size/max)
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
  336 packets input, 111810 bytes
  Received 1 broadcasts (0 IP multicast)
  1 runts, 0 giants, 0 throttles
  1 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
  0 watchdog, 244 multicast
  0 input packets with dribble condition detected
5369 packets output, 422097 bytes, 0 underruns
  0 output errors, 0 collisions, 0 interface resets
  0 babbles, 0 late collision, 0 deferred
  0 lost carrier, 0 no carrier
  0 output buffer failures, 0 output buffers swapped out

```

.225ML12#show int pos 0

```

POS0 is up, line protocol is up

```

```
Hardware is Packet/Ethernet over Sonet, address is 000f.2475.8c00
(bia 000f.2475.8c00)
MTU 1500 bytes, BW 622080 Kbit, DLY 100 usec,
    reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ONS15454-G1000, crc 32, loopback not set
Keepalive set (10 sec)
Scramble enabled
ARP type: ARPA, ARP Timeout 04:00:00
Last input 00:00:32, output never, output hang never
Last clearing of "show interface" counters 02:16:40
Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
Queueing strategy: fifo
Output queue: 0/40 (size/max)
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
    152 packets input, 26266640 bytes
    Received 0 broadcasts (0 IP multicast)
    0 runts, 0 giants, 0 throttles
        0 parity
    1 input errors, 1 CRC, 0 frame, 0 overrun, 0 ignored
    0 input packets with dribble condition detected
4250 packets output, 351305 bytes, 0 underruns
    0 output errors, 0 applique, 0 interface resets
    0 babbles, 0 late collision, 0 deferred
    0 lost carrier, 0 no carrier
    0 output buffer failures, 0 output buffers swapped out
    0 carrier transitions
```

.225ML12#show ons alarm

Equipment Alarms

Active: None

Port Alarms

POS0 Active: None

POS1 Active: None

GigabitEthernet0 Active: None

GigabitEthernet1 Active: None

POS0

Active Alarms : None

Demoted Alarms: None

POS1

Interface not provisioned

This command shows all the defects that can be reported to CLI and TCC (via CTC).

.225ML12#show ons alarm defect

Equipment Defects

Active: None

Reportable to TCC/CLI: CONTBUS-IO-A CONTBUS-IO-B CTNEQPT-PBWORK

CTNEQPT-PBPROT EQPT RUNCFG-SAVENEED ERROR-CONFIG

Port Defects

POS0

Active: None

Reportable to TCC: CARLOSS TPTFAIL

POS1

Active: None

Reportable to TCC: CARLOSS TPTFAIL

GigabitEthernet0

Active: None

Reportable to TCC: CARLOSS TPTFAIL

GigabitEthernet1

Active: None

Reportable to TCC: CARLOSS TPTFAIL

POS0

Active Defects: None

Alarms reportable to CLI: PAIS PRDI PLOP PUNEQ PPLM PTIM PPDI BER_SF_B3 BER_SD_B3

POS1

Interface not provisioned

This command shows all the active alarms.

.225ML12#**show ons alarm failure**

Equipment Alarms

Active: None

Port Alarms

POS0 Active: None

POS1 Active: None

GigabitEthernet0 Active: None

GigabitEthernet1 Active: None

POS0

Active Alarms : None

Demoted Alarms: None

POS1

Interface not provisioned

.225ML12#**show control pos 0**

Interface POS0

Hardware is Packet/Ethernet over Sonet

PATH

PAIS = 0 PLOP = 0 PRDI = 0 PTIM = 0

PPLM = 0 PUNEQ = 0 PPDI = 0

BER_SF_B3 = 0 BER_SD_B3 = 0 BIP(B3) = 0 REI = 0

NEWPTR = 0 PSE = 0 NSE = 0

