



CHAPTER 6

Troubleshooting the Remote Cable MSO Links Solution

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Introduction

This chapter describes several of problem scenarios that you may encounter when using the solution. The problem scenarios and solutions are described under the following sections:

- [Subscriber Complaints, page 6-1](#)
- [Inaccurate, Unavailable, or Missing Reports Information for a Specific CMTS Interface, page 6-5](#)
- [SCE is Congested, But Connected CMTSs are Not Congested, page 6-7](#)
- [Userlog Messages, page 6-9](#)

Subscriber Complaints

To troubleshoot the cause of bad service to subscribers, consider the following:

- Congestion in the backbone network may cause congestion in subscriber traffic.
- Problem with the solution, such as assigning the incorrect policy to the subscriber, or an incorrect interface association, may exist.

To make sure the problem is not with the SCE, perform the following procedures:

Verifying the Correct Policy is Enforced on a Specific Subscriber

Step 1 Verify that the subscriber manager-SCE subscriber data is synchronized.

In the SCE, use the **show interface linecard 0 subscriber name <sub MAC>** command to verify that the upVlinkId and downVlinkId values are the same as in the **p3subs --show -s <sub MAC>** subscriber manager CLU output and that the subscriber package ID is as expected.

The following example shows the output of the SCE CLI:

```
SCE2000#>show interface LineCard 0 subscriber name lynn_jones
Subscriber 'lynn_jones' manager: SM
Subscriber 'lynn_jones' properties:
downVlinkId=10
monitor=0
new_classification_policy=0
packageId=0
QpLimit[0..17]=0*17,8
QpSet[0..17]=0*17,1
upVlinkId=10
.
.
.
```

The following example shows the output of the subscriber manager CLU:

```
>p3subs --show -s lynn_jones
Name:          lynn_jones
Domain:        subscribers
Mappings:
  IP: 5.101.5.129/32
Properties:
  downVlinkId=10  Name=dev0_9_if19-down
  upVlinkId=10   Name=dev0_9_if19-upstream0
Custom Properties:
  giaddr=5.101.254.105
Command terminated successfully
```

Step 2 Verify that the subscriber manager-SCE virtual links data is synchronized.

Compare the output of the SCE **show interface linecard 0 virtual-links different-from-template** command with the subscriber manager CLU **p3vlink --show-vlink-data --vlink-name <UpVlinkId/DownVlinkId Name>** to make sure that the PIR configuration is correct.



Note

The SCE PIR value is in kilobits. You can calculate the VLM value by performing a multiplication with the relevant CMTS device factor as defined in the vlink.cfg configuration file. The CMTS device factor value appears in the output of the subscriber manager CLU **p3vlink --show-device -d <device-name>**.

The following example shows the output of the SCE CLI:

```
SCE2000#> show interface LineCard 0 virtual-links different-from-template
Virtual Link enabled
upstream Virtual-Link:
  virtual index=1, name=virtual link 1
    channel index=1, name=virtual channel 1, pir=99999, cir=99, al=9, agc index=3
    application index=1, name=appGC-1, pir=8000000, cir=0, al=5, agc index=2
  virtual index=2, name=virtual link 2
    channel index=2, name=virtual channel 2, pir=99999, cir=99, al=9, agc index=7
    application index=1, name=appGC-2, pir=8000000, cir=0, al=5, agc index=6
downstream Virtual-Link:
  virtual index=3, name=virtual link 3
    channel index=3, name=virtual channel 3, pir=99999, cir=99, al=9, agc index=15
    application index=1, name=appGC-3, pir=8000000, cir=0, al=5, agc index=12
    application index=2, name=appGC1-3, pir=8000000, cir=0, al=5, agc index=13
    application index=3, name=appGC2-3, pir=8000000, cir=0, al=5, agc index=14
```

The following example shows the output of the **p3vlink --show-vlink-data** subscriber manager CLU:

```
p3vlink --show-vlink-data --vlink-name=device_Cmts0/0-downstream1
VLink Name: device_Cmts0/0-downstream1
VLink Id: 1
Direction: downstream
SCE Name: sce0
Device Name: device
PIR: 200000000
```

```
Channels related to VLink
<name>-L, index <index>, PIR <value>, CIR <value>
<name>-W, index <index>, PIR <value>, CIR <value>
```

