



# Release Notes for Cisco ONS 15454 SDH Release 7.0.2

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June 2008



**Note**

The terms "Unidirectional Path Switched Ring" and "UPSR" may appear in Cisco literature. These terms do not refer to using Cisco ONS 15xxx products in a unidirectional path switched ring configuration. Rather, these terms, as well as "Path Protected Mesh Network" and "PPMN," refer generally to Cisco's path protection feature, which may be used in any topological network configuration. Cisco does not recommend using its path protection feature in any particular topological network configuration.

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Release notes address closed (maintenance) issues, caveats, and new features for the Cisco ONS 15454 SDH multiplexer. For detailed information regarding features, capabilities, hardware, and software introduced with this release, refer to the "Release 7.0" version of the *Cisco ONS 15454 DWDM Installation and Operations Guide*; and the "Release 7.0" version of the *Cisco ONS 15454 SDH Procedure Guide*; *Cisco ONS 15454 SDH Reference Manual*; *Cisco ONS 15454 SDH Troubleshooting Guide*; and *Cisco ONS 15454 SDH TLI Command Guide*. For the most current version of the *Release Notes for Cisco ONS 15454 Release 7.0.2*, visit the following URL:

[http://www.cisco.com/en/US/products/hw/optical/ps2006/prod\\_release\\_notes\\_list.html](http://www.cisco.com/en/US/products/hw/optical/ps2006/prod_release_notes_list.html)

Cisco also provides Bug Toolkit, a web resource for tracking defects. To access Bug Toolkit, visit the following URL:

<http://tools.cisco.com/Support/BugToolKit/action.do?hdnAction=searchBugs>

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## Changes to the Release Notes

This section documents supplemental changes that have been added to the *Release Notes for Cisco ONS 15454 SDH Release 7.0.2* since the production of the Cisco ONS 15454 SDH System Software CD for Release 7.0.2.

The following changes have been added to the release notes for Release 7.0.2.

## Changes to Caveats

The following caveats have been added.

[CSCse85355](#)

[CSCsd52665](#)

[CSCsd56328](#)

## Caveats

Review the notes listed below before deploying the ONS 15454 SDH. Caveats with tracking numbers are known system limitations that are scheduled to be addressed in a subsequent release. Caveats without tracking numbers are provided to point out procedural or situational considerations when deploying the product.

## Hardware

### CSCed18803

Rarely, the non-enhanced Muxponder unit does not pass Jitter Tolerance test from Trunk port to client port as per ITU-T G.825, 2 Mb/s mask, at the 10 Hz specific setpoint. The Muxponder should be configured with G.709 Off, FEC Off and Trunk signal provided by external Jitter test box, and the unit client port output monitored for errors, to see this issue. This issue will not be resolved. Note, however, that in normal network configurations the muxponder is operated with G.709 and FEC turned on, and the jitter tolerance tests pass.

### CSCuk48503

Under specific conditions the non-enhanced MXPDP does not pass the Telcordia GR-253/G.825 Jitter generation mask test on 10G TX Trunk port. The 2.5 G TX Client jitter generation is always within mask and does not exhibit this issue. This occurs only when, in SONET mode, there is no FEC, no G.709, and client interfaces are looped back, with non-synchronous clocking, and the jitter testbox TX connected to Trunk RX port, while the jitter testbox RX is connected to the Trunk TX port. The jitter testbox TX clock recovers from RX with an additional 5 ppm offset added. This issue will be resolved in a future hardware release.

## CSCea78210

The TXP\_MR\_2.5G and TXPP\_MR\_2.5G cards do not support TX Optical power performance monitoring on the trunk port. To see this, go to the Optics Performance Monitoring tab of the TXP\_MR\_2.5G or TXPP\_MR\_2.5G card, and select the trunk port. TX Optical Pwr is not shown. This is as designed.

## CSCdw92634

SDH DS3-I and E3 electrical cards only support a VC4 J1 trace string setting for all VC4s together. You cannot set the J1 byte for individual VC4s. This issue is a limitation of hardware.



**Note**

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VC3 J1 strings can be set individually, but the optical cards cannot monitor the VC3 J1 string.

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## CSCdw14501

Interconnection Equipment failure alarms may be generated at 55 degrees C, and 72 volts. When the operating environment is at 55 degrees C and 72 volts, interconnection equipment failure alarms for the following cards can occur:

- STM16SH
- STM64LH
- STM16LH

The alarms could potentially occur on any of these boards, as well: OC48AS, GigE, OC192 or OC192LR. This issue will not be resolved.

## Upgrades

### CSCec42769 Database Corruption with ONS 15454 SDH Release 4.0, 4.0.1, 4.1



**Caution**

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Before you upgrade to Release 7.x from Release 4.0, 4.0.1, or 4.1, you must read this caveat and run the SDH Circuit Repair Utility (VcCheck) provided on the software CD (also available on CCO).

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The XCVXL card on the ONS 15454 SDH allows the intermixing of VC12 and VC3 payloads within a single VC4. When a VC4 contains only one VC12 tributary and at least one VC3 tributary and the VC12 is deleted, the database becomes corrupt.

The database load process on the ONS 15454 SDH occurs during a TCC2/TCC2P reboot, TCC2/TCC2P protection switch, software activation, or database restore. When the database is loaded containing this corruption the load process fails, causing the corrupt database to be deleted from the TCC2/TCC2P flash memory. The previous saved database is then loaded instead. When all saved databases on a TCC2/TCC2P contain the corruption, the TCC2/TCC2P will load with the default provisioning, and all existing provisioning will be lost.

If this issue occurs you will see a loss of either some or all provisioning after a TCC2/TCC2P switch or reset.

To ensure that your network is not vulnerable to this issue, you must first determine if the issue already exists within your network, and if so, correct it. You can detect the issue by using the SDH Circuit Repair Utility (VcCheck) provided on the ONS 15454 SDH Release 4.1.3, 4.6.x, 5.x, 6.x, or 7.x software CDs. The VcCheck tool is also available for download from CCO. Once you have alleviated immediate risk from the issue, you must upgrade to Release 7.x, Release 6.x, Release 5.x, Release 4.6.1, or maintenance Release 4.1.3 (or any later release) to avoid further risk.

The VcCheck utility and its associated README file (in the same directory with the tool) provide details on how to temporarily alleviate this issue before upgrading to a release in which the issue is resolved.

This issue is resolved in Releases 4.6 and later, and in maintenance Releases 4.1.3 and later (caveated herein because of the upgrade issue).

## Maintenance and Administration



### Caution

VxWorks is intended for qualified Cisco personnel only. Customer use of VxWorks is not recommended, nor is it supported by Cisco's Technical Assistance Center. Inappropriate use of VxWorks commands can have a negative and service affecting impact on your network. Please consult the troubleshooting guide for your release and platform for appropriate troubleshooting procedures. To exit without logging in, enter a Control-D (hold down the Control and D keys at the same time) at the Username prompt. To exit after logging in, type "logout" at the VxWorks shell prompt.



### Note

In releases prior to 4.6 you could independently set proxy server gateway settings; however, with Release 4.6.x and forward, this is no longer the case. To retain the integrity of existing network configurations, settings made in a pre-4.6 release are not changed on an upgrade to Release 7.x. Current settings are displayed in CTC (whether they were inherited from an upgrade, or they were set using the current GUI).

### CSCsc62845

When you try delete a provisionable patchcord (PPC) from the CTC Provisioning > PPC tab, sometimes CTC fails to refresh the screen and the PPC deletion appears to have failed. The workaround is to restart into CTC. This issue is resolved in Release 7.2.

### CSCsc64015

Rarely, in an STM 1+1 configuration with VC3 traffic from one E3 to another where the source node has a 1:1 protection group, if you perform a parallel upgrade from Release 5.0.2 to 7.0.x, E3 traffic might incur a 13.2 ms hit. This issue will be resolved in Release 8.0.

### CSCeh84908

A CTC client session can disconnect from an ONS node during simultaneous deletion of large numbers of VT level circuits (3000+). Connectivity to the node will recover without any user action. If the condition persists, restart the CTC session to reconnect. This issue is under investigation.

## CSCin92246

When one of the underlying connections of a circuit moves to the Unlocked-disabled, failed state, CTC treats the Unlocked-disabled, failed state as out of service and interprets part of the circuit to be out of service, or Locked. However, this is incorrect, as none of the underlying connections is in a Locked state. The result is that the circuit state is displayed as Locked[Partial], even though all of the underlying connections are technically Unlocked. This issue will be resolved in Release 8.0.

## CSCin90057

A signal degrade or signal failure is not reported when you inject bit errors into the line for an E3 card. To see the SD or SF, inject a code violation error instead. This issue will not be resolved.

## CSCeh92201

When you create a bidirectional MS-SPRing-SNCP IDRI circuit using autorouting and select the PCA option for secondary spans, the circuit is created over working MS-SPRing spans and does not use PCA spans. To enforce the use of the PCA option, provision the circuit using manual routing. This issue will not be resolved.

## CSCef53317

A traffic hit can occur during a clock reference switch. To see this issue, complete the following steps.

- 
- Step 1** Set up two ONS 15454 SDH nodes with STM16 SNCP (call the nodes STM16-1 and STM16-2).
  - Step 2** Set up two ONS 15454 SDH nodes with MXP\_MR\_2.5G\_10G (call the nodes MXP-1 and MXP-2).
  - Step 3** Place MXP-1 and MXP-2 in Transparent Termination Mode.
  - Step 4** Ensure that STM16-1 is connected to MXP-1 client 1.
  - Step 5** Ensure that STM16-2 is connected to MXP-2 client 1.
  - Step 6** Ensure that MXP-1 trunk is connected to MXP-2 trunk.
  - Step 7** Connect a traffic generator to MXP\_MR\_2.5G\_10G Port 3 (client) of MXP-1 and feed a PRC clock.
  - Step 8** Set MXP-1 Clock Reference 1 to MXP\_MR\_2.5G\_10G Port 3, leaving the other two clock references as INTERNAL.
  - Step 9** Provision circuits such that a combination of VC4-4C, VC12, VC3 and VC4 traffic flows between STM16-1 and STM16-2 through MXP-1 and MXP-2.
  - Step 10** Gradually inject increasingly negative frequency offset through the traffic generator, in steps of 3 ppm, where you perform the next decrement step only when the node returns to NORMAL state.
- 

When the clock offset reaches around 17 ppm, Clock Reference 1 fails and MXP-1 switches to Clock Reference 2. During the clock switch a traffic hit might occur for less than one second. The same is behavior can occur when injecting positive frequency offset. This issue will not be resolved.

## CSCuk49106

The amplifier gain set point shown by CTC and the actual measured amplifier gain differ. The following steps illustrate this issue.

- 
- Step 1** Reduce the insertion loss of the span just before the amplifier.
  - Step 2** Execute the APC procedure.
- 

The APC procedure does not check consistency between the gain set point and the real gain, but rather only verifies the amplifier total output power. As a workaround, manual setting can be performed to align these values, although the discrepancy does not impact the normal functioning of the amplifier. This issue will not be resolved.

## CSCef54670

The SQUELCHED condition is not raised when a non-enhanced MXP card is in MS termination mode. To see this issue perform the following steps.

- 
- Step 1** Set up one ONS 15454 SDH node with MXP\_2.5G\_10G (MXP-1).
  - Step 2** Provision MXP-1 Port 1 (client) with any payload.
  - Step 3** Set MXP-1 Port 1 (client) and Port 5 (trunk) to the UNLOCKED state.
- 

LOS and LOS-P alarms are reported on MXP-1 Port 1 (client). The SQUELCHED condition is not reported on MXP-1 Port 1 (client) because AIS is sent out the client port instead. This is as designed.

## CSCef05162

Clearing the displayed statistics for a port will also clear the displayed history for that port. Clearing the displayed statistics for all ports will also clear the displayed history for all ports. There is no warning message from the TCC2. If History information is to be retained, do not clear displayed statistics for any port without first documenting the displayed history information for the associated port. This issue will not be resolved.

## CSCef29516

The ALS pulse recovery min value is 60 instead of 100. If this occurs, increase the value to 100. This issue will not be resolved.

## CSCeb36749

In a Y-Cable configuration, if you remove the client standby RX fiber; a non-service affecting LOS is raised, as expected. However, if you then remove the trunk active RX fiber; a non-service affecting LOS-P is raised, but the previously non-service affecting LOS on the client port is now escalated to a service affecting alarm, in spite of no traffic having been affected. This issue will not be resolved.

## CSCee82052

After setting the node time (either manually or via NTP) you must wait for the endpoint of the interval to be reached before the end time will reflect the recently-set node time. Until this has occurred, the date time stamp for the end of the retrieved interval remains 12/31/69. This issue will not be resolved.

## CSCeb39359

When changing NE timing from External or Mixed to Line timing, a Transient IEF alarm might be reported against the standby XC10G. This issue will be resolved in a future hardware release.

## CSCdz62367

When replacing a failed working E1-42 card in a 1:1 or 1:N protection configuration with the protect card carrying the switched traffic, bit errors, less than 50ms in duration, are possible on the activated protection card. This issue will not be resolved.

## CSCdy10030

CVs are not positively adjusted after exiting a UAS state. When a transition has been made from counting UAS, at least 10 seconds of non-SES must be counted to exit UAS. This issue will not be resolved.

## CSCdx35561

CTC is unable to communicate with an ONS 15454 SDH that is connected via an Ethernet craft port. CTC does, however, communicate over an SDCC link with an ONS 15454 SDH that is Ethernet connected, yielding a slow connection. This situation occurs when multiple nodes are on a single Ethernet segment and the nodes have different values for any of the following features:

- Enable OSPF on the LAN
- Enable Firewall
- Craft Access Only

When any of these features are enabled, the proxy ARP service on the node is also disabled. The ONS 15454 SDH proxy ARP service assumes that all nodes are participating in the service.

This situation can also occur immediately after the aforementioned features are enabled. Other hosts on the Ethernet segment (for example, the subnet router) may retain incorrect ARP settings for the ONS 15454 SDHs.

To avoid this issue, all nodes on the same Ethernet segment must have the same values for Enable OSPF on the LAN, Enable Firewall, and Craft Access Only. If any of these values have changed recently, it may be necessary to allow connected hosts (such as the subnet router) to expire their ARP entries.

You can avoid waiting for the ARP entries to expire on their own by removing the SDCC links from the affected ONS 15454 SDH nodes. This will disconnect them for the purposes of the proxy ARP service and the nodes should become directly accessible over the Ethernet. Network settings on the nodes can then be provisioned as desired, after which the SDCC can be restored. This issue will not be resolved.

## CSCdy11012

When the topology host is connected to multiple OSPF areas, but CTC is launched on a node that is connected to fewer areas, the topology host appears in CTC, and all nodes appear in the network view, but some nodes remain disconnected. This can occur when the CTC host does not have routing information to connect to the disconnected nodes. (This can happen, for example, if automatic host detection was used to connect the CTC workstation to the initial node.)

CTC will be able to contact the topology host to learn about all the nodes in all the OSPF areas, but will be unable to contact any nodes that are not in the OSPF areas used by the launch node. Therefore, some nodes will remain disconnected in the CTC network view.

To work around this issue, if no firewall enabled, then the network configuration of the CTC host can be changed to allow CTC to see all nodes in the network. The launch node must be on its own subnet to prevent network partitioning, and craft access must not be enabled. The CTC host must be provisioned with an address on the same subnet as the initial node (but this address must not conflict with any other node in the network), and with the default gateway of the initial node. CTC will now be able to contact all nodes in the network.

If a firewall is enabled on any node in the network, then CTC will be unable to contact nodes outside of the initial OSPF areas. This issue will not be resolved.

## CSCdy57891

An LOP-P alarm can be inadvertently cleared by an LOS that is raised and cleared. On STM-N cards, when an LOP condition and an LOS condition are both present on the input, an LOS will be raised. However, upon clearing the LOS with the LOP still present, the LOP alarm is not raised. An AIS-P condition will be visible. This issue will not be resolved.

## CSCdw38283

If a node has one good BITS reference and is running in a normal state, and you configure a second BITS reference, then reconfigure the second reference within 30 seconds of applying the first configuration, the node will enter FAST START SYNC mode. To avoid this problem, wait a minute before configuring the second reference a second time. This issue is a hardware limitation, and there are no current plans to resolve it.

## CSCdw23208

[Table 1](#) summarizes B1, B2, and B3 error count reporting for SDH optical cards. Note that not all reporting is done according to ITU specifications. In particular, ITU specifies error counts for B1 and B3 as the number of blocks with errors (refer to ITU-T G.826 for paths and ITU-T G.829 for RS and MS).

**Table 1** Error Count Reporting

Specification/Card Comparison	B1	B2	B3
ITU Specification	block	bit	block
STM1	block	bit	block
STM4	bit	bit	bit
STM16 trunk	bit	bit	bit



**Table 1**      **Error Count Reporting (continued)**

<b>Specification/Card Comparison</b>	<b>B1</b>	<b>B2</b>	<b>B3</b>
STM16 AS	block	bit	bit
STM64	block	bit	bit
STM1-8	bit	bit	bit
STM4-4	bit	bit	bit

## CSCdw82689

After creating 509 VLANs and provisioning many Ethernet circuits, Ethernet circuit provisioning can become very slow, or possibly fail. Ethernet traffic may also incur an outage of a few minutes. To avoid this problem, delete any VLANs that are created but not used, and do not recreate them. There is no resolution planned for this issue.

## CSCdv10824: Netscape Plugins Directory

If you use CTC, JRE, and the Netscape browser with a Microsoft Windows platform, you must ensure that any new installation of Netscape uses the same Netscape directory as the previous installation did, if such an installation existed. If you install Netscape using a different path for the plugins directory, you will need to reinstall JRE so that it can detect the new directory.

## “Are you sure” Prompts

Whenever a proposed change occurs, the “Are you sure” dialog box appears to warn the user that the action can change existing provisioning states or can cause traffic disruptions.

## Common Control and Cross Connect Cards

### CSCec82148

Rarely, traffic hits can occur on TCC2/TCC2P card removal. To avoid this issue, remove the card quickly. To recover from this issue, soft reset the TCC2/TCC2P card. This issue will not be resolved.