Active Alarms : None

Demoted Alarms: None

Active Defects: None

Alarms reportable to CLI: PAIS PRDI PLOP PUNEQ PPLM PTIM PPDI BER_SF_B3 BER_SD_B3

Link state change defects: PAIS PLOP PTIM PUNEQ PRDI PPLM PPDI BER_SF_B3

Link state change time : 200 (msec)

DOS FPGA channel number : 0

Starting STS (0 based) : 0

VT ID (if any) (0 based) : 255

Circuit size : STS-12c

RDI Mode : 1 bit

C2 (tx / rx) : 0x01 / 0x01

Framing : SONET

Path Trace

Mode : off

Transmit String :

Expected String :

Received String :

Buffer : Unstable

Remote hostname :

Remote interface:

Remote IP addr :

B3 BER thresholds:

SFBER = 1e-4, SDBER = 1e-7

231 total input packets, 26294392 post-HDLC bytes

0 input short packets, 26294465 pre-HDLC bytes

0 input long packets , 0 input runt packets

1 input CRCError packets , 0 input drop packets

0 input abort packets

0 input packets dropped by ucode

6392 total output packets, 527660 output pre-HDLC bytes
527812 output post-HDLC bytes

Carrier delay is 200 msec

.225ML12#show cdp nei

Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone
Device ID Local Intrfce Holdtme Capability Platform Port ID
.252ML12 POS0 148 T ONS-ML1000POS0
7603a Gig 0 121 R S I Cat 6000 Gig 1/1

The following command shows the detail bridge table. Note that 000b.45b0.484a is the address of Gig0 on 7603b.

.225ML12#show bridge ver

Total of 300 station blocks, 298 free
Codes: P - permanent, S - self
Maximum dynamic entries allowed: 1000
Current dynamic entry count: 2

BG Hash	Address	Action	Interface	VC	Age	RX count	TX count
100 02/0	000b.45b0.484a	forward	POS0		-		
100 BC/0	0009.b7f4.76ca	forward	Gi0		-		

Flood ports
GigabitEthernet0
POS0

This command shows the same type of info as the above.

.225ML12#show sdm l2-switching forwarding bridge-group 100

MAC-Address	B-Group	l3_int	punt_da	Out-int	SPR-NodeId	CAM-ADDR	STATE
0009B7F476CA	100	0	0	Gi0	***	11	Used
000B45B0484A	100	0	0	PO0	***	12	Used

.225ML12#show interface summary

*: interface is up
IHQ: pkts in input hold queue IQD: pkts dropped from input queue
OHQ: pkts in output hold queue OQD: pkts dropped from output queue
RXBS: rx rate (bits/sec) RXPS: rx rate (pkts/sec)
TXBS: tx rate (bits/sec) TXPS: tx rate (pkts/sec)
TRTL: throttle count

Interface	IHQ	IQD	OHQ	OQD	RXBS	RXPS	TXBS	TXPS	TRTL
* GigabitEthernet0	0	0	0	0	0	0	0	0	0
GigabitEthernet1	0	0	0	0	0	0	0	0	0
* POS0	0	0	0	0	0	0	0	0	0

NOTE:No separate counters are maintained for subinterfaces
Hence Details of subinterface are not shown

.225ML12#show ons equipment-agent status

EQA ---- phySlot: 12, eqptType: EQPT_L2SC, eqptID: 0x2403 ----
curTCC: Tcc B
linkStatus: Full dbReq/Recv: 1 / 4 msgVerToEQM: 2
socketFd: 0 pipeMsgAct: No hdrSizeToEQM: 28
connTries: 0 connTimerFast: No hdrSizeFromEQM: 28
timingProv: No
clock auto 1

```
.225ML12#show ons provisioning-agent message ports all
```

```
----- Backend Port (00) Data -----  
prov: yes   sts: 00   vt: 255   type: DOS   name:  
  
----- STS (00) Term Strip -----  
Admin State: IS           Direction: TX_RX_EQPT  
Type: 12 Sf: 1E-4 Sd: 1E-7 C2 tx/exp: 0x01 / 0x01  
PathTrace Format: 64Byte Mode: OFF  
  expected: (not valid)  
  send: valid: "\000\000\000\000"  
  