Related upstream virtual links –Lists all upstream interface related to the same MAC layer as the selected downstream interface.

```
device_Cmts0/0-upstream0
device_Cmts0/0-upstream1
device_Cmts0/0-upstream2
device_Cmts0/0-upstream3
```

Command terminated successfully

The following example shows the output of the **p3vlink --show-device** subscriber manager CLU:

```
p3vlink --show-device -d CMTS1 --detail
Name: CMTS1
Host Name: Paris
IP: 192.0.2.10
Type: Static
SCE Related: sce0
Upstream factor: 95
Downstream factor: 95
Last success Query: Thu Jun 19 17:54:48 IDT 2008
Last Query Attempt: Thu Jun 19 17:54:48 IDT 2008
Last Query Status: Completed
Sync state with SCE: done
Sync state with CM: done
Giaddr List: 127.0.0.1
Upstream Global Controllers: None
Downstream Global Controllers: <GC Name>=<GC Value>,<GC Name>=<GC Value>...
isLogAll: true
Num of up interfaces: 6
Num of down interfaces: 2
```

VLink Information:

- 1) Name: CMTS1_Cmts0/0-upstream2, Vlink Id: 1, Direction UP, PIR 5000 kbps.
- 2) Name: CMTS1_Cmts0/0-downstream1, Vlink Id:1, Direction DOWN, PIR 10000 kbps
Channel Name: <vlink Name>-W, index <value>, PIR <value> kpbs, CIR <value> kpbs
Channel Name: <vlink Name>-L<channel index>, index <value>, PIR <value> kpbs, CIR <value> kpbs
- 3) Name: CMTS1_Cmts0/0-upstream3, Vlink Id:2, Direction UP, PIR 10000 kbps.
- 4) Name: CMTS1_Cmts1/0-downstream1, Vlink Id:2, Direction DOWN, PIR 20000 kbps.
- 5) Name: CMTS1_Cmts0/0-upstream1, Vlink Id:3, Direction UP, PIR 10000 kbps.
- 6) Name: CMTS1_Cmts1/0-upstream2, Vlink Id:4, Direction UP, PIR 20000 kbps.
- 7) Name: CMTS1_Cmts1/0-upstream3, Vlink Id:5, Direction UP, PIR 20000 kbps.
- 8) Name: CMTS1_Cmts1/0-upstream1, Vlink Id:6, Direction UP, PIR 20000 kbps.

Command terminated successfully

>

To fix this problem:

- a. Monitor all CMTS device interfaces using the subscriber manager CLU **p3vlink --show-device -d** *NAME* [**--detail**].
- b. Verify that in the output of the CLU *Sync state with SCE* is done.

If Sync state with SCE is not done:

- View the connection state between the subscriber manager and the SCE using the subscriber manager CLU **p3net --show -n** *SCE_NAME*.
- Synchronize the SCE with the CMTS device configuration using the subscriber manager CLU **p3vlink --resync -n** *SCE_NAME*.

Step 3 Verify that the VLM-CMTS data is synchronized.

Compare the virtual link names from the subscriber manager CLU **p3subs --show -s** *<sub MAC>* output with the CMTS configuration to verify that the subscriber is assigned to the correct CMTS and CMTS interface.



Note

The virtual link name structure is *<CTMS_NAME>_<INTERFACE_DESCRIPTION>* and is obtained from the configuration file and the SNMP ifTable data.

Make sure that the PIR value is the same as the CMTS interface speed (as taken from the SNMP ifTable data) by comparing the virtual link PIR values from the subscriber manager CLU **p3vlink --show-vlink-data --vlink-name** *<UpVlinkId/DownVlinkId Name>* to the CMTS configuration.

To fix this problem:

- a. Use **p3vlink --show-device -d** *<DEVICE_NAME>* to verify that:
 - The monitor period is not 0
 - The last query completed successfully. Check the user-log for reasons for failure.
- b. Use **p3vlink --start-query -d** *<DEVICE_NAME>* to force a start query on a specific CMTS device.

Verifying that the Distribution of Subscribers to the Virtual Link is Correct

Step 1 Obtain the VLM name for a specific interface using the **p3subs --show -s** *<sub MAC>* command, or build the interface name as *<CTMS_NAME>_<INTERFACE_DESCRIPTION>*.