## Ethernet Polarity Detection

The TCC2/TCC2P does not support Ethernet polarity detection. The TCC+ and TCCI both support this feature. If your Ethernet connection has the incorrect polarity (this can only occur with cables that have the receive wire pairs flipped), the TCC+/I will work, but the TCC2/TCC2P will not. In this event, a standing condition, “LAN Connection Polarity Reverse Detected” (COND-LAN-POL-REV), will be raised (a notification will appear on the LCD, and there will be an alarm raised). This issue will most likely be seen during an upgrade or initial node deployment. To correct the situation, ensure that your Ethernet cable has the correct mapping of the wire wrap pins. For Ethernet pin mappings, consult the user documentation.

## Active Cross Connect or TCC2/TCC2P Card Removal

Active cross connect or TCC2/TCC2P cards should not be removed. If the active cross connect or TCC2/TCC2P card must be removed, to minimize network interruption you can first perform an XCVXL side switch and then remove the card once it is in standby, or you can perform a lockout on all circuits that originate from the node whose active cross connect or active TCC2/TCC2P will be removed (performing a lockout on all spans will also accomplish the same goal).



### Caution

If you mistakenly remove an active cross connect or TCC2/TCC2P card and you subsequently lose traffic on some interface cards, you may need to physically reset these cards if they fail to regain traffic.

## Optical IO Cards

### CSCee17695 and CSCed26246

Rarely, an STM1-8 card might fail to read MFG EEPROM and will show MEA in CTC. This issue can be reproduced by power cycling the node several times, by quickly removing and reinserting a fuse, or when the fuse is removed for several minutes and then replaced; however, the issue is not likely to be due to the power cycling. If a card enters this state, remove and reseal it, or cycle power again to recover STM1-8 operation. This issue will not be resolved.

### CSCdw44431

Cisco ONS 15454 optical cards are not provisioned for particular path labels (C2 bytes). Consequently, they cannot raise a PLM condition. However, the ONS 15454 electrical card that terminates traffic ensures that the C2 byte is correct for the type of traffic carried. If the C2 byte is incorrect, this card raises a PLM condition that is reported against the optical port of ingress. An optical card will not raise a PLM against traffic that passes through a node, though it will appear to raise a PLM against traffic with the wrong C2 byte that is terminated on an electrical card within the node. This issue will not be resolved.



### Note

Optical cards do ensure that the C2 byte is nonzero (Equipped), and will raise a UNEQ condition if the C2 byte is 0 (Unequipped).

## Electrical IO Cards

### CSCeg80233

Long traffic hits can occur on E1-42 when using cross connect FIT cards. This can occur when, on the FIT card, you toggle the 155 mhz clock going to the E1-42 cards to the off position. This issue cannot be resolved.

## CSCeg81428

Rarely, a long traffic hit (117 ms) can occur on E1-42 after an XC side switch. In multinode BLSR setups, switching the cross connect cards repeatedly might cause traffic hits greater than 60 ms. To avoid this issue side switch the XC only when needed (and not repeatedly). This issue will not be resolved.

## CSCeg19255

Rarely, DS3I VC3 traffic takes a hit greater than 60 ms during a cross connect card soft reset. This issue will not be resolved.

## CSCef67059

Bit errors can occur on E1-42 line cards passing traffic, when other E1-42 line cards are initially inserted into adjacent slots. Specifically, inserting line cards into adjacent slots or 1:N protect slots (Slots 3 and 15) can cause hits on Ports 1-14. Also, when the card in the 1:N protection slot is passing traffic, inserting E1-42 line cards into adjacent slots can cause bit errors. The bit errors characteristically last less than 5 ms. After the card is inserted, no further bit errors occur. Ports 15-42 behave differently. No bit errors occur on a line card residing in a non-1:N slot if adjacent line cards are inserted. Bit errors will only occur for these ports if line cards are inserted into the 1:N protection slots (Slots 3 and 15). Bit errors might also occur if traffic passes through the 1:N protected slot, and you insert a line card into any other working slot. A future version of E1-42 hardware will resolve this issue.

## Interoperability with SONET DS3i-N-12

When provisioning circuits in SDH to interoperate with SONET DS3i-N-12, you must create a VC4 containing VC3s as a payload in the exact order in which they will attach to port groups on the SONET side.

## CSCea52722

With DS3-I cards in a 1:2 protection group, when the protect card is active and in the WTR condition, removing another working card from the protection group clears the WTR condition. To work around this issue, remove the working card from the protection group when the protect card is in the standby state. This issue will be resolved in a future release.

## CSCdw80652

When one traffic card in a DS3I 1:N protection group is reset, and then another card is reset, there will be a loss of traffic on the second card, after the first card completes its reset, lasting until the second card completes its reset. This only occurs when the protect card tries to handle the traffic of a card that is resetting, and that card is carrying traffic because when it reset the protect card was carrying traffic for another card. This loss of traffic occurs because the protect card attempts to set its relays to handle the traffic of the working card, but the relays on the working card are also set to carry the traffic, and since the card is resetting, no software is running to switch its relays. This issue most frequently presents itself when testing a double-failure scenario: resetting two cards in a protection group. Wait until the first card completes its reset sequence before resetting the second card to prevent this problem. Configuring cards in 1:1 instead of 1:N protection should also avoid the problem. This issue will not be resolved.

## DWDM Cards

### CSCse41468

The GE interface remains down on a switch connected to an MXP\_MR\_2.5G card. This can occur during failure recovery with AUTO NEGOTIATION enabled on a connected switch. To work around this issue disable AUTO NEGOTIATION or set sync-restart-delay 10000 on the port of the switch. This issue will not be resolved.

### CSCeh22604

When an MXP\_MR\_2.5G card is in MIXED or ESCON mode, TCA and alarm optical thresholds of Tx power for laser bias are configurable for ESCON payload, though not supported. This issue will be resolved in the future release.

### CSCei19148

When a port is placed in-service while the conditions necessary to squelch the port are present, as in when the trunk port on a DWDM card is OOS,DSBLD and a client port is placed in-service, the client will momentarily enable, emitting light, before squelching due to the trunk OOS,DSBLD condition. The pulse is approximately 500 ms. This issue will not be resolved.

### CSCei87554

When using a 1GE payload over the TXP\_MR\_2.5G the IfInErrors counter does not report oversized, undersized, or CRC errored frames, but rather, reports frame coding only. This issue will not be resolved.

### CSCsb47323

For MXP\_MR\_10DME-C and MXP\_MR\_10DME-L cards, an unexpected RFI condition might be raised along with an OTUk-BDI. When there is an LOS downstream, the node receives OTUk-BDI. Because of the placement of dual OTN and SONET wrappers, it can also receive an RFI. This issue will not be resolved.

### CSCsb79548

A long traffic hit can occur when an active TCC2/TCC2P resets while an MXP\_MR\_10DME-C or MXP\_MR\_10DME-L card is rebooting.

This issue can be reproduced as follows:

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- Step 1** 1. Set up two MXP\_MR\_10DME-C or MXP\_MR\_10DME-L cards, connected back-to-back in two different nodes, A and B.
  - Step 2** 2. Ensure that Node A has two TCC2 cards; one is active, and the other is standby.
  - Step 3** 3. Set up any kind of traffic between the two MXP\_MR\_10DME-C or MXP\_MR\_10DME-L cards.
  - Step 4** 4. Soft reset the MXP\_MR\_10DME card in Node A, then soft reset the active TCC2/TCC2P.
-

OTUk/ODUk-SD, FEC Uncorrected word alarms are raised on the trunk port. Traffic goes down and does not recover until the MXP\_MR\_10DME card is able to come up. It is not known when or if this issue will be resolved.

## CSCsb94736

After a fault condition (trunk LOS or Y-cable switch) an MXP\_MR\_10DME card might fail to detect the login message and traffic might not start for some minutes (after multiple login trials). This can occur in an N-F configuration with MDS switch and MXP\_MR\_10DME distance extension on, where test equipment traffic is set to 2G Fibre channel (FC) full bandwidth occupancy and started. Stop traffic or keep bandwidth occupancy below 80% during the login phase to work around this issue. This issue will not be resolved.

## CSCsb95918

All GFP related alarms are raised with their active severities on the standby card after a Y-Cable protection switch. When a DWDM card (with GFP support) in a Y-Cable protection group becomes standby as a result of a Y-Cable protection switch, the GFP alarms raised when the card was active retain their severities instead of assuming standby severities. The alarms can be seen in the alarm pane if not suppressed, or in the condition pane if suppressed. This issue will be resolved in a future release.

## CSCsc36494

Manual Y cable switches with squelching turned off can cause a Fibre channel link with brocade switches to go down.

This issue can be reproduced as follows:

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- Step 1** Set up MXP\_MR\_10DME cards so that they are Y cable protected. Squelching is provisioned to be off. Distance extension is turned on.
  - Step 2** The path between the working pair of Y cable protected cards, has no distance introduced. But the protect path has a delay of 800 km introduced.
  - Step 3** Start Fibre channel traffic with brocade switches.
  - Step 4** Perform user-initiated manual Y cable switches from CTC.
- 

After a few switchovers, the FC link will go down. SIGLOSS and GFP-CSF alarms are seen on the CTC. Cisco recommends you provision squelching to be on when interworking with brocade switches. If for some reason, squelching must be off with brocade switches, Cisco recommends you use a FORCE command to perform Y cable switches. It is not known when or if this issue will be resolved.

## CSCsc55771

When two MXP\_MR\_10DME cards are interconnected through OC-192/STM-64 cross connects and traffic is up, if you hard reset one of the MXP\_MR\_10DME cards, the traffic might fail to recover. To recover traffic flow, place the client port in OOS,DSBLD state, delete the PPM then recreate it, and reprovision the port. This issue is resolved in Release 7.2.

**CSCsc60472**

CTC is not able to discover a TL1 OCHCC circuit provisioned over an ITU-T line card (ITU-T OC48/STM16 and ITU-T OC192/STM64). This issue can occur when, using the TL1 client interface, you create the OCHNC layer that will be used by the OCHCC circuit, then create the OCHCC connections that involve the ITU-T line cards. The result is an OCHNC and two OCHCC partial circuits, instead of an OCHNC and a single OCHCC complete circuit. This issue will not be resolved.

**CSCsc14290**

LOW communication between two nodes equipped with TXP-MR-10E and AIC-I cards does not work with TXP-MR-10E cards in line termination mode, G.709 enabled, GCC present on the trunk port, and LOW circuits created between the transponders and AIC-I; Cisco recommends that you use EOW instead. This issue will be resolved in a future release.

**CSCsc58941**

Trunk ports of the TXPP\_MR\_2.5G and MXPP\_MR\_2.5G can be in facility and terminal loopback at the same time. this can occur if you provision terminal loopback on the protected trunk port after putting the trunk ports in facility loopback. You can clear this condition by removing loopback provisioning on the trunk ports. This issue will be resolved in Release 8.0.

**CSCeh94567**

Setting a Terminal loopback on an MXP-2.5G-10G trunk port causes OTUK alarms.

This can occur under the following conditions.

1. Two MXP-2.5G-10G cards are connected via the trunk ports.
2. The client ports are connected to respective STM16 line cards.
3. SDCC is enabled on the client ports and the line cards' STM16 port.
4. A terminal loopback is set on the MXP-2.5G-10G trunk port.

This terminal loopback causes OTUK-LOF and OTUK-IA alarms to be reported on both MXP-2.5G-10G trunk ports. This issue will not be resolved.

**CSCef15415**

RMON TCAs are not raised on the TXPP\_MR\_2.5G client port after a hardware reset. To see this issue, provision two nodes with TXPP\_MR\_2.5G (TXP-1 and TXP-2) as follows.

- 
- Step 1** Connect the TXP-1 DWDM-A trunk to the TXP-2 DWDM-A trunk.
  - Step 2** Connect the TXP-1 DWDM-B trunk to the TXP-2 DWDM-B trunk.
  - Step 3** Create an external fiber loopback on the TXP-1 client.
  - Step 4** Connect the TXP-2 client to a traffic generator.
  - Step 5** Provision 1G FC payload on the TXP-1 and TXP-2.
  - Step 6** Ensure that traffic is running smoothly.
  - Step 7** Provision RMON thresholds using TL1 for all TXPP\_MR\_2.5G ports (client and trunks).

**Step 8** Apply a hardware reset to the TXPP\_MR\_2.5G.

---

After the card reboots, only DWDM-A and DWDM-B (trunk) port RMON TCAs are raised in the CTC History pane. RMON TCAs for port 1 (client) are not raised. This issue will not be resolved.

## CSCef15452

RMON TCAs are not raised when the RMON history is cleared on TXPP\_MR\_2.5G card. To see this issue, provision two nodes with TXPP\_MR\_2.5G (TXP-1 and TXP-2) as follows.

---

- Step 1** Connect the TXP-1 DWDM-A trunk to the TXP-2 DWDM-A trunk.
  - Step 2** Connect the TXP-1 DWDM-B trunk to the TXP-2 DWDM-B trunk.
  - Step 3** Create an external fiber loopback on the TXP-1 client.
  - Step 4** Connect the TXP-2 client to a traffic generator.
  - Step 5** Provision 1G FC payload on the TXP-1 and TXP-2.
  - Step 6** Ensure that traffic is running smoothly.
  - Step 7** Provision RMON thresholds using TL1 for all TXPP\_MR\_2.5G ports (client and trunks).
  - Step 8** While the traffic is running reset the RMON history by clicking the Clear button in the CTC Payload PM pane.
- 

RMON TCAs are not raised for any port. This issue will not be resolved.

## CSCef50726

Receive client fiber removal can cause a switch from the protect to the active in a TXPP\_MR\_2.5G. To see this issue, perform the following steps.

---

- Step 1** Set up two nodes with TXPP\_MR\_2.5G (call the nodes TXP-1 and TXP-2).
  - Step 2** Ensure that TXP-1 DWDM-A trunk is connected to TXP-2 DWDM-A trunk with a 100 Km span.
  - Step 3** Ensure that TXP-1 DWDM-B trunk is connected to TXP-2 DWDM-B trunk with a 0 Km span.
  - Step 4** Ensure that TXP-1 client has an external fiber loopback.
  - Step 5** Connect the TXP-2 client to a traffic generator.
  - Step 6** Provision TXP-1 and TXP-2 with FICON 1G payload.
  - Step 7** Ensure that traffic is running smoothly on the protected span.
  - Step 8** Remove the receive client fiber at the near end.
- 

This causes the far end trunk to switch from protect to working span. Similarly, removal of the receive Client fiber at far end causes the near end trunk to switch from the protect to the working span. (Note that the traffic is already lost due to the receive client fiber pull.) To work around this issue, manually switch via CTC from the working to the protect span. This issue will not be resolved.

## CSCef13304

Incorrect ALS initiation causes a traffic outage on an FC payload. This issue can be seen by performing the following steps.

- 
- Step 1** Set up two nodes with TXPP\_MR\_2.5G (call these nodes TXP-1 and TXP-2).
  - Step 2** Connect the TXP-1 DWDM-A trunk to the TXP-2 DWDM-A trunk.
  - Step 3** Connect the TXP-1 DWDM-B trunk to the TXP-2 DWDM-B trunk.
  - Step 4** Provision the TXP-1 client with an external fiber loopback.
  - Step 5** Connect the TXP-2 client to a traffic generator.
  - Step 6** Ensure that TXP-1 and TXP-2 have 1G FC payload provisioned.
  - Step 7** Enable ALS on TXP-1 trunk port and set it to “Manual Restart.”
  - Step 8** When traffic is running, remove the receive and transmit fibers on TXP1 port 1 (client). Traffic goes down and shutdown on TXP-1 port 2 (trunk) displays “No.”
  - Step 9** Reconnect the fibers for TXP-1 port 1 (client).
- 

ALS is now initiated on TXP-1 port 2 (trunk) and the laser shuts down. Traffic never comes back.



### Note

This issue is restricted to the TXPP\_MR\_2.5G card.

---

To recover from this situation, perform a manual restart or disable the ALS in this configuration. This issue will not be resolved.

## CSCuk51184

When downloading Release 4.7 to nodes with Release 4.6 installed, The 15454-32MUX-O and 15454-32DMX-O report an AWG Temperature fail low alarm that subsequently clears. This also occurs when downgrading from Release 4.7 to Release 4.6, where the AWG Temperature alarm fail is high. This issue cannot be resolved.

## CSCec22885

AS-MT is not enabled in Port 3 when a loopback is applied. To see this issue, on the TXPP card, make the following 3 changes before clicking Apply:

- 
- Step 1** Change Port 2 to OOS-MT from IS.
  - Step 2** Change Port 3 to OOS-MT from IS.
  - Step 3** Change Port 2 to facility or terminal loopback.
- 

Now, when you click Apply, CTC issues the error message: “Error applying changes to row2 peer trunk port must not be IS.” Port 3 is still IS and the loopback changes are not applied. You must place Port 3 in the OOS-MT state, apply the changes, and then change the loopback to recover.



This error occurs only when all three of the above changes are attempted at the same time.

To avoid this issue, first change both the trunk ports to OOS-MT, click Apply, and then place port 2 in loopback and click Apply again. This issue will not be resolved.

## CSCed76821

With Y-cable provisioned for MXP-MR-2.5G cards, if you remove the client receive fiber on one side, the far end takes greater than 100 ms to switch away from the affected card. This issue will not be resolved.

## CSCef44939

Under certain conditions you may be unable to provision an Express Order Wire (EOW) circuit using an MXP\_2.5G\_10G or TXP\_MR\_10G card trunk port. This can occur as follows.

- 
- Step 1** Provision an MXP\_2.5G\_10G or TXP\_MR\_10G card within a node.
  - Step 2** Disable OTN.
  - Step 3** Provision DCC on both client and trunk ports.
  - Step 4** Go to the Network view **Provisioning > Overhead Circuits** tab.
- 

During the EOW circuit provisioning only the MXP/TXP client ports are listed for the selection. This issue will not be resolved.

## CSCuk51185

After a soft reset of an OSCM or OSC-CSM card, a CONTBUS-IO alarm is raised. This issue will not be resolved.