----- VT (255) Term Strip not provisioned -----  
  
----- STS (00) Xc Strip -----  
rate: 12 Admin: IS  
Src Port/STS: 0x09/0x00 STS Eqpt: 0x01  
Dest Port/STS: 0x06/0x00 UPSR STS Cont Dest: 0x00  
Prev STS Stich Dest Port/STS: 0xFF/0x00  
Next STS Stich Dest Port/STS: 0xFF/0x00  
  
----- Backend Port (01) Data -----  
prov: no   sts: xx   vt: xx   type: xxx   name: xxxxxx
```

The following command retrieves the ONS provisioning information that is done via CTC.

```
.225ML12#show ons provisioning-agent message node-element
```

```
----- NE Data -----  
Node Name: R27-15454c  
MAC Addr : 00 10 CF D2 70 92  
IP Addr   : 10.89.244.225  
Sub Net Mask : 255.255.255.192  
Dflt Router : 10.89.244.193  
Lan IP Addr : 10.89.244.225  
Lan Sub Mask : 255.255.255.192  
Day Savings : 0x01  
Min from UTC : 480  
Node ID      : 0xFF  
Sync Msg Ver : 0x01  
Sync Msg Res Delta : -1  
Sync Msg Res Quality : 0x06  
XConA Eqpt ID : 0x00000201  
XConB Eqpt ID : 0x00000201   OSPF Node ID : 0xCFD27092  
SDH Mode      : SONET
```

[.252ML12](#)

The auto negotiation was turned off on Gig0 (see later).

```
.252ML12#show run
```

```
Building configuration...  
Current configuration : 643 bytes  
!  
version 12.1  
no service pad  
service timestamps debug uptime  
service timestamps log uptime  
no service password-encryption  
!  
hostname .252ML12
```

```

!
logging buffered 4096 debugging
enable password cisco
!
ip subnet-zero
no ip routing
no ip domain-lookup
!
!
bridge 100 protocol ieee
!
!
interface GigabitEthernet0
  no ip address
  no ip route-cache
  no speed
  no negotiation auto
  bridge-group 100
!
interface GigabitEthernet1
  no ip address
  no ip route-cache
  shutdown
!
interface POS0
  no ip address
  no ip route-cache
  crc 32
  bridge-group 100
!
ip classless
no ip http server
!
!
!
!
line con 0
line vty 0 4
  exec-timeout 0 0
  no login
!
end

```

.252ML12#show ip int brie

Interface	IP-Address	OK?	Method	Status	Protocol
GigabitEthernet0	unassigned	YES	manual	up	up
GigabitEthernet1	unassigned	YES	NVRAM	administratively down	down
POS0	unassigned	YES	unset	up	up

The Gig0 interface showed carrier loss until it was forced up by turning off auto negotiation.

.252ML12#show int gig 0