Step 2 Retrieve the subscribers list related to a specific interface and compare it to the CMTS data using the **p3vlink --show-subs --vlink-name=** *<UpVlinkId/DownVlinkId Name>* command:

```
>p3vlink --show-subs --vlink-name test1_Cmts0/0-upstream2
Subscribers related to device: test1 vlink-id: 5, giaddr: 10.78.233.149, direction UP
010101010101
1 subscriber was found
Command terminated successfully
>
```

Inaccurate, Unavailable, or Missing Reports Information for a Specific CMTS Interface

The SCA Reporter can generate per interface consumption reports that can be used to monitor the solution. The VLM updates the reporter with the interface ID to name data and the SCE sends the raw data with the interface ID (virtual link).

A problem can stem from the VLM update or from the SCE RDRs.

Two possible solutions include:

- Verify that the SCE sends virtual link update RDRs (VLUR) to the collection manager. For information, see *Cisco SCE8000 10GBE Software Configuration Guide* or *Cisco SCE8000 GBE Software Configuration Guide*.
- Verify that the VLM updates the collection manager.

Verifying that the VLM Updates the Collection Manager

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- Step 1** Verify the connectivity between the subscriber manager and the collection manager.
- View the configured network elements and verify that the collection manager exists using the subscriber manager CLU **p3net --show-all --detail** command.
- View the subscriber manager-collection manager connection properties and state using the **p3net --show -n CM_NAME** command, and then verify that the SCE list property value contains the SCE to which the CMTS is connected.
- To fix this problem:
- a. Check that the subscriber manager configuration file contains the relevant collection manager information:
 - Check that a CM Section exists and points to the SCE section
 - Validate the collection manager IP and port
 - Check that the SCE is related to the collection manager.
 - b. See the “Information About Communication Failures” section in the “Subscriber Manager Overview” chapter of *Cisco Service Control Management Suite Subscriber Manager User Guide*.
- Step 2** Verify that the VLM and collection manager data is synchronized.
- Verify that the synchronization state with collection manager is set to done using the CLU **p3vlink --show-device -d <CMTS_NAME>** command. To view a list of configured virtual links, use the collection manager CLU **update_vlinks.sh --sce=<SCE_IP> --show** command.
- To fix this problem:
- a. Force the VLM and the collection manager to synchronize using the **p3vlink --resync -n <CM_NAME>** command.
 - b. For manual configuration, see *Cisco Service Control Management Suite Collection Manager User Guide* to add virtual links using the CLU **update_vlinks.sh --sce=<SCE_IP> --file=vlinks.csv**.

The following example shows the output of the **p3net --show -n** command:

```
>p3net --show -n cm0
Network Element Information:
=====
Name:                cm0
Host:                10.56.197.231
Ip:                 10.56.197.231
Port:               14375
Status:             Connection ready
Type:               Collection Manager
SCE List:           sce0
Synchronization Status: Not-done(100% failures)
Redundancy Status:  Standalone
Quarantine Status:  ok
Command terminated successfully
```

The following example shows the output of the **p3vlink --show-device -d** command:

```
>p3vlink --show-device -d test1
Device Name:        test1
Host Name:          singleSimpleDevices
IP:                10.78.233.149
Type:              Static
SCE Related:       scel
Upstream factor:   95
Downstream factor: 95
Last success Query: Fri Feb 19 14:29:11 IST 2010
Last Query Attempt: Fri Feb 19 14:29:11 IST 2010
Last Query Status: Completed
Sync state with SCE: Not-done
Sync state with CM: N/A
Giaddr List:       10.78.233.149;
Upstream Global Controllers: None
Downstream Global Controllers: None
isLogAll:          true
Num of up interfaces: 8
Num of down interfaces: 2

Command terminated successfully
```

The following example shows the output of the **update_vlinks.sh** script:

```
./update_vlinks.sh --sce=10.56.197.232 --show
```

```
.
.
.
TIME_STAMP |          SE_IP |          VLINK_ID |  VLINK_DIRECTION |
VLINK_NAME |
-----+-----+-----+-----+
--+
.
.
.
2008-12-17 | 10.56.197.232 | 10 | 0 |
dev0_9_if19-upstream0|
2008-12-17 | 10.56.197.232 | 10 | 1 |
dev0_9_if19-down|
.
.
.
```

SCE is Congested, But Connected CMTSs are Not Congested

If the virtual link assignment is incorrect or false subscriber login operations are not handled by the correct virtual link controller, virtual links can become congested. To resolve this issue, you must confirm that there are no subscribers associated with the virtual link and also verify that the distribution of subscribers to the virtual link is as expected.