## CSCuk50144

Neither E1 nor E2 circuits are available for EOW circuits on TXP\_MR\_2.5 TXT in Section and Line Termination mode. This issue will not be resolved.

## CSCee45443

When the FICON bridge does not receive the expected number of idle frames between data packets it will transition to SERV MODE. The MXP-MR-2.5G should not be used in scenarios where there is a FICON Bridge in place. This issue will not be resolved.

## CSCec40684

After a database restore TXPP trunk ports might report SF, resulting in a traffic outage. The SF occurs when you restore the database and then put the port OOS for DWDM cards; then the operating mode in the database is different from the current operating mode. To avoid this issue, either put the DWDM port OOS before restore the database, or, after restoring the database, reset the DWDM cards. This issue will not be resolved.

**CSCec51270**

Far end traffic does not switch in line termination mode with .G709 off. This can occur with non-revertive Y-cable, and DCC enabled, under certain specific conditions. To avoid this issue, turn on .G709 when in line mode. This issue will not be resolved.

**CSCuk42668**

TXP-MR-2.5G F1-UDC may not be passed through in a line-terminated configuration with OTN off. This can occur with clean, OC-3/STM-1, line-terminated traffic, with OTN disabled, when you create a D1-D3 tunnel, a D4-D12 tunnel, and an F1-UDC from client to client. This issue will not be resolved.

**CSCuk42752**

If you go to the Overhead Circuits Tab in network view and select any User Data, F1 or User Data D4-D12 circuit type, no nXP cards are available for selection in the Endpoints. However, user Data type circuits can still be made end-to-end (where “end-to-end” refers to external cards, such as AIC to AIC) if the nXP cards are put in Transparent mode. This issue will not be resolved.

**CSCeb49422**

With TXPP cards, a traffic loss up to six seconds can occur during a DWDM protection switch. This behavior may be exhibited during protection switches by certain third-party fiber channel switches due to loss of buffer credits resulting in a reconvergence of the fiber channel link. This issue will not be resolved.

**CSCeb53044**

The 2G Fiber Channel (FC) payload data type in the TXP\_MR\_2.5G and TXPP\_MR\_2.5G cards does not support any 8B/10B Payload PM monitoring. This is by design.

**CSCeb32065**

Once engaged, the ALR will not restart on the trunk lines of a TXP or TXPP card. This occurs whenever ALR engages on the trunk lines of a TXP or TXPP card and the recover pulse width is provisioned to less than 40 seconds. This is a function of the trunk laser turn-on time, and the limiting recovery pulse width will vary by card. To avoid this issue, provision the pulse width to 40 seconds or more. This issue will not be resolved.

**CSCeb26662 and CSCea88023**

With TXP-MR-2.5G cards, when the current 1 day Optics PM rolls over, the information is inaccurate. This issue will not be resolved.

**CSCuk42588**

With ALS mode configured as “Auto Restart” or “Manual Restart,” it is possible the ALS Pulse Duration Recovery time can be set to values out of ITU-T recommendation G.664. You can use values out of the range defined in ITU-T recommendation G.664 only in order to interoperate with equipment that lasers cannot turn on or off within the required pulse time. To stay within the specification, you can set this value to 2 seconds and up to 2.25 seconds.

**CSCea81219**

On the TXPP, the default value for Tx Power High for TCAs & Alarms is too high for the trunk ports. Since Tx Power TCA and Alarm are not supported for trunk ports, this caveat is for informational purposes only.

**CSCeb24815**

With TXP-MR-2.5G cards, ratios are calculated incorrectly after clearing statistics. This is because after you clear statistics the entire time period becomes invalid. Once the time period rolls over again, values will be reliable for the new period.

**CSCeb27187**

During a Y-Cable protection switch, the client interface sends 200,000 to 300,000 8B/10B errors towards the attached Catalyst 3550 switch. The switch reacts to this large amount of 8B/10B errors by reinitializing the interface and spanning tree. The end result is that a protection switch can lead to a 30-45 second traffic hit if the switch is running spanning tree (default mode). This is expected behavior.

**CSCea87290**

In a Y-Cable protection group, if GCCs are defined on both cards, both cards' active LEDs will be green. This is by design.

**CSCeb12609**

For the TXPP, attenuating Port 2 Rx signal, SD, and SF alarms are not declared before LOS-P is raised. This is due to the intrinsic design of the optical interface, which allows required BER performances with dispersion and OSNR penalties.

This can occur when Port 2 is in back to back or has low dispersions and high OSNR.

**CSCea68773**

The ACTV/STBY LED shows AMBER when a 2.5G transponder is first connected. The DWDM cards introduced a new design: When all the ports are OOS on a card, the card is considered to be in standby mode.

## Data IO Cards

### SONET and SDH Card Compatibility

Tables 2, 3, and 4 list the cards that are compatible for the ONS 15454 SONET and ONS 15454 SDH platforms. All other cards are platform specific.

**Table 2** *SDH Data Cards that are SONET Compatible*

Product Name	Description
15454E-G1000-4	4 port Gigabit Ethernet Module - need GBICs
15454E-E100T-12	12 port 10/100BT Ethernet Module
15454E-E1000-2	2 port Gigabit Ethernet Module - need GBICs
15454E-ML100T-12	10/100 Mbps Ethernet card, 12 ports, RJ-45, L2/L3 switching, SDH/ETSI system, includes console cable
15454E-ML1000-2	1000 Mbps Ethernet card, 2 SFP slots, L2/L3 switching, SDH/ETSI system

**Table 3** *SONET Data Cards that are SDH Compatible*

Product Name	Description
CE-1000-4	4 port 1000-Mbps Gigabit Ethernet module
CE-100T-8	8 port 10/100FE Ethernet Module
15454-G1000-4	4 Port Gigabit Ethernet
15454-E100T-G	10/100BT, 12 circuit, compatible w/ XC, XCVT and XC10G
15454-E1000-2-G	Gigabit Ethernet, 2 circuit, GBIC - G
15454-ML100T-12	10/100 Mbps Ethernet card, 12 ports, RJ-45, L2/L3 switching, SONET/ANSI system, includes console cable
15454-ML1000-2	1000 Mbps Ethernet card, 2 SFP slots, L2/L3 switching, SONET/ANSI system

**Table 4** *Miscellaneous Compatible Products*

Product Name	Description
15454-BLANK	Empty slot Filler Panel
15454-GBIC-LX	1000Base-LX, SM or MM, standardized for 15454/327
15454-GBIC-SX	1000Base-SX, MM, standardized for 15454/327
15454-FIBER-BOOT=	Bag of 15 90 degree fiber retention boots

**Table 4** *Miscellaneous Compatible Products (continued)*

<b>Product Name</b>	<b>Description</b>
15454-SFP-LC-SX	1000BASE, SX, short-reach, multimode, small form factor pluggable (SFP), LC connectors
15454-SFP-LC-LX	1000BASE, LX, long-reach, single mode, SFP, LC connectors
15454-CONSOLE-02	Cable, console, ML-Series, RJ-11 plug to RJ-45 jack, 22in/55.9cm long, SONET/ANSI system
15454E-CONSOLE-02	Cable, console, ML-Series, RJ-11 plug to RJ-45 jack, 22in/55.9cm long, SDH/ETSI system

## E1000-2/E100T

Do not use the repair circuit option with provisioned stitched Ethernet circuits. It is not known at this time when or if this issue will be resolved.

## Single-card EtherSwitch

Each E100/E1000 card can be configured as a single-card EtherSwitch configuration to allow VC4-4c of bandwidth to be dropped at each card. The following scenarios for provisioning are available:

VC4-4c

VC4-2c, VC4-2c

VC4-2c, VC4, VC4

VC4, VC4, VC4, VC4

When configuring scenario 3, the VC4-2c must be provisioned before either of the VC4 circuits.

## Multicard EtherSwitch

When deleting and recreating Ethernet circuits that have different sizes, you must delete all VC4 circuits provisioned to the EtherSwitch before you create the new circuit scenario. (See the preceding “Single-card EtherSwitch” section on page 6 for details on the proper order of circuit creation.) Enable front ports so that the VLANs for the ports are carried by the largest circuit first. A safe approach is to enable the front port before you create any circuits and then retain the front port VLAN assignment afterwards. If you break the rules when creating a circuit, or if you have to delete circuits and recreate them again, delete all circuits and start over with the largest first.

## CSCed96068

If an ML-Series card running Software Release 4.6.2 or later is interoperating with an ML-Series card running Software Release 4.6.0 or 4.6.1, then the `pos vcat resequence disable` command must be added to the configuration of the ML-Series card running R4.6.2 or later.

**CSCec52443**

On an ML-series RPR ring circuit deletion or creation causes an approximately 200 ms traffic loss. Traffic loss is expected to be less than 50 ms for RPR. To avoid this issue, from the ML-series CLI, perform a “shutdown” on both ends of the circuit prior to circuit changes. This issue will not be resolved.

**CSCec52372**

You must issue a “shut” command to both ends of a POS circuit before placing the circuit OOS, and issue IS before a “no shut” command. Placing a POS circuit OOS without shutting down can cause long traffic hits. This issue will not be resolved.

**CSCec51252**

You must issue a “shut” on both ends of affected POS circuits before performing a maintenance action on those circuits. If a POS circuit is restored without first issuing the shut commands, traffic loss is greater than 50 ms. When a maintenance action is taken, one end of the circuits could come up before the other. During that time, traffic is lost because the other end is not up yet. This issue will not be resolved.

**CSCeb25778**

When a MAC-SA is seen for the first time, it is learned, but may age out in less than 5 minutes. If the same MAC-SA is seen again before the first ages out, the entry will age out after 5 minutes, as expected. This issue will not be resolved.

**CSCin43669**

Timer expiration can cause a system crash when you attempt to remove 250 Shared Packet Ring (SPR) subinterfaces using the “no int spr1” command, while Cisco Discovery Protocol (CDP) is also enabled. To avoid this issue, either turn off CDP, issue the command, and then turn CDP back on; or remove the SPR subinterfaces explicitly. This issue will not be resolved.

**CSCea36829**

The broadcast packet count is always 0 for the SPR interface. The ML100 and ML1000 hardware does not support counting broadcast packets. This issue will not be resolved.

**CSCeb21996**

When the POS interface is removed from SPR due to a defect, while SPR is configured in immediate mode, the defect type may not be reported. This only occurs if the defect is set and clears in less than 50 ms.

**CSCdz49700**

ML-series cards do not appear in the Cisco Discovery Protocol (CDP) adjacencies and do not participate in the Spanning-Tree Protocol. All packets are counted as multicast.

The ML-series cards always forward Dynamic Trunking protocol (DTP) packets between connected devices. If DTP is enabled on connected devices (which might be the default), DTP might negotiate parameters, such as ISL, that are not supported by the ML-series cards. All packets on a link negotiated to use ISL are always counted as multicast packets by the ML-series card, and STP and CDP packets are bridged between connected devices using ISL without being processed. To avoid this issue, disable DTP and ISL on connected devices. This functionality is as designed.

### CSCdz68649

Under certain conditions, the flow-control status may indicate that flow control is functioning, when it is not. Flow-control on the ML-series cards only functions when a port-level policer is configured. A port-level policer is a policer on the default and only class of an input policy-map. Flow-control also only functions to limit the source rate to the configured policer discard rate, it does not prevent packet discards due to output queue congestion.

Therefore, if a port-level policer is not configured, or if output queue congestion is occurring, policing does not function. However, it might still mistakenly display as enabled under these conditions. To avoid this issue, configure a port-level policer and prevent output queue congestion. This issue will not be resolved.

### CSCdz69700

Issuing a **shutdown/no shutdown** command sequence on an ML1000 port clears the counters. This is a normal part of the startup process and there are no plans to change this functionality.

### CSCea01675

Packets without an 802.1q VLAN tag are classified as COS 0. This issue will not be resolved.

### CSCin29274

When configuring the same static route over two or more interfaces, use the following command:

```
ip route a-prefix a-networkmask a.b.c.d
```

Where *a.b.c.d* is the address of the outgoing gateway, or, similarly, use the command:

```
ip route vrf vrf-name
```

Do not try to configure this type of static route using only the interface instead of the address of the outgoing gateway. This issue will not be resolved.

### CSCin32057

If no BGP session comes up when VPN Routing/Forwarding (VRF) is configured and all interfaces have VRF enabled ensure that at least one IP interface (without VRF) is configured and add an IP loopback interface on each node. This issue will not be resolved.

## CSCdy55437

The maximum MAC Address Learn Rate for the ML-Series cards is 1300 MAC addresses per second. This number varies based on the ML-Series control and forwarding plane loads. If the forwarding and control planes are heavily loaded, the maximum MAC Address Learn Rate could be as low as 100 MAC addresses per second. To correct a situation where an ML-Series card has stopped learning MAC addresses, reduce the load on these cards. This load limit is by design.

## CSCdy47284

Oversize frames are not supported on ML100 Fast Ethernet ports. Oversize frames cause egress traffic to incur CRC, line, and fragment errors on these ports. To avoid this issue, do not send jumbo packets to ML far end ports. This is as designed.

## Alarms

### CSCed28167

When a VC\_LOW\_PATH\_TUNNEL only contains unidirectional circuits, an AU-LOP critical alarm is raised. This can occur when a bidirectional tunnel goes through at least three nodes, and the AU-LOP alarm is shown on the intermediate node on the direction not used. Tunnels are bidirectional. If a tunnel does not have traffic in both directions, it will be alarmed. The alarm will be cleared when a bidirectional circuit is added to the tunnel. This issue will not be resolved.

### CSCef63240

Rarely, an LP TIM alarm displays its severity as NR instead of MJ in CTC. This can occur when a VC3 circuit is created on Port 5 and IO has detected a VC4 PLM alarm. This issue will not be resolved.

### CSCee29901

A CARLOSS alarm can take up to 3 minutes to be reported depend of the number of VLANs configured on a node. When the alarm does appear, if you clear this major alarm, the severity changes to minor, but then the alarm disappears. The alarm severity behavior will not be changed.

### CSCse85355

The NE should report alarms or conditions on ingress port not on any internal ports. Alarm detected at the internal ports (TERM) side will be ingress map to the MON side. So the NE raises the STS-MON/VT-MON and STS-TERM/VT-TERM alarms or conditions on the STS-MON/VT-MON ports, irrespective of the actual detection port (MON or TERM). If the user wants the customized severity to be reflected for a specific STS/VT alarms, the alarm profile entities of both STS-MON and STS-TERM, if available, should be changed to the same severity.



## CSCsd52665

The NE should report alarms or conditions on ingress port not on any internal ports. Alarm detected at the internal ports (TERM) side will be ingress map to the MON side. So the NE raises the STS-MON/VT-MON and STS-TERM/VT-TERM alarms or conditions on the STS-MON/VT-MON ports, irrespective of the actual detection port (MON or TERM). If the user wants the customized severity to be reflected for a specific STS/VT alarms, the alarm profile entities of both STS-MON and STS-TERM, if available, should be changed to the same severity.

## CSCsd56328

The NE should report alarms or conditions on ingress port not on any internal ports. Alarm detected at the internal ports (TERM) side will be ingress map to the MON side. So the NE raises the STS-MON/VT-MON and STS-TERM/VT-TERM alarms or conditions on the STS-MON/VT-MON ports, irrespective of the actual detection port (MON or TERM). If the user wants the customized severity to be reflected for a specific STS/VT alarms, the alarm profile entities of both STS-MON and STS-TERM, if available, should be changed to the same severity.

## MS-SPRing Functionality

### CSCdz66275

When creating a MS-SPRing from the network view, the node default values for reversion are not initially used. To see this, starting with no preferences file, log into a node with CTC, and set the node default values for MS-SPRing reversion. Now, in Network view, use the MS-SPRing wizard to create a MS-SPRing. The node level default values are initially ignored while the wizard is still in operation. If you encounter this issue, you may need to change values as appropriate for your network while you are still using the MS-SPRing wizard. Once the wizard is finished, these values are saved to a preferences file and will be used henceforth. This issue will not be resolved.

### CSCdw53481

Two MS-SPRings are not allowed to coexist. If you execute a manual ring switch command on one side of an MS-SPRing node and apply another manual ring switch command on other side of the node, the second manual ring switch command is rejected. This works as designed. The implementation complies with Telcordia GR-1230, R6-102.

### CSCdx45851

On a four fiber MS-SPRing, restoring the database for all nodes at the same time could cause VC4-16c traffic to fail to switch. Do not restore the database for multiple nodes simultaneously. The proper procedure for restoring the database for multiple nodes is to restore one node at a time. This procedure is documented in the user documentation.

## CSCdx19598

A rare hardware failure on an STM16AS card transmitter can trigger SEF on the receiving STM16AS card in a four fiber MS-SPRing (or BLSR) configuration. The BER calculations are suspended when SEF is detected, so SD or SF is never raised. Likewise SEF is not considered a signal failure condition like LOS or LOF, so a protection switch will not occur. If this occurs, use the CTC GUI to force a protection switch on the MS-SPRing (or BLSR). This issue will not be resolved.

## CSCdv53427

In a two ring, two fiber MS-SPRing (or BLSR) configuration (or a two ring MS-SPRing or BLSR configuration with one two fiber and one four fiber ring) it is possible to provision a circuit that begins on one ring, crosses to a second ring, and returns to the original ring. Such a circuit can have protection vulnerabilities if one of the common nodes is isolated, or if a ring is segmented in such a way that two non-contiguous segments of the circuit on the same ring are each broken. There are two possible workarounds for this issue:

1. Manually route the circuit to avoid the “one circuit over two ring” routing scenario.
2. When routing the circuit automatically, select the Using Required Nodes/Spans option in the Circuit Routing Preference screen, then select the appropriate spans to avoid the “one circuit over two ring” routing scenario.

This issue will be resolved in a future release.