```

GigabitEthernet0 is up, line protocol is up
  Hardware is xpif_port, address is 000f.2475.8c4c (bia 000f.2475.8c4c)
  MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Full-duplex, 1000Mb/s, 1000BaseSX, Force link-up
  output flow-control is off, input flow-control is on
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 00:00:06, output 00:00:01, output hang never
  Last clearing of "show interface" counters never

```

Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
Queueing strategy: fifo
Output queue: 0/40 (size/max)
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
391 packets input, 125375 bytes
Received 1 broadcasts (0 IP multicast)
0 runts, 0 giants, 0 throttles
0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
0 watchdog, 282 multicast
0 input packets with dribble condition detected
8489 packets output, 637084 bytes, 0 underruns
0 output errors, 0 collisions, 0 interface resets
0 babbles, 0 late collision, 0 deferred
0 lost carrier, 0 no carrier
0 output buffer failures, 0 output buffers swapped out

.252ML12#show int pos 0

POS0 is up, line protocol is up
Hardware is Packet/Ethernet over Sonet, address is 000f.2475.8c48
(bia 000f.2475.8c48)
MTU 1500 bytes, BW 622080 Kbit, DLY 100 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ONS15454-G1000, crc 32, loopback not set
Keepalive set (10 sec)
Scramble enabled
ARP type: ARPA, ARP Timeout 04:00:00
Last input 00:00:00, output never, output hang never
Last clearing of "show interface" counters 03:58:02
Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
Queueing strategy: fifo
Output queue: 0/40 (size/max)
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
7396 packets input, 608413 bytes
Received 0 broadcasts (0 IP multicast)
0 runts, 0 giants, 0 throttles
0 parity
1 input errors, 1 CRC, 0 frame, 0 overrun, 0 ignored
0 input packets with dribble condition detected
267 packets output, 96676 bytes, 0 underruns
0 output errors, 0 applique, 0 interface resets
0 babbles, 0 late collision, 0 deferred
0 lost carrier, 0 no carrier
0 output buffer failures, 0 output buffers swapped out
0 carrier transitions

.252ML12#show ons alarm

Equipment Alarms
Active: None
Port Alarms
POS0 Active: None
POS1 Active: None
GigabitEthernet0 Active: None
GigabitEthernet1 Active: None

POS0
Active Alarms : None
Demoted Alarms: None

POS1
Interface not provisioned

.252ML12#show ons alarm defect

Equipment Defects

Active: None

Reportable to TCC/CLI: CONTBUS-IO-A CONTBUS-IO-B CTNEQPT-PBWORK
CTNEQPT-PBPROT EQPT RUNCFG-SAVENEED ERROR-CONFIG

Port Defects

POS0

Active: None

Reportable to TCC: CARLOSS TPTFAIL

POS1

Active: None

Reportable to TCC: CARLOSS TPTFAIL

GigabitEthernet0

Active: None

Reportable to TCC: CARLOSS TPTFAIL

GigabitEthernet1

Active: None

Reportable to TCC: CARLOSS TPTFAIL

POS0

Active Defects: None

Alarms reportable to CLI: PAIS PRDI PLOP PUNEQ PPLM PTIM PPDI BER_SF_B3 BER_SD_B3

POS1

Interface not provisioned

.252ML12#show ons alarm failure

Equipment Alarms

Active: None

Port Alarms

POS0 Active: None

POS1 Active: None

GigabitEthernet0 Active: None

GigabitEthernet1 Active: None

POS0

Active Alarms : None

Demoted Alarms: None

POS1

Interface not provisioned

.252ML12#show contro pos 0

Interface POS0

Hardware is Packet/Ethernet over Sonet

PATH

PAIS	= 0	PLOP	= 0	PRDI	= 0	PTIM	= 0
PPLM	= 0	PUNEQ	= 0	PPDI	= 0		
BER_SF_B3	= 0	BER_SD_B3	= 0	BIP(B3)	= 0	REI	= 0
NEWPTR	= 0	PSE	= 0	NSE	= 0		

Active Alarms : None

Demoted Alarms: None

Active Defects: None

Alarms reportable to CLI: PAIS PRDI PLOP PUNEQ PPLM PTIM PPDI BER_SF_B3 BER_SD_B3

Link state change defects: PAIS PLOP PTIM PUNEQ PRDI PPLM PPDI BER_SF_B3

Link state change time : 200 (msec)

DOS FPGA channel number : 0

Starting STS (0 based) : 0

VT ID (if any) (0 based) : 255

Circuit size : STS-12c

RDI Mode : 1 bit

C2 (tx / rx) : 0x01 / 0x01

Framing : SONET

Path Trace

Mode : off
Transmit String :
Expected String :
Received String :
Buffer : Unstable
Remote hostname :
Remote interface:
Remote IP addr :

B3 BER thresholds:

SFBER = 1e-4, SDBER = 1e-7

7425 total input packets, 610493 post-HDLC bytes
0 input short packets, 610501 pre-HDLC bytes
0 input long packets , 0 input runt packets
1 input CRCerror packets , 0 input drop packets
0 input abort packets
0 input packets dropped by ucode

268 total output packets, 97061 output pre-HDLC bytes
97061 output post-HDLC bytes

Carrier delay is 200 msec

.252ML12#show cdp neigh

Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone
Device ID Local Infrfce Holdtme Capability Platform Port ID
.225ML12 POS0 168 T ONS-ML1000POS0
7603b Gig 0 158 R S I Cat 6000 Gig 1/1

.252ML12#show bridge verbose

Total of 300 station blocks, 300 free
Codes: P - permanent, S - self

Total of 300 station blocks, 298 free Codes: P - permanent, S - self

Maximum dynamic entries allowed: 1000 Current dynamic entry count: 2

Table with 8 columns: BG Hash, Address, Action, Interface, VC, Age, RX count, TX count. Rows include 100 02/0 and 100 BC/0.

.252ML12#show sdm 12-switching forwarding bridge-group 100

Table with 7 columns: MAC-Address, B-Group, l3_int, punt_da, Out-int, SPR-NodeId, CAM-ADDR, STATE. Rows show MAC addresses 000B45B0484A and 0009B7F476CA.

.252ML12#show int summ

*: interface is up
IHQ: pkts in input hold queue IQD: pkts dropped from input queue
OHQ: pkts in output hold queue OQD: pkts dropped from output queue
RXBS: rx rate (bits/sec) RXPS: rx rate (pkts/sec)
TXBS: tx rate (bits/sec) TXPS: tx rate (pkts/sec)
TRTL: throttle count

Table with 10 columns: Interface, IHQ, IQD, OHQ, OQD, RXBS, RXPS, TXBS, TXPS, TRTL. Rows show GigabitEthernet0, GigabitEthernet1, and POS0.

NOTE:No separate counters are maintained for subinterfaces
Hence Details of subinterface are not shown