To verify that the distribution of subscribers to the virtual link is as expected, see the [“Verifying that the Distribution of Subscribers to the Virtual Link is Correct”](#) section on page 6-4.

Verifying that No Subscriber Is Associated with the Default Virtual Link

Step 1 Use the SCE CLI **show interface LineCard 0 subscriber property <upVlinkId|downVlinkId> equals 0** to make sure that there are no subscribers associated with the default virtual link.

Subscribers in the SCE can have a virtual link ID set to 0 in several cases:

- If the giaddr list is learned automatically, a few subscribers may have this policy if they performed the first login from this giaddr. In this case, compare the results with the subscriber manager database.
- If a specific interface or CMTS is removed from the VLM, at some point all the subscribers associated with this interface or CMTS are set to use the default virtual link.
- If no match exists in the DHCP Sniffer LEG mapping table and the LEG is configured to log in a subscriber with the default virtual link.

The following example shows the output of the **show interface LineCard 0 subscriber property upVlinkId equals 0** command:

```
SCE2000#>show interface LineCard 0 subscriber property upVlinkId equals 0
N/A
000004650001
000004650002
000004650003
000004650004
000004650005
000004650006
000004650007
000004650008
000004650009
00000465000A
00000465006F
000004650070
000004650071
000004650072
000004650073
000004650074
000004650075
000004650076
000004650077
000004650078
0000046500DD
0000046500DE
0000046500DF
```

The following example shows the output of the `p3dhcpsniff --show-policy --policy=upVLinkId --detail` command:

```
>p3dhcpsniff --show-policy --policy=upVLinkId --detail
Policy Name: upVLinkId
=====
separator:_
use default: false
default value: 0
allow no package: true
concat option:giaddr,
concat option:82:1,
concat option type: integer,binary
log success: true
log default success: false
Number of mappings: 400

5.101.254.100_00010000=9
5.101.254.100_00010003=10
5.101.254.100_80010000=9
5.101.254.100_80010003=10
5.101.254.101_00010000=9
5.101.254.101_00010003=10
5.101.254.101_80010000=9
5.101.254.101_80010003=10
5.101.254.102_00010000=9
5.101.254.102_00010003=10
5.101.254.102_80010000=9
5.101.254.102_80010003=10
5.101.254.103_00010000=9
5.101.254.103_00010003=10
5.101.254.103_80010000=9
5.101.254.103_80010003=10
5.101.254.104_00010000=9
5.101.254.104_00010003=10
5.101.254.104_80010000=9
5.101.254.104_80010003=10
5.101.254.105_00010000=9
5.101.254.105_00010003=10
5.101.254.105_80010000=9
5.101.254.105_80010003=10
5.101.254.106_00010000=9
5.101.254.106_00010003=10
5.101.254.106_80010000=9
```

Userlog Messages

The messages that are written to the userlog are categorized based on their severity as:

- [Userlog Error Messages](#)
- [Userlog Warning Messages](#)
- [Userlog Information Messages](#)

The preconditions of the messages are described as follows:

- None—Messages are sent irrespective of the value set in the config file.
- General.log_all—Messages are sent only if log_all flag in the general section of the vlink.cfg file is set to true.
- Device.log_all—Messages are sent only if log_all flag in the device section is set to true.

Userlog Error Messages

Table 6-1 lists the error messages that can be written to the userlog.