## Database Restore on an MS-SPRing

When restoring the database on an MS-SPRing, follow these steps:

- 
- |               |   |
|---------------|---|
| <b>Step 1</b> | To isolate the failed node, issue a force switch toward the failure node from the adjacent east and west nodes.   |
| <b>Step 2</b> | If more than one node has failed, restore the database one node at a time.  |
| <b>Step 3</b> | After the TCC2/TCC2P has reset and booted up, ensure that the “MS-SPRing Multi-Node Table update completed” event has occurred for all nodes in the ring. |
| <b>Step 4</b> | Release the force switch from each node.  |
- 

## SNCP Functionality

### CSCee53579

Traffic hits can occur in an unprotected to SNCP topology upgrade in unidirectional routing. If you create an unprotected circuit, then upgrade the unprotected circuit to a SNCP circuit using Unprotected to SNCP wizard, selecting unidirectional routing in the wizard, the circuit will be upgraded to a SNCP circuit. However, during the conversion, traffic hits on the order of 300 ms should be expected. This issue will not be resolved.

## CSCeb37707

With a VT SNCP circuit, if you inject signals with a thru-mode test set into one path of the circuit in a particular order, you may not see the appropriate alarms. This can occur when you first inject LOP-P, then clear, then inject LOP-V. This issue will not be resolved.

## Active XCVXL or TCC2/TCC2P Card Removal

As in MS-SPRing, you must perform a lockout on SNCP before removing an active cross connect or TCC2/TCC2P card. The following rules apply to SNCP.

Active XCVXL cards should not generally be physically removed. If the active cross connect or TCC2/TCC2P card must be removed, you can first perform an XCVXL side switch or TCC2/TCC2P reset and then remove the card once it is in standby, or you can perform a lockout on all circuits that originate from the node whose active cross connect card or active TCC2/TCC2P will be removed (performing a lockout on all spans will also accomplish the same goal). No lockout is necessary for switches initiated through CTC or through TL1.

## Performance Monitoring

### CSCef28522

When you inject errors on a splitter protection card in the node's working port, CVL and ESL are incremented for the working and protect far end ports. This issue will not be resolved.

## SNMP

### CSCsc62801

For nodes configured in multishelf mode using the default LAN configuration, SNMP traps are not sent to the management system. To avoid this issue, provision any the DCN-connected node as "Socks proxy," then, on such nodes add the following static route:

- Destination: 0.0.0.0
- Next hop: DCN Router
- Cost: 10
- Provision any non-DCN connected node as ENE.

A documented solution is available in the February 2006 online version of the *ONS 15454 DWDM Reference Manual*, Release 7.0.

## SNMP Attribute Changes

The following SNMP attributes will be replaced in future releases, and will no longer be supported after Release 7.0.

- cMsDwdmIfMultiplexSectionRingDirection
- cMsDwdmIfTransportRingDirection

- cMsDwdmIfChannelRingDirection

## Resolved Caveats for Release 7.0.2

This section highlights resolved caveats for Release 7.0.x.

### Maintenance and Administration

#### CSCei67897

Rarely, autoprovisioned audits (those with the unique ID of 0) can become stranded after a bulk roll of VC LO circuits prior to deletion of those circuits. If an attempt was made previously to delete all such circuits, you can use subtractive logic to discover which circuits have become stranded. That is, matrices indicating usage in the node view, Maintenance > Cross-connect > Resource Usage window will indicate stranded circuits.

Once you have identified that there are stuck STSs, go to the card view for each affected trunk card and view the Maintenance > Loopback > SDH STS tabs. From here you can view all used STSs, including any stuck STSs. Determine which STSs in your network have no circuit associated with them, then create and subsequently delete a LO circuit on each affected STS. This will clean up the stuck STSs. This issue is resolved in Release 7.0.

#### CSCef89692

Sometimes, in a 1:N protection group, a locked-out working card carries traffic. This issue can occur when you lock out a working card, reseal that card, reseal the protect card, and then, while the protect card is booting up, remove another working card. After the protect card comes up, it starts protecting the traffic for the removed card and the locked-out working card carries its own traffic. This issue is resolved in Release 7.0.

#### CSCuk52850

In a fiber cut scenario on the LINE-RX, with OSC and channels provisioned, transient LOS-P or LOS-O alarms might be raised. This issue is resolved in Release 7.0.

### DWDM Cards

#### CSCsc54518

The OPT-BST amplifier card is in a LASER OFF state, even if input power is provided to all input ports. This issue only occurs with Release 7.0 and can be reproduced on a card with the amplifier turned on, in operating conditions (with lasers on) as follows.

- 
- Step 1** From the card-level **Maintenance** tab set ALS Mode to **Manual Restart** and click **Apply**.
  - Step 2** Set **OSRI** to **ON** and click **Apply**. The amplifier turns off.

- Step 3** Set **OSRI** to **OFF** and click **Apply**. The amplifier stays turned off (this is expected, since in Manual Restart the lasers are turned back on by means of a Request Laser Restart command issued in CTC).
- Step 4** Select the **Request Laser Restart** check box in the **Maintenance** tab and click **Apply**.

---

The amplifier goes into APR for 9 seconds (correct), but after this it turns off; it should go into LASER ON state (State 4 at module level). If this issue occurs, change the card from manual restart to auto restart, then toggle OSRI ON and OFF. This issue is resolved in Release 7.0.2.

## CSCsc62581

A T-TX-PWR-MIN TCA is raised and a wrong receive optical power value (of -40 dB) is displayed after a card is reset. The alert and incorrect Rx value both clear in the next 15 min sample period. This issue is resolved in Release 7.0.1.

## CSCei37691

The trunk port service state for the TXPP and TXP cards does not transition to unlocked-disabled,failed in the presence of an LOS-P alarm. This can occur when the payload signal for LOS-P is missing for the particular port type. This issue is resolved in Release 7.0.

## CSCuk57046

An unexpected Mismatch Equipment Attributes (MEA) transient alarm can occur on rapidly inserting and removing a PPM. This issue can occur with a TXP\_MR\_10E-L for which you preprovision an OC-192 PPM. The transient alarm is raised on the PPM. This issue is resolved in Release 7.0.

## Data IO Cards

### CSCsb40206

In Asymmetric configuration, with autonegotiation enabled and flow control selected, an ML-series card might fail to synchronize with, or to recognize the asymmetric flow control. This issue is resolved in Release 7.0.

### CSCeg15044

IOS does not allow telnet connections when there are simultaneous Telnet requests, even though there might be unused tty lines available. If this issue occurs, a “No Free TTYs error” message is displayed. This issue is resolved in Release 7.0 (and 6.0).

## Electrical IO Cards

### CSCsd59042

When upgrading the software from Release 6.x.x to Release 7.x.x, the DS3 and E3 cards fail to load if the node name begins with the letters FL. Changing the node name resolves this issue.

## Bridge and Roll

### CSCei37364

When a rollTo leg is not receiving a good signal, and because of this the rollPending alarm is not cleared, there is no alarm indicating the reason that the RollPending alarm fails to clear. This issue is resolved in Release 7.0.

## TL1

### CSCsc62784

The Calibration Tilt is not properly changed using the TL1 interface. The reference tilt is changed instead. This issue can be seen when you try to change the CALTILT parameter on amplifier cards using the ED-OTS command. To avoid this issue, use CTC. This issue is resolved in Release 7.0.1.

## New Features and Functionality

This section highlights new features and functionality for Releases 7.0.x. For detailed documentation of each of these features, consult the user documentation.

### New Features for Release 7.0.2

The following feature has been added for Release 7.0.2.

#### Daylight Savings Time Support

With Release 7.0.2 CTC and TL1 display daylight savings time (DST) in keeping with the new DST rules applicable from 2007 forward. As described in the change in energy policy for the United States of America (USA), the DST start date will be the 2nd Sunday of March and the DST end date will be 1st Sunday of November.

The following features were added for Release 7.0.

## New Hardware

### MXP\_MR\_10DME-C and MXP\_MR\_10DME-L Multirate Muxponder Cards

The 10-Gbps Multirate Muxponder-100 GHz-Tunable 15xx.xx-15yy.yy C-band and L-band (MXP\_MR\_10DME-C and MXP\_MR\_10DME-L) cards aggregate a mix of client Storage Area Network (SAN) service client inputs (GE, FICON, and Fibre Channel) into one 10-Gbps STM-64/OC-192 DWDM signal on the trunk side. They provide one long-reach STM-64/OC-192 port per card and are compliant with Telcordia GR-253-CORE and ITU-T G.957.

The cards support aggregation of the following signal types:

- 1-Gigabit Fibre Channel
- 2-Gigabit Fibre Channel
- 4-Gigabit Fibre Channel
- IBM FICON-1G
- IBM FICON-2G
- 1-Gigabit Ethernet
- 1-Gigabit ISC-Compatible (ISC-1)
- 1-Gigabit ISC-Peer (ISC-3)
- 2-Gigabit ISC-Peer (ISC-3)

The MXP\_MR\_10DME-C and MXP\_MR\_10DME-L muxponders pass all SONET/SDH overhead bytes transparently.

The digital wrapper function (ITU-T G.709 compliant) formats the DWDM wavelength so that it can be used to set up GCCs for data communications, enable FEC, or facilitate performance monitoring. The MXP\_MR\_10DME-C and MXP\_MR\_10DME-L cards work with OTN devices defined in ITU-T G.709. The cards support G.709 OTU2 digital wrapper, an industry standard method for asynchronously mapping a SONET/SDH payload into a digitally wrapped envelope. Aggregation of input service signals is provided at the SONET level via GFP-T in STS24c or STS48c framing (depending on the service type).



#### Note

Because the client payload cannot oversubscribe the trunk, a mix of client signals can be accepted, up to a maximum limit of 10 Gbps.

You can install MXP\_MR\_10DME-C and MXP\_MR\_10DME-L cards in Slots 1 to 6 and 12 to 17.



#### Note

The MXP\_MR\_10DME-C and MXP\_MR\_10DME-L cards are not compatible with the MXP\_2.5G\_10G card, which does not support full optical transparency.

The MXP\_MR\_10DME-C card features a tunable 1550-nm C-band laser on the trunk port. The laser is tunable across 82 wavelengths on the ITU grid with 50-GHz spacing between wavelengths. The MXP\_MR\_10DME\_L features a tunable 1580-nm L-band laser on the trunk port. The laser is tunable across 80 wavelengths on the ITU grid, also with 50-GHz spacing. Each card features four 1310-nm lasers on the client ports and contains five transmit and receive connector pairs (labeled) on the card faceplate. The cards use dual LC connectors on the trunk side and use SFP modules on the client side for optical cable termination. The SFP pluggable modules are SX multimode or LX single-mode interface and support an LC fiber connector.

Details regarding the input data rate, encapsulation method, and data rates available for each client interface can be found in the *Cisco ONS 15454 DWDM Installation and Operations Guide*.

A buffer-to-buffer credit management scheme provides FC flow control. With this feature enabled, a port indicates the number of frames that can be sent to it (its buffer credit), before the sender is required to stop transmitting and wait for the receipt of a “ready” indication. The MXP\_MR\_10DME-C and MXP\_MR\_10DME-L cards support FC credit-based flow control with a buffer-to-buffer credit extension of up to 1600 km for 1G FC, up to 800 km for 2G FC, or up to 400km for 4G FC. The feature can be enabled or disabled.

The MXP\_MR\_10DME-C and MXP\_MR\_10DME-L cards feature a 1550-nm laser for the trunk/line port and a 1310-nm or 850-nm laser (depending on the SFP) for the client ports. The cards contain eight 12.5 degree downward tilt SFP modules for the client interfaces. For optical termination, each SFP uses two LC connectors, which are labeled TX and RX on the faceplate. The trunk port is a dual-LC connector with a 45 degree downward angle.

## Key Features

The MXP\_MR\_10DME-C and MXP\_MR\_10DME-L cards have the following high level features:

- Onboard E-FEC processor—The processor supports both standard RS (specified in ITU-T G.709) and E-FEC, which allows an improved gain on trunk interfaces with a resultant extension of the transmission range on these interfaces. The E-FEC functionality increases the correction capability of the transponder to improve performance, allowing operation at a lower OSNR compared to the standard RS (237,255) correction algorithm. A new BCH algorithm implemented in E-FEC allows recovery of an input BER up to 1E-3.
- Pluggable client interface optic modules—The MXP\_MR\_10DME-C and MXP\_MR\_10DME-L cards have modular interfaces. Two types of optics modules can be plugged into the card. These include an OC-48/STM 16 SR-1 interface with a 7 km nominal range (for short range and intra-office applications) and an IR-1 interface with a range up to 40 km. SR-1 is defined in Telcordia GR-253-CORE and in I-16 (ITU-T G.957). IR-1 is defined in Telcordia GR-253-CORE and in S-16-1 (ITU-T G.957).
- Y-cable protection—Supports y-cable protection between the same card type only, on ports with the same port number and signal rate.
- High level provisioning support—The cards are initially provisioned using Cisco MetroPlanner software. Subsequently, the card can be monitored and provisioned using CTC software.
- Automatic laser shutdown (ALS), a safety mechanism used in the event of a fiber cut.
- Link monitoring and management—The cards can use either G.709 or SONET OC-192 overhead bytes to monitor and manage incoming trunk interfaces.
- Automatic timing source synchronization—The MXP\_MR\_10DME-C and MXP\_MR\_10DME-L cards normally synchronize from the TCC2/TCC2P card. If for some reason, such as maintenance or upgrade activity, the TCC2/TCC2P is not available, the cards automatically synchronize to one of the input client interface clocks.
- Configurable squelching policy—The cards can be configured to squelch the client interface output if there is LOS at the DWDM receiver or if there is a remote fault. In the event of a remote fault, the card can either squelch the laser or send an error code order set.
- The cards are tunable across the full C band (MXP\_MR\_10DME-C) or full L band (MXP\_MR\_10DME-L), thus eliminating the need to use different versions of each card to provide tunability across specific wavelengths in a band. For the specific wavelengths for each band, see the *Cisco ONS 15454 DWDM Installation and Operations Guide*.



## TXP\_MR\_10E\_C and TXP\_MR\_10E\_L Multirate Transponder Cards

The 10-Gbps Transponder-100-GHz-Tunable (TXP\_MR\_10E\_C and TXP\_MR\_10E\_L) cards are multirate transponders for the ONS 15454 platform. They process one 10-Gbps signal (client side) into one 10-Gbps, 100-GHz DWDM signal (trunk side). The TXP\_MR\_10E\_C is tunable over the entire set of C-band wavelength channels (82 channels spaced at 50 GHz on the ITU grid). The TXP\_MR\_10E\_L is tunable over the entire set of L-band wavelength channels (80 channels spaced at 50 GHz on the ITU grid) and is particularly well suited for use in networks that employ dispersion shifted (DS) fiber or SMF-28 single-mode fiber.

The advantage of these cards over previous versions (TXP\_MR\_10G and TXP\_MR\_10E) is that there is only one version of each card (one C-band version and one L-band version) instead of several versions needed to cover each band.

You can install TXP\_MR\_10E\_C and TXP\_MR\_10E\_L cards in Slots 1 to 6 and 12 to 17 and provision the cards in a linear configuration, BLSR/MS-SPRing, path protection/SNCP, or a regenerator. The cards can be used in the middle of BLSR/MS-SPRing or 1+1 spans when the cards are configured for transparent termination mode.

The TXP\_MR\_10E card features a universal transponder 2 (UT2) 1550-nm tunable laser (C band) or a UT2 1580-nm tunable laser (L band) for the trunk port and a separately orderable ONS-XC-10G-S1 1310-nm laser XFP module for the client port. On its faceplate, the TXP\_MR\_10E\_C and TXP\_MR\_10E\_L cards contain two transmit and receive connector pairs, one for the trunk port and one for the client port. Each connector pair is labeled.

### Key Features

The key features of the TXP\_MR\_10E\_C and TXP\_MR\_10E\_L cards are:

- A tri-rate client interface (available through the ONS-XC-10G-S1 XFP, ordered separately):
  - OC-192 (SR1)
  - 10GE (10GBASE-LR)
  - 10G-FC (1200-SM-LL-L)
- A UT2 module tunable through the entire C band (TXP\_MR\_10E\_C card) or L band (TXP\_MR\_10E\_L card). The channels are spaced at 50 GHz on the ITU grid.
- OC-192 to ITU-T G.709 OTU2 provisionable synchronous and asynchronous mapping

### Client Interface

The client interface is implemented with a separately orderable XFP module. The module is a tri-rate transceiver, providing a single port that can be configured in the field to support an OC-192 SR-1 (Telcordia GR-253-CORE) or STM-64 I-64.1 (ITU-T G.691) optical interface, as well as 10GE LAN PHY (10GBASE-LR), 10GE WAN PHY (10GBASE-LW), or 10G FC signals.

The client side XFP pluggable module supports LC connectors and is equipped with a 1310-nm laser.

### DWDM Trunk Interface

On the trunk side, the TXP\_MR\_10E\_C and TXP\_MR\_10E\_L cards provide a 10-Gbps STM-64/OC-192 interface. There are 80 tunable channels available in the 1550-nm C band or 82 tunable channels available in the 1580-nm L band on the 50-GHz ITU grid for the DWDM interface.

The TXP\_MR\_10E\_C and TXP\_MR\_10E\_C cards provide 3R transponder functionality for this 10-Gbps trunk interface. Therefore, the card is suited for use in long-range amplified systems. The DWDM interface is compliant with ITU-T G.707, ITU-T G.709, and Telcordia GR-253-CORE standards.

The DWDM trunk port operates at a rate that is dependent on the input signal and the presence or absence of the ITU-T G.709 Digital Wrapper/FEC. The possible trunk rates are:

- OC192 (9.95328 Gbps)
- OTU2 (10.70923 Gbps)
- 10GE (10.3125 Gbps) or 10GE into OTU2 (nonstandard 10.0957 Gbps)
- 10G FC (10.51875 Gbps) or 10G FC into OTU2 (nonstandard 11.31764 Gbps).

The maximum system reach in filterless applications without the use of optical amplification or regenerators is nominally rated at 23 dB over C-SMF fiber. This rating is not a product specification, but is given for informational purposes. It is subject to change.

### Y-Cable Protection

The TXP\_MR\_10E card supports Y-cable protection, which provides transponder equipment protection without client terminal equipment interface protection. A single client interface can be split between two transponder cards using a Y-protection device.