```
.252ML12#show ons equipment-agent status
EQA ---- phySlot: 12, eqptType: EQPT_L2SC, eqptID: 0x2403 ----
  curTCC: Tcc A
linkStatus: Full dbReq/Recv: 1 / 5 msgVerToEQM: 2
  socketFd: 0 pipeMsgAct: No hdrSizeToEQM: 28
  connTries: 0 connTimerFast: No hdrSizeFromEQM: 28
timingProv: No
clock auto 1
```

```
.252ML12#show ons provisioning-agent message ports all
```

```
----- Backend Port (00) Data -----
prov: yes sts: 00 vt: 255 type: DOS name:

----- STS (00) Term Strip -----
Admin State: IS Direction: TX_RX_EQPT
Type: 12 Sf: 1E-4 Sd: 1E-7 C2 tx/exp: 0x01 / 0x01
PathTrace Format: 64Byte Mode: OFF
  expected: (not valid)
  send: valid: "\000\000\000\000"

----- VT (255) Term Strip not provisioned -----

----- STS (00) Xc Strip -----
rate: 12 Admin: IS
Src Port/STS: 0x09/0x00 STS Eqpt: 0x01
Dest Port/STS: 0x06/0x00 UPSR STS Cont Dest: 0x00
Prev STS Stich Dest Port/STS: 0xFF/0x00
Next STS Stich Dest Port/STS: 0xFF/0x00

----- Backend Port (01) Data -----
prov: no sts: xx vt: xx type: xxx name: xxxxxx
```

```
.252ML12#show ons provisioning-agent message node-element
```

```
----- NE Data -----
Node Name: r26-15454a
MAC Addr : 00 10 CF D2 40 52
IP Addr : 10.89.244.252
Sub Net Mask : 255.255.255.192
Dflt Router : 10.89.244.193
Lan IP Addr : 10.89.244.252
Lan Sub Mask : 255.255.255.192
Day Savings : 0x01
Min from UTC : 480
Node ID : 0xFF
Sync Msg Ver : 0x01
Sync Msg Res Delta : 0
Sync Msg Res Quality : 0x00
XConA Eqpt ID : 0x00000201
XConB Eqpt ID : 0x00000201
OSPF Node ID : 0xCFD24052
SDH Mode : SONET
```

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