Table 6-1 Userlog Error Messages

Message	Description	Precondition
Device {0} Error: Speed value {1} cannot be translated to int number.	The SNMP interface provides a non integer value for the if speed.	None
Device {2}: Cannot create query factory class {0} from jar {1}: Error {3}	Cannot instantiate the class related to the device and responsible for the query operation.	None
Failed to send vlink message to SCE {0}	An error occurred when trying to update the SCE with vlinks. The error is specified in the umlog.	None
Failed to update CM {0} with configuration related to SCE {1}	An error occurred when trying to update the collection manager. The error message is specified in the umlog.	None
Clearing {0} vlink information because of the following error:\n System detected reduction in max valid vlink index in SCE <sceName>, valid vlink index was '<maxVlinkIdInDb>' and it was decreased to <maxValidVlinkIndexInSce>	The VLM deleted all vlinks related to a specific SCE because the vlink max valid index was reduced.	None
System detected reduction in max valid vlink index in SCE {0} valid vlink index was '{1}' and it was decreased to {2}	The VLM detected that the SCE max valid vlink index was reduced.	None
Failed to allocate virtual link index for interface {0} because of lack of vlink {upstream/downstream} resources in SE {name}	SCE free vlink indexes are no longer available; abort the vlink creation.	None
SCE {0}, Failed to set pir {1}, to vlink {2}, with vlink id {3}	The SCE was unable to set the PIR value on the GC. This can occur if the PIR value exceeds the MAX PIR value in the SCE.	None

Table 6-1 Userlog Error Messages (continued)

Message	Description	Precondition
Failed to set Host Name <name> to device <DeviceName_A> since it is already occupied by device < DeviceName_B>.	Host name (MIB .1.3.6.1.2.1.1.5.0) duplication, verify that DeviceName_A has different Host Name, remove DeviceName_A and add it again.	None
SNMP SysName {0} is illegal value for static device {1}, expecting to get {2} value.	Found unexpected sysName for static device query failure IP related to static device can not be moved to other device, IP returns an unexpected sysName value (null/different than current), query operation fails. Work Around: Set the sysName related to the IP to the expected one and start query on the device using p3vlink –start-query CLU command. If the device IP changes, update the configuration file, load config and restart the query on the device using p3vlink –start-query CLU command.	None
Failed to communicate with device {0}, using its giaddr list {1}, number of retries={2}, timeout between retries={3} ms	Device is not responsive to the VLM using its giaddr list. Check physical connection to the device.	None
Failure in Init process; error in LEG synchronization: {0}	The VLM has a failure in the boot, vlink mapping table is not created properly, and needs to provide a support file.	None
Failure in Init process; failed to synchronize LEG with all mappings on {0} minutes	The VLM has a failure in the boot, vlink mapping table is not created properly, and needs to provide a support file.	None

Userlog Warning Messages

Table 6-3 lists the warning messages that can be written to the userlog.

Table 6-2 Userlog Warning Messages

Message	Description	Precondition
VLM does not have valid RPC connection to SCE {0}, aborting VLink updates in SCE.	This message is sent when the VLM tries to update the SCE with vlink information but the RPC connection is missing.	None
Starting up VLM Solution	—	None
VLM Solution is stopped, going to clear all vlink information.	—	None
System detected change in max valid vlink index in SCE '{0}', valid vlink index is increased from {1} to {2}	The VLM detected that the SCE max valid vlink index was increased.	None

Table 6-2 Userlog Warning Messages (continued)

Message	Description	Precondition
giaddr value duplication; both devices {0} and {1} are having the same ip definition {2}.	The same IP Address is assigned to two different devices. The VLM assigns the IP to the latest device.	None
PIR size of {0} kbps is more than SCE {1} max bw size, setting vlink {2} with max sce PIR value: {3}	The device interface bandwidth is higher than the maximum bandwidth of the SCE, the VLM sets the MAX SCE bandwidth value instead.	none
SCE {0} does not support vlink functionality, aborting VLink updates in SCE	VLM tries to send message to SCE, RPC connection is available pqi is installed but VLM is disabled. To recover from the failure, download the policy that enables Vlink support and perform VLM synchronization on the SCE.	None
VLM did not find any installed application in SCE {0}	VLM tries to send message to SCE, RPC connection is available but pqi is missing in the SCE or SCEs in cascade. To recover from the failure, install PQI and download the policy that supports Virtual Link. Perform the VLM synchronization using p3vlink -resynch operation/ .	None
Connection interrupts to SCE {0} while trying to download VLM data.	VLM tries to send message to SCE, RPC connection is not available. Perform SM-SCE disconnection methodology.	None
Failed to set Host Name {0} to device {1} since it is occupied by device {2}	Failed to set host name to non existing device, If the device is static device, send support file to tech support, if the device is dynamic, check if the device was previously deleted by the CLU command or by dynamic giaddr removal procedure.	None
Failed to create CommunityTarget to IP <IP Address>	If VLM is unable to create a SNMP session to the IP address, send the support file to CISCO support.	None
Failed to read sysName related to ip:port {0}, , number of retries={1}, timeout between retries={2} ms	VLM failed to get the sys name MIB value related to IP Address. Validate that sysName value is set.	None
There are no giaddr related to device {0}, VLM is going to remove it from the system	VLM removes the dynamic device that does not have any giaddr related to it.	None
VLM is disabled or not supported in SCE {0}	Ensure relevant pqi is installed in the SCE. Ensure that the policy with vlink enabled is set in the SCE.	None
IP {0} Collision detected between Device {1} to the Device {2}, Deleting device {3} and moving its IP data to {4}.	—	None