With Y-cable protection, two TXP\_MR\_10E\_C or two TXP\_MR\_10E\_L transponder cards can be joined in a Y-cable protection group. In Y-cable protection, the client ports of the two cards are joined by Y cables. An incoming client signal is injected into the Rx Y-cable port and is split between the two cards (connected to Rx client ports) in the protection group. The Tx client signals from the two protection group cards are connected to the correspondent ports of the Tx Y cable. Only the Tx client port of the active card is turned on and transmits the signal towards the receiving client equipment.

If you create a GCC using a digital wrapper and apply it to either card of the Y-cable protect group, the DWDM trunk (span) port stays permanently active, regardless of the switch state. When you provision a GCC, you are provisioning unprotected overhead (OH) bytes. The GCC is not protected by the protection group.

### Enhanced FEC Feature

A key feature of the TXP\_MR\_10E\_C and TXP\_MR\_10E\_L cards is the availability to configure the forward error correction in three modes: NO FEC, FEC, and Enhanced FEC (E-FEC). The output bit rate is always 10.7092 Gbps as defined in ITU-T G.709, but the error coding performance can be provisioned as follows:

- NO FEC—No forward error correction
- FEC—Standard ITU-T G.975 Reed-Solomon algorithm
- E-FEC—Standard ITU-T G.975.1 algorithm, which is a super FEC code.

### FEC and E-FEC Modes

As client side traffic passes through the TXP\_MR\_10E\_C and TXP\_MR\_10E\_L cards, it can be digitally wrapped using FEC mode, E-FEC mode, or no error correction at all. The FEC mode setting provides a lower level of error detection and correction than the E-FEC mode setting of the card. As a result, using E-FEC mode allows higher sensitivity (lower OSNR) with a lower bit error rate than FEC mode. E-FEC enables longer distance trunk-side transmission than with FEC.

The E-FEC feature is one of three basic modes of FEC operation. FEC can be turned off, FEC can be turned on, or E-FEC can be turned on to provide greater range and lower BER. The default mode is FEC on and E-FEC off. E-FEC is provisioned using CTC.

Because the transponder has no visibility into the data payload and detect circuits, the TXP\_MR\_10E\_C and TXP\_MR\_10E\_L cards do not display circuits under the card view.

## Client-to-Trunk Mapping

The TXP\_MR\_10E\_C and TXP\_MR\_10E\_L cards can perform ODU2-to-OCh mapping, which allows operators to provision data payloads in a standard way across 10-Gbps optical links.

Digital wrappers that define client side interfaces are called Optical Data Channel Unit 2 (ODU2) entities in ITU-T G.709. Digital wrappers that define trunk side interfaces are called Optical Channels (OCh) in ITU-T G.709. ODU2 digital wrappers can include Generalized Multiprotocol Label Switching (G-MPLS) signaling extensions to ITU-T G.709 (such as Least Significant Part [LSP] and Generalized Payload Identifier [G-PID] values) to define client interfaces and payload protocols.

## Automatic Laser Shutdown

The ALS procedure is supported on both client and trunk interfaces. On the client interface, ALS is compliant with ITU-T G.664 (6/99). On the data application and trunk interface, the switch on and off pulse duration is greater than 60 seconds. The on and off pulse duration is user-configurable.

## MXP\_2.5G\_10E\_C and MXP\_2.5G\_10E\_L Cards

The 2.5-Gbps-10-Gbps Muxponder-100 GHz-Tunable (MXP\_2.5G\_10E\_C and MXP\_2.5G\_10E\_L) cards are DWDM muxponders for the ONS 15454 platform that support full optical transparency on the client side. The cards multiplex four 2.5 Gbps client signals (4 x OC48/STM-16 SFP) into a single 10-Gbps DWDM optical signal on the trunk side. The MXP\_2.5G\_10E\_C and MXP\_2.5G\_10E\_L cards provide wavelength transmission service for the four incoming 2.5 Gbps client interfaces. The MXP\_2.5G\_10E\_C and MXP\_2.5G\_10E\_L muxponders pass all SONET/SDH overhead bytes transparently.

The digital wrapper function (ITU-T G.709 compliant) formats the DWDM wavelength so that it can be used to set up GCCs for data communications, enable FEC, or facilitate performance monitoring.

The MXP\_2.5G\_10E\_C and MXP\_2.5G\_10E\_L cards work with OTN devices defined in ITU-T G.709. The cards support ODU1 to OTU2 multiplexing, an industry standard method for asynchronously mapping a SONET/SDH payload into a digitally wrapped envelope.

The MXP\_2.5G\_10E\_C and MXP\_2.5G\_10E\_L cards are not compatible with the MXP\_2.5G\_10G card, which does not support full optical transparency.

You can install MXP\_2.5G\_10E\_C and MXP\_2.5G\_10E\_L cards in Slots 1 to 6 and 12 to 17. You can provision a card in a linear configuration, as a BLSR/MS-SPRing, a path protection/SNCP, or a regenerator. The cards can be used in the middle of BLSR/MS-SPRing or 1+1 spans when the cards are configured for transparent termination mode.

The MXP\_2.5G\_10E\_C card features a tunable 1550-nm C-band laser on the trunk port. The laser is tunable across 82 wavelengths on the ITU grid with 50-GHz spacing between wavelengths. The MXP\_2.5G\_10E\_L features a tunable 1580-nm L-band laser on the trunk port. The laser is tunable across 80 wavelengths on the ITU grid, also with 50-GHz spacing. Each card features four 1310-nm lasers on the client ports and contains five transmit and receive connector pairs (labeled) on the card faceplate. The cards use dual LC connectors on the trunk side and use SFP modules on the client side for optical cable termination. The SFP pluggable modules are short reach (SR) or intermediate reach (IR) and support an LC fiber connector.

## Key Features

The MXP\_2.5G\_10E\_C and MXP\_2.5G\_10E\_L cards have the following high level features:

- Four 2.5 Gbps client interfaces (OC-48/STM-16).
- One 10 Gbps trunk interface.
- The four OC-48 signals are mapped into a ITU-T G.709 OTU2 signal using standard ITU-T G.709 multiplexing.
- Onboard E-FEC processor—The processor supports both standard RS (specified in ITU-T G.709) and E-FEC, which allows an improved gain on trunk interfaces with a resultant extension of the transmission range on these interfaces. The E-FEC functionality increases the correction capability of the transponder to improve performance, allowing operation at a lower OSNR compared to the standard RS (237,255) correction algorithm. A new BCH algorithm implemented in E-FEC allows recovery of an input BER up to 1E-3.
- Pluggable client interface optic modules—The MXP\_MP\_10E\_C and MXP\_MP\_10E\_L cards have modular interfaces. Two types of optics modules can be plugged into the card. These include an OC-48/STM 16 SR-1 interface with a 7 km nominal range (for short range and intra-office applications) and an IR-1 interface with a range up to 40 km. SR-1 is defined in Telcordia GR-253-CORE and in I-16 (ITU-T G.957). IR-1 is defined in Telcordia GR-253-CORE and in S-16-1 (ITU-T G.957).
- High level provisioning support—The cards are initially provisioned using Cisco MetroPlanner software. Subsequently, the card can be monitored and provisioned using CTC software.
- Link monitoring and management—The cards use standard OC-48 OH (overhead) bytes to monitor and manage incoming interfaces. The cards pass the incoming SDH/SONET data stream and its overhead bytes transparently.
- Control of layered SONET/SDH transport overhead—The cards are provisionable to terminate regenerator section overhead. This is used to eliminate forwarding of unneeded layer overhead. It can help reduce the number of alarms and help isolate faults in the network.
- Automatic timing source synchronization—The MXP\_MP\_10E\_C and MXP\_MP\_10E\_L cards normally synchronize from the TCC2/TCC2P card. If for some reason, such as maintenance or upgrade activity, the TCC2/TCC2P is not available, the cards automatically synchronize to one of the input client interface clocks.
- Configurable squelching policy—The cards can be configured to squelch the client interface output if there is LOS at the DWDM receiver or if there is a remote fault. In the event of a remote fault, the card manages multiplex section alarm indication signal (MS-AIS) insertion.
- Full tunability across the band—The cards are tunable across the full C band (MXP\_2.5G\_10E\_C) or full L band (MXP\_MP\_10E\_L), thus eliminating the need to use different versions of each card to provide tunability across specific wavelengths in a band.

## Client Interfaces

The MXP\_2.5G\_10E\_C and MXP\_2.5G\_10E\_C cards provide four intermediate- or short-range OC-48/STM-16 ports per card on the client side. Both SR-1 or IR-1 optics can be supported and the ports use SFP connectors. The client interfaces use four wavelengths in the 1310-nm, ITU 100-MHz-spaced, channel grid.

## DWDM Interface

The MXP\_2.5G\_10E\_C and MXP\_2.5G\_10E\_L cards serve as OTN multiplexers, transparently mapping four OC-48 channels asynchronously to ODU1 into one 10-Gbps trunk. The DWDM trunk is tunable for transmission over the entire C band (MXP\_2.5G\_10E\_C) or over the entire L band (MXP\_2.5G\_10E\_L) on the ITU 50-GHz spaced channel grid.

## Multiplexing Function

The muxponder is an integral part of the optically transparent ROADM network in which data payload channels and wavelengths are processed exclusively at the optical level without electrical to optical (E-O) conversion. The key function of the MXP\_MP\_10E\_C and MXP\_MP\_10E\_L cards is to multiplex 4 OC-48/STM16 signals onto one ITU-T G.709 OTU2 optical signal (DWDM transmission). The multiplexing mechanism allows the signal to be terminated at a far-end node by another similar card.

Optical transparency on the muxponder is configured using OTUx and ODUx OH bytes. The ITU-T G.709 specification defines OH byte formats that are used to configure, set, and monitor frame alignment, FEC mode, section monitoring, tandem connection monitoring, and optical transparency.

The MXP\_2.5G\_10E and MXP\_MP\_10E\_L cards perform ODU to OTU multiplexing as defined in ITU-T G.709. The ODU is the framing structure and byte definition (ITU-T G.709 digital wrapper) used to define the data payload coming into one of the SONET/SDH client interfaces on the cards. The term ODU1 refers to an ODU that operates at 2.5-Gbps line rate. On the cards, there are four client interfaces that can be defined using ODU1 framing structure and format by asserting a ITU-T G.709 digital wrapper.

The output of the muxponder is a single 10-Gbps DWDM trunk interface defined using OTU2. It is within the OTU2 framing structure that FEC or E-FEC information is appended to enable error checking and correction.

The MXP\_2.5G\_10E\_C and MXP\_2.5G\_10E\_L cards are synchronized to the TCC2/TCC2P clock during normal conditions and transmits the ITU-T G.709 frame using this clock.

The cards support Y-cable protection. Two cards can be joined in a Y-cable protection group with one card assigned as the working card and the other defined as the protection card. This protection mechanism provides redundant bidirectional paths.

You can configure the Forward Error correction for the cards in three modes: NO FEC, FEC, and E-FEC. So, as client side traffic passes through the MXP\_2.5G\_10E\_C or MXP\_2.5G\_10E\_L card, it can be digitally wrapped using FEC mode error correction or E-FEC mode error correction (or no error correction at all).

For further card details, specifications, and functionality, see the *Cisco ONS 15454 DWDM Installation and Operations Guide*.

## New MXP\_MR\_2.5G and MXPP\_MR\_2.5G Muxponder Cards

The 2.5-Gbps Multirate Muxponder-100 GHz-Tunable 15xx.xx-15yy.yy (MXP\_MR\_2.5G) card aggregates a mix and match of client Storage Area Network (SAN) service client inputs (GE, FICON, Fibre Channel, and ESCON) into one 2.5 Gbps STM-16/OC-48 DWDM signal on the trunk side. It provides one long-reach STM-16/OC-48 port per card and is compliant with Telcordia GR-253-CORE.

**Note**

In Release 7.0.x, two additional operating modes are available: pure ESCON (all 8 ports running ESCON), and Mixed mode (port 1 running FC/GE/FICON, and ports 5 through 8 running ESCON). When the card is part of a node running Release 6.0 or below, only one operating mode, FC\_GE mode, is available for use.

The 2.5-Gbps Multirate Muxponder-Protected-100 GHz-Tunable 15xx.xx-15yy.yy (MXPP\_MR\_2.5G) card aggregates various client SAN service client inputs (GE, FICON, Fibre Channel, and ESCON) into one 2.5 Gbps STM-16/OC-48 DWDM signal on the trunk side. It provides two long-reach STM-16/OC-48 ports per card and is compliant with ITU-T G.957 and Telcordia GR-253-CORE.

Because the cards are tunable to one of four adjacent grid channels on a 100-GHz spacing, each card is available in eight versions, with 15xx.xx representing the first wavelength and 15yy.yy representing the last wavelength of the four available on the board. In total, 32 DWDM wavelengths are covered in accordance with the ITU-T 100-GHz grid standard, G.692, and Telcordia GR-2918-CORE, Issue 2. The card versions and their corresponding wavelengths are documented in the Cisco ONS 15454 DWDM Installation and Operations Guide.

**Client Interface**

The client interface supports the following payload types:

- 2G FC
- 1G FC
- 2G FICON
- 1G FICON
- GE
- ESCON

**Note**

Because the client payload cannot oversubscribe the trunk, a mix of client signals can be accepted, up to a maximum limit of 2.5 Gbps.

Details on the input data rate for each client interface, the encapsulation method, and the mix and match of client interfaces on various ports can be found in the Cisco ONS 15454 DWDM Installation and Operations Guide.

For the MXP\_MR\_2.5G card, protection is done using Y-cable protection. Two MXP\_MR\_2.5G cards can be joined in a Y-cable protection group, which provides protection against failures both on the fiber and in the muxponders.

For the MXPP\_MR\_2.5G card, protection is done using splitter protection, which provides protection against failures due to fiber cuts or unacceptable signal degradation on the trunk side.

**Note**

Switching is performed only if the protect line is error free.

GFP-T performance monitoring (GFP-T PM) is available via remote monitoring (RMON), and trunk PM is managed according to Telcordia GR-253-CORE and ITU G.783/826. Client PM is achieved through RMON for FC and GE.

A buffer-to-buffer credit management scheme provides FC flow control. With this feature enabled, a port indicates the number of frames that can be sent to it (its buffer credit), before the sender is required to stop transmitting and wait for the receipt of a “ready” indication. The MXP\_MR\_2.5G and MXPP\_MR\_2.5 cards support FC credit-based flow control with a buffer-to-buffer credit extension of up to 1600 km for 1G FC and up to 800 km for 2G FC. The feature can be enabled or disabled.

You can install MXP\_MR\_2.5G and MXPP\_MR\_2.5G cards in Slots 1 to 6 and 12 to 17. The TCC2/TCC2P card is the only other card required to be used with these muxponder cards. Cross-connect cards do not affect the operation of the muxponder cards.

The MXP\_MR\_2.5G card features a 1550-nm laser for the trunk/line port and a 1310-nm or 850-nm laser (depending on the SFP) for the client ports. The card contains eight 12.5 degree downward tilt SFP modules for the client interfaces. For optical termination, each SFP uses two LC connectors, which are labeled TX and RX on the faceplate. The trunk port is a dual-LC connector with a 45 degree downward angle.

The MXPP\_MR\_2.5G card features a 1550-nm laser for the trunk/line port and a 1310-nm or 850-nm laser (depending on the SFP) for the client port. The card contains eight 12.5 degree downward tilt SFP modules for the client interfaces. For optical termination, each SFP uses two LC connectors, which are labeled TX and RX on the faceplate. There are two trunk port connectors (one for working and one for protect). Each is a dual-LC connector with a 45-degree downward angle.

### Automatic Laser Shutdown

The ALS procedure is supported on both client and trunk interfaces. On the client interface, ALS is compliant with ITU-T G.664 (6/99). On the data application and trunk interface, the switch on and off pulse duration is greater than 60 seconds. The on and off pulse duration is user-configurable.

### OPT-BST-L Optical Booster Card

The Optical Booster L-Band (OPT-BST-L) has a standard gain range of 8 to 20 dB in the controllable gain tilt mode, and 20 to 27 dB in the uncontrolled gain tilt mode. The OPT-BST-L is designed to support 64 channels at 50-GHz channel spacing, but currently is limited to 32 channels at 100-GHz spacing. The OPT-BST-L is an L-band DWDM EDFA with OSC add-and-drop capability. The card is particularly well suited for use in networks that employ dispersion shifted (DS) fiber or SMF-28 single-mode fiber.

When an ONS 15454 has an OPT-BST-L installed, it is only necessary to have the OSCM to process the OSC. You can install the OPT-BST-L in Slots 1 to 6 and 12 to 17. To control the gain tilt, the OPT-BST-L is equipped with a built-in VOA.

### Key Features

The OPT-BST-L features include:

- Fixed gain mode (with programmable tilt)
- True variable gain
- Fast transient suppression
- Nondistorting low-frequency transfer function
- Settable maximum output power
- Fixed output power mode (mode used during provisioning)
- ASE compensation in fixed gain mode
- Full monitoring and alarm handling with settable thresholds

- OSRI, which is a software feature capable (through CTC) of shutting down the optical output power or reducing the power to a safe level (automatic power reduction)
- ALS, which is a safety mechanism used in the event of a fiber cut

**Note**


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The optical splitters each have a ratio of 1:99. The result is that the power at the MON TX and MON RX ports is about 20 dB lower than the power at the COM TX and COM RX ports.

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Several photodiodes monitor the power for the OPT-BST-L card. The returned power level values are calibrated to the ports on the card. See the Cisco ONS 15454 DWDM Installation and Operations Guide for details.

## OPT-AMP-L Preamplicator Card

The OPT-AMP-L is an L-band DWDM optical amplifier module consisting of a two-stage EDFA with mid-stage access loss (MSL) for an external DCU and OSC add-and-drop capability. The card is provisionable in CTC as a preamplifier or booster amplifier and is well suited for use in networks that employ DS fiber or SMF-28 single-mode fiber. The amplifier can operate up to 64 optical transmission channels at a channel spacing of 50 GHz in the wavelength range from 1570 nm to 1605 nm.