Table 6-2 Userlog Warning Messages (continued)

Message	Description	Precondition
Collision detected between Device {0} to the Device {1}, assigning IP {2} to device {3}.	—	None
IP {0} found in device {1} collide with main ip address related to Static Device {2}, operation aborted.	—	None

Userlog Information Messages

Table 6-3 lists the information messages that can be written to the userlog.

Table 6-3 Userlog Information Messages

Message	Description	Precondition
Device {0} was added to VLM	—	None
SCE {0} was added to VLM	—	None
SCE {0} was removed from VLM	—	None
<SCE Name> : Max valid vlink index is set to <value>	Setting the max valid vlink index to ... This value is read from the SCE. If the SCE is not available, the system uses the default value (1023).	General.log_all = true or Device.log_all = true
Add device to VLM {name} up factor={1} down factor={2} aliases={3}	A new device was added to the VLM database. The umlog contains the giaddr information.	Device.log_all = true
Create vlink {name} with id {1}, on device {name}	Adding vlink to the VLM. The umlog contains the database internal data.	Device.log_all = true
delete vlink {name} with id {1}, direction-{2}, on device {name}	Removing vlink from the VLM. The umlog contains the database internal data.	Device.log_all = true
Delete device {name}	Deleting device from the repository database.	Device.log_all = true
VLM decided to remove device {0} since it does not have any giaddr.	The VLM automatically remove the Device {0} since all its giaddr were being removed by the aging mechanism.	None
Virtual Link mappings are missing for subscriber <subscriber_name>, login operation is being delayed, LEG is querying for mappings related to giaddr <ip value>.	While processing DHCP RDR, SCE DHCP SNIFFER detects that Mappings to up/down vlink id are missing. The RDR message is stored in a queue, and the query operation is initiated.	logAll = true Or Print message every 100 occurrences
Virtual Link mappings are missing for subscriber <subscriber_name>, continue login operation with no mappings.	Perform login operation even if mappings are not found. The VLM query on the device is complete before the message is generated.	logAll = true Or Print message every 100 occurrences

Table 6-3 Userlog Information Messages (continued)

Message	Description	Precondition
Blocking operation for mac <mac id> since vlink policy is still not set for giaddr <IP value>	If the LEG detects that policy mappings are not synchronized with the device, the login operation is blocked. After the completion of device query, the login operations continue.	logAll = true Or Print message every 100 occurrences
Device {0} changed its IP to {1}	The dynamic device changes its IP when: <ul style="list-style-type: none"> Current IP is not responsive. sysName related to the IP is different from the one defined in the device. 	None
Giaddr {0} which was related to device {1} found out to be related to device {2}, VLM starts query on this device	A giaddr which was related to device {1}, is currently related to another device, system tries to query this device.	None
Device {0} was removed	Device was removed from the VLM.	None
VLM detected new dynamic device: Device {0} is related to SCE {1}	Creates a dynamic device.	None
Dynamic Device Creation feature is being enabled	The VLM detects configuration file with Dynamic Device Configuration feature enabled.	None
Dynamic Device Creation feature is being disabled.	The VLM detects configuration file with Dynamic Device Configuration feature disabled.	None
IP Collision between Static Device {0} to the Dynamic Device {1}, The Dynamic device is replaced by the Static device.	—	None