The OPT-AMP-L is able to achieve a maximum signal power of 20 dBm throughout the gain and MSL ranges. The amplifier has a variable gain range that is settable from 12 to 24 dBm in the standard gain range and from 24 dBm to 35 dBm with uncontrolled gain tilt. It also provides up to 12 dBm MSL for an external DCU.

When an ONS 15454 has an OPT-AMP-L installed, it is only necessary to have the OSCM to process the OSC. You can install the two-slot OPT-AMP-L in Slots 1 to 6 and 12 to 17. To control the gain tilt, the OPT-AMP-L is equipped with a built-in VOA.

### Key Features

The OPT-AMP-L has the following features:

- Maximum power output of 20 dBm
- True variable gain amplifier
- Fast transient suppression; able to adjust power levels in hundreds of microseconds to avoid bit errors in failure or capacity growth situations
- Nondistorting low frequency transfer function
- Mid-stage access loss for dispersion compensation unit
- Constant pump current mode (test mode)
- Constant output power mode (used during optical node setup)
- Constant gain mode.
- Internal ASE compensation in Constant Gain and in Constant Output Power mode
- Programmable tilt
- Full monitoring and alarm handling capability
- Optical safety support through signal loss detection and alarm at any input port, fast power down control (less than one second), and reduced maximum output power in safe power mode



Several photodiodes monitor the power for the OPT-AMP-L card. The returned power level values are calibrated to the card ports. See the *Cisco ONS 15454 DWDM Installation and Operations Guide* for details.

## 32WSS-L Wavelength Selective Switch Card

The 32-Channel Wavelength Selective Switch L-Band (32WSS-L) card performs channel add/drop processing within the ONS 15454 DWDM node. The 32WSS-L works in conjunction with the 32DMX-L to implement ROADM functionality within the L band (1570 to 1620 nm). The 32WSS-L card is particularly well suited for use in networks that employ DS fiber or SMF-28 single-mode fiber. Equipped with ROADM functionality, the ONS 15454 DWDM can be configured to add or drop individual optical channels using CTC, Cisco MetroPlanner, and CTM.

A ROADM NE utilizes two 32WSS-L cards (two slots each) and two 32DMX-L cards (one slot each), for a total of six slots in the chassis. The 32WSS-L card can be installed in Slots 1 and 2, 3 and 4, 5 and 6, 12 and 13, 14 and 15, or 16 and 17.

The 32WSS-L has six types of ports:

- ADD RX ports (1 to 32)
- EXP RX port
- EXP TX port
- COM TX port
- DROP TX port

For more details on the functions of the ports, see the *Cisco ONS 15454 DWDM Installation and Operations Guide*.

Several photodiodes monitor the power for the 32WSS-L card. The returned power level values are calibrated to the ports. See the *Cisco ONS 15454 DWDM Installation and Operations Guide* for more details.

## 32DMX-L Demultiplexer Card

The 32-Channel Demultiplexer L-Band card (32DMX-L) is a single-slot optical demultiplexer. The card receives an aggregate optical signal on its COM RX port and demultiplexes it into 32 100-GHz-spaced channels. The 32DMX-L card is particularly well suited for use in networks that employ DS fiber or SMF-28 single-mode fiber. The 32DMX-L card can be installed in Slots 1 to 6 and in Slots 12 to 17.

The 32WSS-L has two types of ports:

- COM RX port
- DROP ports (1 to 32)

For more details on the functions of the ports, see the *Cisco ONS 15454 DWDM Installation and Operations Guide*.

Several photodiodes monitor the power for the 32WSS-L card. The returned power level values are calibrated to the ports. See the *Cisco ONS 15454 DWDM Installation and Operations Guide* for more details.

## CE-1000-4 Card

The CE-1000-4 card uses pluggable Gigabit Interface Converters (GBICs) to transport Ethernet traffic over a SDH network. The CE-1000-4 provides four IEEE 802.3-compliant, 1000-Mbps Gigabit Ethernet ports at the ingress. At the egress, the CE-1000-4 card provides an integrated Ethernet over SDH mapper with four virtual ports to transfer Ethernet packets over a SDH network.

The Ethernet ports automatically configure to operate at either half or full duplex and can determine whether to enable or disable flow control. The Ethernet ports can also be oversubscribed using flow control.

The Ethernet frames are encapsulated using the ITU-T generic framing procedure (GFP) (with or without CRC) or LEX, the point-to-point protocol (PPP) with high-level data link control (HDLC). The CE-1000-4 card can interoperate with G1000-4/G1K-4 cards (using LEX encapsulation), CE-100T-8 cards (using LEX or GFP-F), and ML-Series cards (using LEX or GFP-F).

The Ethernet frames can be mapped into:

- Virtual concatenated (VCAT) payloads: VC-4-nv where n is 1 to 7.




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**Note** The CE-1000-4 card does not support VC-3 member sizes.

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- Contiguously concatenated (CCAT) SDH payloads: VC-3, VC-4, VC-4-2c, VC-4-3c, VC-4-4c, VC-4-6c, VC-4-8c, and VC-4-16c.

The CE-1000-4 card provides multiple management options through Cisco Transport Controller (CTC), Cisco Transport Manager (CTM), Transaction Language 1 (TL1), and Simple Network Management Protocol (SNMP).

The CE-1000-4 card supports the software link capacity adjustment scheme (SW-LCAS). This makes it compatible with the ONS 15454 CE-100T-8 and ML-Series cards. The CE-1000-4 card supports VCAT groups (VCGs) that are reconfigurable when SW-LCAS is enabled (flexible VCGs). The CE-1000-4 card does not support the standard hardware-based LCAS. For specific guidelines that apply to flexible VCGs consult the user documentation.

The CE-1000-4 card supports a non link capacity adjustment scheme (no-LCAS). This also makes it compatible with the ONS 15454 CE-100T-8 and ML-Series cards. The CE-1000-4 card supports VCAT groups (VCGs) that are fixed and not reconfigurable when no-LCAS is enabled (fixed VCGs). For specific guidelines that apply to fixed VCGs consult the user documentation.

The CE-1000-4 card supports VCAT differential delay and provides these associated features:

- Supports a maximum VCG differential delay of 122 ms in each direction.
- Supports all protection schemes (path protection, two-fiber BLSR, four-fiber BLSR) on VCAT circuits that are split-fiber routed.
- Supports two-fiber BLSR on VCAT circuits that are common-fiber routed.
- Differential delay compensation is automatically enabled on VCAT circuits that are diverse (split fiber) routed, and disabled on VCAT circuits that are common fiber routed.

For CE-1000-4 Card-Level Indicators, Port-Level Indicators, and Cross-Connect and Slot Compatibility, consult the user documentation.

## MS-ISC-100T Card

The Multishelf Internal Switch Card (MS-ISC-100T) is an Ethernet switch used to implement the MSTP multishelf LAN. It connects the node controller shelf to the network and to subtending shelves. The MS-ISC-100T must always be equipped on the node controller shelf; it cannot be provisioned on a subtending controller shelf.

Cisco recommends that you configure the node to implement LAN redundancy, using two MS-ISC-100T cards: one switch is connected to the Ethernet front panel port of the TCC2/TCC2P card in Slot 7, and the other switch is connected to the Ethernet front panel port of the TCC2/TCC2P card in Slot 11. The Ethernet configuration of the MS-ISC-100T card is part of the software package and is automatically loaded. The MS-ISC-100T card operates in Slots 1 to 6 and 12 to 17 on the node controller shelf; the recommended slots are Slot 6 and Slot 12. For MS-ISC-100T card port assignments and card-level indicators consult the user documentation.

## MMU Card

The Mesh/Multiring Upgrade Unit (MMU) card supports multiring and mesh upgrades for ROADMs nodes in both the C band and the L band. Mesh/multiring upgrade is the capability to optically bypass a given wavelength from one section of the network or ring to another one without requiring 3R regeneration. In each node, install two MMUs, one on the east side and one on the west side. You can install the MMU card in Slots 1 through 6 and 12 through 17.

The MMU has six ports:

- EXP RX port—The EXP RX port receives the optical signal from the ROADM section available on the NE.
- EXP TX port—The EXP TX port sends the optical signal to the ROADM section available on the NE.
- EXP-A RX port—The EXP-A RX port receives the optical signal from the ROADM section available on other NEs or rings.
- EXP-A TX port—The EXP-A TX port sends the optical signal to the ROADM section available on other NEs or rings.
- COM TX port—The COM TX port sends the optical signal to the fiber stage section.
- COM RX port—The COM RX port receives the optical signal from the fiber stage section.

For power monitoring, MMU card-level indicators, and MMU port-level indicators, consult the user documentation.

## New Software Features and Functionality

### CTC Support for Full C-band and L-band Trunk Wavelength Tunability

Release 7.0.x CTC supports full C-band and L-band trunk wavelength tunability with settings in the card-level Provisioning > Line > Wavelength Trunk Settings tab for the following cards:

- TXP\_MR\_10E\_C
- TXP\_MR\_10E\_L
- MXP\_MR\_10DME\_C
- MXP\_MR\_10DME\_L

- MXP\_2.5G\_10E\_C
- MXP\_2.5G\_10E\_L

Each card can be provisioned to operate in a specific trunk wavelength in its respective band (C or L). You can also preprovision trunk wavelength settings to the band appropriate for the card you plan to install. Trunk wavelength settings employ interleaved odd and even 100-GHz ITU spaced grids. Interleaved odd and even wavelength subdivisions ensure maximum transmission capacity in the form of a high number of available channels per card for your DWDM network, while also maintaining signal reliability. In CTC, selecting the odd or even grid sets your first tunable wavelength, as well as the 100-GHz ITU spaced wavelengths you can tune to thereafter.

## Multishelf Nodes

Release 7.0.x supports multishelf DWDM nodes. Multishelf node provisioning enables you to centralize many tasks, such as node configuration and maintenance, VLAN management, software download, alarm management, performance monitoring, remote DCC, GCC, and OSC terminations, and database and diagnostic functions.

An ONS 15454 node provisioned as a multishelf node can manage up to 8 subtending shelves as a single entity. The node controller is the main shelf; its TCC2/TCC2P cards run multishelf functions. Each subtending shelf must also be equipped with TCC2/TCC2P cards, which run the local shelf functions. For internal data exchange between the node controller shelf and subtending shelves, the node controller shelf must be equipped with redundant MS-ISC-100T cards or, as an alternative, the Cisco Catalyst 2950 switch. Cisco recommends using the MS-ISC-100T cards. If you use the Catalyst 2950, install it on one of the multishelf racks. All subtending shelves must be located in the same site at a maximum distance of 100 meters from the Ethernet switches used to support the communication LAN.

A multishelf node has a single public IP address for all client interfaces (CTC, TL1, SNMP, or HTTP, for example); a client can only connect to the node controller shelf; not to the subtending shelves. The user interface and subtending shelves are connected to a patch panel using straight-through (CAT 5) LAN cables.

The node controller shelf has the following responsibilities:

- IP packet routing
- Network topology discovery
- Centralized OSPF

Subtending shelves have the following responsibilities:

- Overhead circuit management




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**Note** To use overhead bytes, the AIC-I must be installed on the subtending shelf where it is terminated.

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- Act as a single shelf node that can be used as a timing source line, TCC clock, or BITs source line

## Multishelf Node Setup

Cisco recommend the following multishelf configurations, which are supported by MetroPlanner and automatically discovered by the software:

- Typical installation—All optical units are equipped on the node controller shelf, and TXP/MXP cards are equipped in the aggregated subtended shelves. In addition, all empty slots in the node controller shelf can be equipped with TXP/MXP cards.

- East/west protected—All optical units facing west are equipped in one shelf; all optical units facing east are equipped in another shelf.

Patchcords are automatically created only if the TXP/MXP cards have been previously tuned on one of the supported wavelengths.

### DCC, GCC, and OSC Terminations

A multishelf node provides the same communication channels as a single shelf MSTP node:

- OSC links terminate on OSCM/OSC-CSM cards. Two links between each ONS node are required. An OSC link between two nodes cannot be substituted by an equivalent GCC or DCC link terminated on the same pair of nodes. OSC links are mandatory and they can be used to connect a node to a GNE.
- GCC and DCC links terminate on TXP or MXP cards.

The maximum number of DCC, GCC, and OSC terminations that are supported in a multishelf node is 48.

### ROADM Multishelf Configuration Alarming

In Release 7.0.x, reconfigurable optical add-drop multiplexing (ROADM) systems can share a single IP address among shelves and also correlate optical signal alarms.

### DWDM Network-Level Alarm Correlation

Release 7.0.x ITU-T G.798-based alarm correlation simplifies alarm reporting for MSTP channels. Communication failures including Loss of Signal (LOS), Loss of Signal Payload (LOS-P), and Optical Power Receive Fail-Loss of Light (OPWR-LFAIL) generate multiple conditions at each affected node for each affected channel. Correlation simplifies troubleshooting because a single alarm is reported for each root cause. (The original alarms retain their severity in the Conditions window.)

The Payload Missing Indication (PMI) condition is raised at the far end to correlate OMS and OTS communication failures. A single PMI condition is sent when every channel on the aggregated port is lost, that is, when there are no pass-through channels or active added channels in service. If there are added channels on the node, the Forward Defect Indication (FDI) condition is raised at the near end to indicate there are no pass-through optical channels (OCH) in service.

### Multishelf Ethernet Alarm Management

Ethernet alarm-raising for multishelf configuration also differs from the alarm-raising in single-shelf configurations. The shelf-connecting Ethernet interface card (MS-ISC-100T) does not raise traditional Ethernet alarms, such as CARLOSS, that apply to TXP or MXP client ports. Instead, MS-ISC-100T alarms are raised on the shelf as EQPT alarms. These alarms, new for Release 7.0.x, include Duplicate Shelf ID (DUP-SHELF-ID) and Shelf Communication Failure (SHELF-COMM-FAIL).

### Viewing ROADM Alarmed Entities

The Multishelf view, added in Release 7.0, shows where an alarm is raised in the Object column. In Shelf view, the Alarms and Conditions tabs also contain a Shelf column that indicates where the alarmed card is located.

## Optical Channel Trail and Client Connection Circuits

With Release 7.0.x the ONS 15454 MSTP system provides three types of optical channel circuits.

An Optical Channel Trail (OCH trail) is an optical circuit from a TXP/MXP trunk port to a TXP/MXP trunk port that can pass through a DWDM cloud, functioning as the server layer. Wavelength and signal rate are the OCH trail primary characteristics.

An Optical Channel Client Connection (OCHCC) is an optical channel from a TXP/MXP client port to a TXP/MXP client port. OCHCCs use the OCH trail as the server layer. OCHCCs are essentially client-to-client-circuits. Signal rate is the primary characteristic.

An Optical Channel Network Connection (OCHNC) is an optical circuit from an optical channel card to an optical channel card. Wavelength is the primary characteristic. OCHNCs are the legacy optical channel circuit type used in situations when OCH trails are not supported. OCHNCs are also used to carry wavelengths from non-ONS 15454 equipment.

### Optical Channel Client Connection Functionality

Optical Channel Client Connections (OCHCCs) support SONET/SDH, Ethernet, FC/FICON, data storage (including ESCON), video, and passthrough (other) payload types. For specific payload rates, consult the user documentation.

You can upgrade existing OCHNCs created in earlier software releases to OCHCCs using the Circuits > Upgrade OCHNC option.

You can create DWDM OCHCCs by assigning port names, creating and verifying PPCs, verifying OCHCC client ports, and provisioning optical channel client connections as needed; or delete existing OCHCCs by deleting the associated optical channel network connections.

You can verify the provisionable patchcords (PPCs) that are required between client and optical channel nodes for OCHCCs using the Provisioning > Provisionable Patchcords (PPC) tabs.

When creating OCHCC circuits, on the Attributes page, you can define the following client circuit attributes:

- **Name**—Assign a name to the OCHCC. The name can be alphanumeric and up to 48 characters (including spaces). Circuit names should be 44 characters or less if you want the ability to create monitor circuits. If you leave the field blank, CTC assigns a default name to the circuit.
- **Type**—(Display only) OCHCC.
- **Size**—Defines the circuit payload type and rate. Two fields are provided. The first specifies the payload type. Choose a payload type, then choose the rate in the next field. The payload type and rate must match the PPM provisioning on the client cards at the source and destination nodes.
- **OCHNC Wavelength**—Provides three fields to define the wavelength that the OCHCC will use to travel across the OCH network. Choose a wavelength from the first field. In the second field, you can change the wavelength band by choosing either C Band or L Band. In the third field, you can indicate whether odd or even C-band or L-band wavelengths are displayed.
- **Bidirectional**—(Display only) OCHCCs are bidirectional. This field cannot be changed.
- **State**—Provisions the OCHCC state. The state can be IS (ANSI)/Unlocked (ETSI) or OOS,DSBLED (ANSI)/Locked,Disabled (ETSI).
- **Apply to OCHCC ports**—If checked, applies the state chosen in the next field to the OCHCC client ports. For TXP, MXP, TXPP, or MXPP cards, this will be the client and all trunk ports. For ITU line cards, this will be the trunk port only. The states that you can apply include: IS (ANSI)/Unlocked (ETSI), OOS,DSBLED (ANSI)/Locked,Disabled (ETSI), and IS,AINS (ANSI)/Unlocked,AutomaticInService (ETSI).

- **Protection**—Check this box if the source and destination client cards are TXPP or MXPP cards. Checking the box restricts the source and destination choices to those cards and allows you to provision the reversion parameters.
- **Reversion**—If Protection is checked, checking this box turns on the TXPP or MXPP reversion parameter.
- **Reversion Time**—If Reversion is checked, set the time before the protection will switch to the active port after conditions that caused the switch are remedied.
- **G.709 OTN**—If checked, enables the ITU-T G.709 optical transport network on the client cards, if permitted by the client card and payload.
- **FEC**—Allows you to enable or disable FEC on the client cards, if permitted by the client card and payload.
- **SF BER**—Allows you to set the signal fail bit error rate for payloads and client cards that allow the parameter to be provisioned.
- **SD BER**—Allows you to set the signal degrade bit error rate for payloads and client cards that allow the parameter to be provisioned.
- **Mapping**—Sets the mapping for cards that allow this parameter to be provisioned, including the TXP\_MR\_10E and MXP\_MR\_10DME cards. If you set mapping to Synchronous, the client signal is mapped into the OTU2 signal without justification of the payload because the client signal timing (the timing source) is the same as the trunk output timing. If you set mapping to asynchronous, the trunk timing is disconnected from the client timing (because the network element [NE] is the timing source), so justification is needed to map the client signal (OC192) to OTU2 trunk output.

## Automatic Node Provisioning

Release 7.0.x offers a better solution for provisioning DWDM nodes, using Cisco MetroPlanner configuration files and connection reports.

### Cisco MetroPlanner Configuration File Support

With Release 7.0.x you can import a Cisco MetroPlanner configuration file, provided in XML format, that provisions the shelf layout, sets the OPT-AMP-L mode (if present) and installs the automatic node setup (ANS) parameters calculated by Cisco MetroPlanner.

In CTC node view (for single-shelf mode) or multishelf view, you can access the configuration file from the Provisioning > WDM-ANS > Node Setup tabs. Each node setup session also monitors your setup process by maintaining a log file that you can view to see the results of your setup.

In the node setup page, you can choose from the following options. Each option will result in a different wizard guiding you through the steps to successful node setup.

- **Provision Node Layout**—Preprovisions the slots in CTC for the cards required by the network plan. Choose this option when no DWDM cards are installed. Preprovisioning the slots before the physical cards are installed ensures that card installers place the cards in the correct slots. Preprovisioning the slots is also useful if you want to set up the network prior to card installation.
- **Provision Card Parameters**—This option is available only when an OPT-AMP-L card will be installed. If you check the box, ANS provisions the OPT-AMP-L role, either as an L-band booster amplifier (OPT-LINE) or an L-band preamplifier (OPT-PRE).

- **Provision ANS Parameters**—If checked, installs the ANS parameters. ANS parameters provision the values required for the node to function within the specified network design. ANS parameters include span losses, optical power, optics thresholds, amplifier working mode, gain, tilt, and many others. Refer to the “Node Reference” chapter in the Cisco ONS 15454 DWDM Reference Manual for a list of ONS 15454 ANS parameters.
- **Skip Interactive Mode**—If checked, ANS provisions all the chosen setup components automatically without allowing you to view the results after each one.

### Cisco MetroPlanner Internal Connections Report Support

With Release 7.0.x you can use the MetroPlanner Release 7.0 Internal Connections Report to install cables on your DWDM cards. The table displayed in the report identifies the patchcords that you must cable by their endpoints. Position 1 identifies the fiber start point; Position 2 indicates the fiber endpoint. The patchcord endpoints are identified by site, slot, and port. Information provided by the Internal Connections report includes:

- **Site**—Identifies the node where you are provisioning the internal connections.
- **IP Address**—The node IP address. The IP address will be 0.0.0.0 if it is not known.
- **Position-1**—The cable origination, in the format: Rack.Shelf.Port. Refer to the Cisco MetroPlanner Site Dialog for rack and shelf names and locations.
- **Unit-1**—The ONS 15454 DWDM card (unit) that is installed in the Position-1 slot. This is where the cabling originates.
- **Port#-1**—The port identifier shown in CTC for the first Position-1 connection.
- **Port ID-1**—The port identifier shown in TL1 for the Position-1 connection.
- **Port Label-1**—The name of the physical port printed on the card's front panel and shown in CTC card view for the Position-1 connection.
- **Attenuator**—If attenuation is required, the product ID of the bulk fixed attenuator is shown.
- **Position-2**—The cable termination, in the format: Rack.Shelf.Port. Refer to the Cisco MetroPlanner Site Dialog window for rack and shelf names and locations.
- **Unit-2**—The ONS 15454 DWDM card that is installed in the Position-2 slot. This is where the cabling terminates.
- **Port #2**—The port identifier shown in CTC for the first Position-2 connection.
- **Port ID-2**—The port identifier shown in TL1 for the Position-2 connection.
- **Port Label-2**—The name of the physical port printed on the card's front panel and shown in CTC card view for the Position-2 connection.
- **Manually Set**—Indicates whether you must create the connection manually in CTC. A Yes appearing in this column means that you must create the connection manually.

For detailed instructions on using the Cisco MetroPlanner Configuration Files and Internal Connections report, consult the user documentation.

### MetroPlanner Support

Release 7.0.x supports MetroPlanner Release 7.0. For new features of MetroPlanner consult the MetroPlanner Release 7.0 documentation.



## Server Trails

Release 7.0.x adds support for server trails. A server trail is a non-DCC link across a third-party network that connects two CTC network domains. A server trail allows circuit provisioning when no DCC is available. You can create server trails between any two STM-N ports. Server trails are not allowed on DCC-enabled ports.

The server trail link is bidirectional and can be VC4-2c, VC4-3c, VC4-4c, VC4-6c, VC4-8c, VC4-12c, VC4-16c, VC4-64c, VC4, VC3, VC12, or VC11; you cannot upgrade an existing server trail to another size. A server trail link can be one of the following protection types: Preemptible, Unprotected, and Fully Protected. The server trail protection type determines the protection type for any circuits that traverse it. PCA circuits will use server trails with the Preemptible attribute.

When creating circuits or VCATs, you can choose a server trail link during manual circuit routing. CTC can also route circuits over server trail links during automatic routing. VCAT common-fiber automatic routing is not supported.

## Link Consolidation

CTC provides the ability to consolidate the DCC, general communications channel (GCC), optical transport section (OTS), server trail, and provisionable patchcord (PPC) links shown in the network view into a more streamlined view. Link consolidation allows you to condense multiple internodal links into a singular link. The link consolidation sorts links by class, meaning that all DCC links are consolidated together, for example. You can access individual links within consolidated links using the right-click shortcut menu. Each link has an associated icon.

Link consolidation is only available on non-detailed maps. Non-detailed maps display nodes in icon form instead of detailed form, meaning the nodes appear as rectangles with ports on the sides. Refer to the *Cisco ONS 15454 SDH Procedure Guide* for more information about consolidated links.

## Data Communications Network Tool

Release 7.0.x CTC includes a data communications network (DCN) tool that assists with network troubleshooting for Open Shortest Path First (OSPF) networks. This tool, located in network view, executes an internal dump command to retrieve information about all nodes accessible from the entry point. The retrieved information is the same as you would get if you were to execute a dump using special networking commands. The contents of the dump file can be saved or printed and furnished to Cisco Technical Support for use in OSPF network support.

## Advanced Circuit Filtering and Export

Release 7.0.x adds an Advanced tab to the Circuit Filter dialog. With advanced circuit filtering you can filter on selected rings, nodes, links, or source/drop combinations.

Also, you can export the active Circuit window data in HTML, comma-separated values (CSV), or tab-separated values (TSV) format using the Export command from the File menu.

## MS-SPRing VC4 Squelching

Release 7.0.x supports MS-SPRing VC4 squelching for the ONS 15454 SDH. MS-SPRing squelching is performed on VC4s that carry VC4 circuits only. MS-SPRing VC4 squelch tables show VC4s that will be squelched for every isolated node, providing MS-SPRing VC4 numbers, and East and West source and destination information.

## “Ring is Squelching High-Order Path Traffic” Condition

The ONS 15454 SDH Release 7.0.x supports an informational Ring is Squelching High-Order Path Traffic (HP-SQUELCH-L) condition that can be raised on an STM-N facility. The HP-SQUELCH-L condition indicates that traffic is squelched due to node failure (traffic outage). If the node failure scenario includes the source or destination node, switching the nodes will squelch all the paths that originate from or terminate to the failed node. The condition resolves when the node is no longer failing.

## Superuser Privileges for Provisioning Users

With Release 7.0.x Superusers can grant permission to Provisioning users to perform a set of tasks, including retrieving the audit log, restoring a database, clearing performance monitoring (PM) parameters, activating a software load, and reverting a software load. These privileges can only be set using the node-level network element (NE) defaults, with the exception of the PM clearing privilege, which can be granted to a Provisioning user from the CTC Provisioning > Security > Access tabs. For more information about setting up Superuser privileges, refer to the Cisco ONS 15454 Procedure Guide.

## CTC Download Highest Level NET JAR File

As of Release 7.0 CTC, during network topology discovery, polls each node in the network to determine which one contains the most recent version of the CTC software. If CTC discovers a node in the network that has a more recent version of the CTC software than the version you are currently running, CTC generates a message stating that a later version of CTC has been found in the network, and offers to install the CTC software upgrade JAR files. If you have network discovery disabled, CTC will not seek more recent versions of the software. Unreachable nodes are not included in the upgrade discovery.

## Local Domain Creation and Viewing

With Release 7.0.x a Superuser can control whether domains that any future users create and view persist globally (for all CTC sessions), or only locally (within the current CTC session in which they are created), as well as who can create domains (all users, or just Superusers). This control is given to Superusers by means of the NE default, CTC.network.LocalDomainCreationAndViewing. The factory pre-set default value is FALSE, meaning domain information is applied to all CTC sessions and only Superusers can create a domain or add a node to a domain. Setting the default to TRUE enables the option for local domain creation by any user.

## Enhanced Fault Management

Release 7.0.x adds increased flexibility for fault management. When an entity is put in the Locked,maintenance administrative state, the ONS 15454 SDH suppresses all standing alarms on that entity. All alarms and events appear on the Conditions tab. You can change this behavior for the LPBKFACILITY and LPBKTERMINAL alarms. To display these alarms on the Alarms tab, you can set the default, NODE.general.ReportLoopbackConditionsOnPortsInLocked,MaintenancePorts to TRUE in the NE Defaults editor.

## Rx and Tx Indication for TCAs

For electrical card or port PMs for which a direction, either Receive (Rx) or Transmit (Tx), can be detected, Release 7.0.x CTC and TL1 display the Rx or Tx value with the associated threshold crossing alert (TCA) description. For specific cards, port types, and PMs supported consult the Performance Monitoring chapter of the *Cisco ONS 15454 SDH Reference Manual*.

## TL1

### New Card Support

The following new cards are supported by TL1 in Release 7.0.x.

- CE1000-4 Ethernet card
- MXP\_MR\_10DME-C and MXP\_MR\_10DME-L Multirate Muxponder cards
- TXP\_MR\_10E\_C and TXP\_MR\_10E\_L Multirate Transponder cards
- MXP\_2.5G\_10E\_C and MXP\_2.5G\_10E\_L cards
- MXP\_MR\_2.5G and MXPP\_MR\_2.5G demultiplexer cards
- MS-ISC-100T Data card
- MMU card

### TL1 Command Changes

#### New Commands

The following new TL1 commands are added for Release 7.0.x.

- DLT-OCHNC
- ED-OCHNC
- ENT-OCHNC
- RTRV-OCHNC
- DLT-OCHCC
- ED-OCHCC
- ENT-OCHCC
- RTRV-OCHCC
- DLT-LNK
- ED-LNK
- ENT-LNK

#### Removed Commands

The following commands are removed from Release 7.0.x:

- DLT-WLEN
- RTRV-WLEN

- ED-WLEN
- ENT-WLEN

## Command Syntax Changes

The syntax of the following commands is changed in Release 7.0.x.

### ED-EQPT syntax:

```
ED-EQPT[:<TID>]:<aid>:<CTAG>[::PROTID=<protid>],[PRTYPE=<prtype>],[RVRTV=<r
vrtv>],[RVTM=<rvtm>],[CARDMODE=<cardmode>],[PEERID=<protid>],[REGENNAME=
<regenname>],[PWL=<pw>],[CMDMDE=<cmdmde>][:<pst>[,<sst>]];
```

Is changed to:

```
ED-EQPT[:<TID>]:<aid>:<CTAG>[::PROTID=<protid>],[PRTYPE=<prtype>],[RVRTV=<r
vrtv>],[RVTM=<rvtm>],[CARDMODE=<cardmode>],[PEERID=<peerid>],[REGENNAME=
<regenname>],[CMDMDE=<cmdmde>],[RETIME=<retime>],[SHELFROLE=<shelfrole>],[
NEWSHELFID=<newshelfid>][:<pst>[,<sst>]];
```

### ED-GFP syntax:

```
ED-GFP[:<TID>]:<src>:<CTAG>[::FCS=<fcs>],[AUTOTHGFPBUF=<autothgfpbuf>][GFP
BUF=<gfpbuf>],[FILTER=<filter>];
```

Is changed to:

```
ED-GFP[:<TID>]:<src>:<CTAG>[::FCS=<fcs>],[AUTOTHGFPBUF=<autothgfpbuf>],[GFP
BUF=<gfpbuf>],[FILTER=<filter>];
```

### ENT-EQPT syntax:

```
ENT-EQPT[:<TID>]:<aid>:<CTAG>::<aidtype>[:PROTID=<protid>],[PRTYPE=<prtype>],[
RVRTV=<rvtv>],[RVTM=<rvtm>],[CARDMODE=<cardmode>],[PEERID=<protid>],[REG
ENNAME=<regenname>],[PWL=<pw>],[CMDMDE=<cmdmde>],[RETIME=<retime>][:];
```

Is changed to:

```
ENT-EQPT[:<TID>]:<aid>:<CTAG>::<aidtype>[:PROTID=<protid>],[PRTYPE=<prtype>],[
RVRTV=<rvtv>],[RVTM=<rvtm>],[CARDMODE=<cardmode>],[PEERID=<protid>],[REG
ENNAME=<regenname>],[CMDMDE=<cmdmde>],[TRANSMODE=<transmode>],[RETIM
E=<retime>],[SHELFROLE=<shelfrole>][:];
```

### ENT-TADRMAP syntax:

```
ENT-TADRMAP[:<TID>]::<CTAG>::TIDNAME=<name>,[IPADDR=<ipAddr>],[PORT=<p
ort>],[ENCODING=<encoding>],[NSAP=<nsapAddr>];
```

Is changed to:

```
ENT-TADRMAP[:<TID>]::<CTAG>::TIDNAME=<tidname>,[IPADDR=<ipaddr>],[PORT=
<port>],[ENCODING=<encoding>],[NSAP=<nsap>];
```

### INIT-SYS syntax:

```
INIT-SYS[:<TID>]:<aid>:<CTAG>[::];
```

Is changed to:

```
INIT-SYS[:<TID>]:<aid>:<CTAG>;
```



#### Note

The INIT-SYS syntax change does not apply for CE-100T-8 cards.

**OPR-SYNCNSW** syntax:

```
OPR-SYNCNSW[:<TID>]:<CTAG>;
```

Is changed to:

```
OPR-SYNCNSW[:<TID>][:<aid>]:<CTAG>;
```

**RTRV-NE-SYNCN** syntax:

```
RTRV-NE-SYNCN[:<TID>]:<CTAG>[:::];
```

Is changed to:

```
RTRV-NE-SYNCN[:<TID>][:<aid>]:<CTAG>[:::];
```

**RTRV-SYNCN** syntax:

```
RTRV-SYNCN[:<TID>]:<aid>:<CTAG>[:::];
```

Is changed to:

```
RTRV-SYNCN[:<TID>][:<aid>]:<CTAG>[:::];
```

**RTRV-TADRMAP** syntax:

```
RTRV-TADRMAP[:<TID>][:<AID>]:<CTAG>:::MODE=<modeType>
```

Is changed to:

```
RTRV-TADRMAP[:<TID>][:<AID>]:<CTAG>[:::MODE=<modeType>]
```

**ED-NE-GEN** syntax:

```
ED-NE-GEN[:<TID>]:<CTAG>[:::NAME=<name>],[IPADDR=<ipaddr>],[IPMASK=<ipmask>],[DEFRTR=<defrtr>],[IIOPPORT=<iioport>],[NTP=<ntp>],[SUPPRESSIP=<mode>];
```

Is changed to:

```
ED-NE-GEN[:<TID>]:<CTAG>[:::NAME=<name>],[IPADDR=<ipaddr>],[IPMASK=<ipmask>],[DEFRTR=<defrtr>],[IIOPPORT=<iioport>],[NTP=<ntp>],[PROXYSRV=<isProxyServer>],[FIREWALL=<isFireWall>];
```

## Command Response Changes

The following TL1 responses have changed in Release 7.0.x.

**ED-LNKTERM** response:

```
::<tmmd>],[<ssmgen>],[<qres>],[<rvrtv>],[<rvtm>]
```

Is changed to:

```
[<aid>]:<tmmd>],[<ssmgen>],[<qres>],[<rvrtv>],[<rvtm>]
```

**RTRV-EQPT** response:

```
<aid>:<aidtype>,<equip>,[<role>],[<status>]:[<protid>],[<prtype>],[<rvrtv>],[<rvtm>],[<cardname>],[<ioscfg>],[<cardmode>],[<peerid>],[<regenname>],[<pw1>],[<transmode>],[<retime>]:<pst>,[<sst>]
```

Is changed to:

```
<aid>:<aidtype>,<equip>,[<role>],[<status>]:[<protid>],[<prtype>],[<rvrtv>],[<rvtm>],[<cardname>],[<ioscfg>],[<cardmode>],[<peerid>],[<regenname>],[<transmode>],[<retime>],[<shelfrole>]:<pst>,[<sst>]
```

**RTRV-INV** response:

```
<aid>,<aidtype>::[<pn>],[<hwrev>],[<fwrev>],[<sn>],[<clei>],[<twl1=nwl in
code>],[<pluginvendorid>],[<pluginpn>],[<pluginhwrev>],[<pluginfwrev>],[<pluginsn>],[<il
oshref>],[<productId>],[<versionId>],[<fpgaVersion>]
```

Is changed to:

```
<aid>,<aidtype>::[<pn>],[<hwrev>],[<fwrev>],[<sn>],[<clei>],[<twl1=nwl in
code>],[<pluginvendorid>],[<pluginpn>],[<pluginhwrev>],[<pluginfwrev>],[<pluginsn>],[<il
oshref>],[<productId>],[<versionId>],[<fpgaVersion>],[<vendorId>]
```

## TL1 ENUM Changes

### TL1 ENUM Items Added or Removed

The following section, including [Table 5](#) through [Table 26](#), highlights ENUM items changed (added or removed) for Release 7.0.x, by ENUM type.

**Table 5** *EQUIPMENT\_TYPE enum items added to Release 7.0.x*

Enum Name	Enum Value
EQUIPMENT_TYPE_ET_UNKNOWN	“UNKNOWN”
EQUIPMENT_TYPE_ET_UNPROVISIONED	“UNPROVISIONED”
EQUIPMENT_TYPE_ET_32_DMX_L	“32-DMX-L”
EQUIPMENT_TYPE_ET_32_WSS_L	“32-WSS-L”
EQUIPMENT_TYPE_ET_CE_1000_4	“CE-1000-4”
EQUIPMENT_TYPE_ET_MMU	“MMU”
EQUIPMENT_TYPE_ET_MS_ISC_100T	“MS-ISC-100T”
EQUIPMENT_TYPE_ET_MXP_MR_10DME	“MXP-MR-10DME”
EQUIPMENT_TYPE_ET_OPT_AMP_L	“OPT-AMP-L”
EQUIPMENT_TYPE_ET_OPT_BST_L	“OPT-BST-L”
EQUIPMENT_TYPE_ET_RAN_SVC	“RAN-SVC”
EQUIPMENT_TYPE_ET_SHELF	“SHELF”

EQUIPMENT\_TYPE is used in the following commands:

- CHG-EQPT
- ENT-EQPT

**Table 6** *MTU\_TYPE enum items added to Release 7.0.x*

Enum Name	Enum Value
MTU_1500	“1500”
MTU_10004	“10004”
MTU_1548	“1548”

MTU\_TYPE is used in the following commands:

- ED-GIGE

- ED-POS

**Table 7** *CARDMODE enum items added to Release 7.0.x*

Enum Name	Enum Value
CARDMODE_AMPL_BST	“AMPL-BST”
CARDMODE_AMPL_PRE	“AMPL-PRE”
CARDMODE_MXPMR10DME_4GFC	“MXPMR10DME-4GFC”
CARDMODE_MXPMR10DME_4GFC_FCGEISC	“MXPMR10DME-4GFC-FCGEISC”
CARDMODE_MXPMR10DME_FCGEISC	“MXPMR10DME-FCGEISC”
CARDMODE_MXPMR10DME_FCGEISC_4GFC	“MXPMR10DME-FCGEISC-4GFC”

CARDMODE is used in the following commands:

- ED-EQPT
- ENT-EQPT
- RTRV-EQPT

**Table 8** *CATEGORY enum items dropped from Release 7.0.x*

Enum Name	Enum Value
CATEGORY_2R	“2R”
CATEGORY_BBE	“BBE”
CATEGORY_ESCON	“ESCON”
CATEGORY_FC	“FC”
CATEGORY_GE	“GE”
CATEGORY_ISC	“ISC”
CATEGORY_OCN	“OCN”
CATEGORY_UNPROV	“UNPROVISIONED”
CATEGORY_WBE	“WBE”

CATEGORY is no longer used in any command.

**Table 9** *FLOW enum items added in Release 7.0.x*

Enum Name	Enum Value
FLOW_PASSTHRU	“PASSTHRU”

FLOW is used in the following commands:

- ED-GIGE
- RTRV-FSTE
- RTRV-G1000
- RTRV-GIGE

**Table 10** *MOD1PAYLOAD enum items added to Release 7.0.x*

Enum Name	Enum Value
MOD1PAYLOAD_ISC1	“ISC1”
MOD1PAYLOAD_ISC3	“ISC3”
MOD1PAYLOAD_4GFC	“4GFC”
MOD1PAYLOAD_4GFICON	“4GFICON”
MOD1PAYLOAD_ISC3PEER1G	“ISC3PEER1G”
MOD1PAYLOAD_ISC3PEER2G	“ISC3PEER2G”
MOD1PAYLOAD_ISC3PEER2R	“ISC3PEER2R”
MOD1PAYLOAD_ISCCOMPAT	“ISCCOMPAT”

MOD1PAYLOAD is used in the following commands:

- RTRV-OCHCC

**Table 11** *MOD2 enum items dropped from Release 7.0.x*

Enum Name	Enum Value
MOD2_M2_ISC1	“ISC1”
MOD2_M2_ISC3	“ISC3”
MOD2_M2_WLEN	“WLEN”

**Table 12** *MOD2 enum items added to Release 7.0.x*

Enum Name	Enum Value
MOD2_M2_4GFC	“4GFC”
MOD2_M2_4GFICON	“4GFICON”
MOD2_M2_ISC3PEER1G	“ISC3PEER1G”
MOD2_M2_ISC3PEER2G	“ISC3PEER2G”
MOD2_M2_ISC3PEER2R	“ISC3PEER2R”
MOD2_M2_ISCCOMPAT	“ISCCOMPAT”
MOD2_M2_OCHCC	“OCHCC”
MOD2_M2_OCHNC	“OCHNC”

MOD2 is used in the following commands:

- RTRV-FFP-MOD2
- RTRV-LNK-MOD2LNK
- RTRV-NE-APC
- RTRV-NE-WDMANS
- RTRV-OCHTERM



- RTRV-TRC-OCH
- SCHED-PMREPT-MOD2

**Table 13** *MOD2ALM enum items dropped from Release 7.0.x*

Enum Name	Enum Value
MOD2ALM_M2_ISC1	“ISC1”
MOD2ALM_M2_ISC3	“ISC3”
MOD2ALM_M2_WLEN	“WLEN”

**Table 14** *MOD2ALM enum items added to Release 7.0.x*

Enum Name	Enum Value
MOD2ALM_M2_4GFC	“4GFC”
MOD2ALM_M2_4GFICON	“4GFICON”
MOD2ALM_M2_ISC3PEER1G	“ISC3PEER1G”
MOD2ALM_M2_ISC3PEER2G	“ISC3PEER2G”
MOD2ALM_M2_ISC3PEER2R	“ISC3PEER2R”
MOD2ALM_M2_ISCCOMPAT	“ISCCOMPAT”

MOD2ALM is used in the following commands:

- RTRV-ALM-MOD2ALM
- RTRV-COND-MOD2ALM

**Table 15** *MOD2B enum items dropped from Release 7.0.x*

Enum Name	Enum Value
MOD2B_M2_ISC1	“ISC1”
MOD2B_M2_ISC3	“ISC3”

**Table 16** *MOD2B enum items added to Release 7.0.x*

Enum Name	Enum Value
MOD2B_M2_4GFC	“4GFC”
MOD2B_M2_4GFICON	“4GFICON”
MOD2B_M2_ISC3PEER1G	“ISC3PEER1G”
MOD2B_M2_ISC3PEER2G	“ISC3PEER2G”
MOD2B_M2_ISC3PEER2R	“ISC3PEER2R”
MOD2B_M2_ISCCOMPAT	“ISCCOMPAT”

MOD2B is used in the following commands:

- ALS

- RTRV-ALM-ALL
- RTRV-ALM-BITS
- RTRV-ALM-EQPT
- RTRV-ALM-SYNCN
- RTRV-COND-ALL
- RTRV-COND-BITS
- RTRV-COND-EQPT
- RTRV-COND-SYNCN
- RTRV-PM-MOD2
- RTRV-TH-ALL
- RTRV-TH-MOD2

**Table 17** *MOD2O enum items dropped from Release 7.0.x*

Enum Name	Enum Value
MOD2O_M2_ISC1	“ISC1”
MOD2O_M2_ISC3	“ISC3”

**Table 18** *MOD2O enum items added to Release 7.0.x*

Enum Name	Enum Value
MOD2O_M2_4GFC	“4GFC”
MOD2O_M2_4GFICON	“4GFICON”
MOD2O_M2_ISC3PEER1G	“ISC3PEER1G”
MOD2O_M2_ISC3PEER2G	“ISC3PEER2G”
MOD2O_M2_ISC3PEER2R	“ISC3PEER2R”
MOD2O_M2_ISCCOMPAT	“ISCCOMPAT”

MOD2O is used in the following commands:

- RTRV-ALMTH-MOD2O

**Table 19** *MOD2\_DATA enum items dropped from Release 7.0.x*

Enum Name	Enum Value
MOD2_DATA_M2_ISC1	“ISC1”

**Table 20** *MOD2\_DATA enum items added to Release 7.0.x*

Enum Name	Enum Value
MOD2_DATA_M2_4GFC	“4GFC”
MOD2_DATA_M2_4GFICON	“4GFICON”

**Table 20** *MOD2\_DATA enum items added to Release 7.0.x (continued)*

Enum Name	Enum Value
MOD2_DATA_M2_ESCON	“ESCON”
MOD2_DATA_M2_ISCCOMPAT	“ISCCOMPAT”

MOD2\_DATA is used in the following commands:

- DLT-RMONTH-MOD2-DATA

**Table 21** *NE\_MODE enum items added to Release 7.0.x*

Enum Name	Enum Value
NE_MODE_MULTISHELF	“MULTISHELF”
NE_MODE_MULTISHELFETH	“MULTISHELFETH”
NE_MODE_SINGLESHELF	“SINGLESHELF”

NE\_MODE is used in the following commands:

- ED-NE-GEN

**Table 22** *OPTICAL\_WLEN enum items added to Release 7.0.x*

Enum Name	Enum Value
OPTICAL_WLEN_WL_1529_55	“1529.55”
OPTICAL_WLEN_WL_1529_94	“1529.94”
OPTICAL_WLEN_WL_1530_73	“1530.73”
OPTICAL_WLEN_WL_1531_51	“1531.51”
OPTICAL_WLEN_WL_1532_29	“1532.29”
OPTICAL_WLEN_WL_1533_07	“1533.07”
OPTICAL_WLEN_WL_1533_47	“1533.47”
OPTICAL_WLEN_WL_1533_86	“1533.86”
OPTICAL_WLEN_WL_1534_64	“1534.64”
OPTICAL_WLEN_WL_1535_43	“1535.43”
OPTICAL_WLEN_WL_1536_22	“1536.22”
OPTICAL_WLEN_WL_1537_00	“1537.00”
OPTICAL_WLEN_WL_1537_40	“1537.40”
OPTICAL_WLEN_WL_1537_79	“1537.79”
OPTICAL_WLEN_WL_1538_58	“1538.58”
OPTICAL_WLEN_WL_1539_37	“1539.37”
OPTICAL_WLEN_WL_1540_16	“1540.16”
OPTICAL_WLEN_WL_1540_95	“1540.95”
OPTICAL_WLEN_WL_1541_35	“1541.35”
OPTICAL_WLEN_WL_1541_75	“1541.75”

**Table 22** *OPTICAL\_WLEN enum items added to Release 7.0.x (continued)*

<b>Enum Name</b>	<b>Enum Value</b>
OPTICAL_WLEN_WL_1542_54	"1542.54"
OPTICAL_WLEN_WL_1543_33	"1543.33"
OPTICAL_WLEN_WL_1544_13	"1544.13"
OPTICAL_WLEN_WL_1544_92	"1544.92"
OPTICAL_WLEN_WL_1545_32	"1545.32"
OPTICAL_WLEN_WL_1545_72	"1545.72"
OPTICAL_WLEN_WL_1546_52	"1546.52"
OPTICAL_WLEN_WL_1547_32	"1547.32"
OPTICAL_WLEN_WL_1548_12	"1548.12"
OPTICAL_WLEN_WL_1548_92	"1548.92"
OPTICAL_WLEN_WL_1549_32	"1549.32"
OPTICAL_WLEN_WL_1549_71	"1549.71"
OPTICAL_WLEN_WL_1550_52	"1550.52"
OPTICAL_WLEN_WL_1551_32	"1551.32"
OPTICAL_WLEN_WL_1552_12	"1552.12"
OPTICAL_WLEN_WL_1552_93	"1552.93"
OPTICAL_WLEN_WL_1553_33	"1553.33"
OPTICAL_WLEN_WL_1553_73	"1553.73"
OPTICAL_WLEN_WL_1554_54	"1554.54"
OPTICAL_WLEN_WL_1555_34	"1555.34"
OPTICAL_WLEN_WL_1556_15	"1556.15"
OPTICAL_WLEN_WL_1556_96	"1556.96"
OPTICAL_WLEN_WL_1557_36	"1557.36"
OPTICAL_WLEN_WL_1557_77	"1557.77"
OPTICAL_WLEN_WL_1558_58	"1558.58"
OPTICAL_WLEN_WL_1559_39	"1559.39"
OPTICAL_WLEN_WL_1560_20	"1560.20"
OPTICAL_WLEN_WL_1561_01	"1561.01"
OPTICAL_WLEN_WL_1561_42	"1561.42"
OPTICAL_WLEN_WL_1561_83	"1561.83"
OPTICAL_WLEN_WL_1570_83	"1570.83"
OPTICAL_WLEN_WL_1571_24	"1571.24"
OPTICAL_WLEN_WL_1571_65	"1571.65"
OPTICAL_WLEN_WL_1572_06	"1572.06"
OPTICAL_WLEN_WL_1572_48	"1572.48"
OPTICAL_WLEN_WL_1572_89	"1572.89"

**Table 22** *OPTICAL\_WLEN enum items added to Release 7.0.x (continued)*

<b>Enum Name</b>	<b>Enum Value</b>
OPTICAL_WLEN_WL_1573_30	"1573.30"
OPTICAL_WLEN_WL_1573_71	"1573.71"
OPTICAL_WLEN_WL_1574_13	"1574.13"
OPTICAL_WLEN_WL_1574_54	"1574.54"
OPTICAL_WLEN_WL_1574_95	"1574.95"
OPTICAL_WLEN_WL_1575_37	"1575.37"
OPTICAL_WLEN_WL_1575_78	"1575.78"
OPTICAL_WLEN_WL_1576_20	"1576.20"
OPTICAL_WLEN_WL_1576_61	"1576.61"
OPTICAL_WLEN_WL_1577_03	"1577.03"
OPTICAL_WLEN_WL_1594_22	"1594.22"
OPTICAL_WLEN_WL_1594_64	"1594.64"
OPTICAL_WLEN_WL_1595_06	"1595.06"
OPTICAL_WLEN_WL_1595_49	"1595.49"
OPTICAL_WLEN_WL_1595_91	"1595.91"
OPTICAL_WLEN_WL_1596_34	"1596.34"
OPTICAL_WLEN_WL_1596_76	"1596.76"
OPTICAL_WLEN_WL_1597_19	"1597.19"
OPTICAL_WLEN_WL_1597_62	"1597.62"
OPTICAL_WLEN_WL_1598_04	"1598.04"
OPTICAL_WLEN_WL_1598_47	"1598.47"
OPTICAL_WLEN_WL_1598_89	"1598.89"
OPTICAL_WLEN_WL_1599_32	"1599.32"
OPTICAL_WLEN_WL_1599_75	"1599.75"
OPTICAL_WLEN_WL_1600_17	"1600.17"
OPTICAL_WLEN_WL_1600_60	"1600.60"
OPTICAL_WLEN_WL_1601_03	"1601.03"
OPTICAL_WLEN_WL_1601_46	"1601.46"
OPTICAL_WLEN_WL_1601_88	"1601.88"
OPTICAL_WLEN_WL_1602_31	"1602.31"
OPTICAL_WLEN_WL_1602_74	"1602.74"
OPTICAL_WLEN_WL_1603_17	"1603.17"
OPTICAL_WLEN_WL_1603_60	"1603.60"
OPTICAL_WLEN_WL_1604_03	"1604.03"
OPTICAL_WLEN_WL_850	"850"

OPTICAL\_WLEN is used in the following commands:

- ED-10GIGE
- ED-DWDM-CLNT
- ED-EQPT
- ED-FC
- ED-GIGE
- ED-OCH
- ED-OCN-TYPE
- ENT-EQPT
- RTRV-10GIGE
- RTRV-DWDM-CLNT
- RTRV-EQPT
- RTRV-FC
- RTRV-GIGE
- RTRV-LNK-MOD2LNK
- RTRV-OCH
- RTRV-OCN-TYPE

**Table 23** PAYLOAD enum items dropped from Release 7.0.x

Enum Name	Enum Value
PAYLOAD_PT_ISC1	“ISC1”
PAYLOAD_PT_ISC3	“ISC3”

**Table 24** PAYLOAD enum items added to Release 7.0.x

Enum Name	Enum Value
PAYLOAD_PT_4GFC	“4GFC”
PAYLOAD_PT_4GFICON	“4GFICON”
PAYLOAD_PT_ISC3PEER1G	“ISC3PEER1G”
PAYLOAD_PT_ISC3PEER2G	“ISC3PEER2G”
PAYLOAD_PT_ISC3PEER2R	“ISC3PEER2R”
PAYLOAD_PT_ISCCOMPAT	“ISCCOMPAT”

PAYLOAD is used in the following commands:

- ED-FAC
- RTRV-E4
- RTRV-STM1E

**Table 25** *SHELF\_ROLE enum items added to Release 7.0.x*

Enum Name	Enum Value
SHELF_ROLE_NC	“NC”
SHELF_ROLE_SC	“SC”

SHELF\_ROLE is used in the following commands:

- ED-EQPT
- ENT-EQPT
- RTRV-EQPT

**Table 26** *WLEN\_MODE enum items dropped from Release 7.0.x*

Enum Name	Enum Value
WLEN_MODE_ADD	“ADD”
WLEN_MODE_DROP	“DROP”
WLEN_MODE_EXP	“EXP”

WLEN\_MODE is no longer used in any command.

## Related Documentation

### Release-Specific Documents

- *Release Notes for the Cisco ONS 15454 SDH, Release 7.0*
- *Release Notes for the Cisco ONS 15454, Release 7.0.2*
- *Release Notes for the Cisco ONS 15327, Release 7.0.2*
- *Release Notes for the Cisco ONS 15600, Release 7.0.2*
- *Release Notes for the Cisco ONS 15310-CL, Release 7.0.2*
- *Release Notes for the Cisco ONS 15310-MA, Release 7.0.2*
- *Cisco ONS 15454 SDH Software Upgrade Guide, Release 7.0*

### Platform-Specific Documents

- *Cisco ONS 15454 SDH Procedure Guide*  
Provides installation, turn up, test, and maintenance procedures
- *Cisco ONS 15454 SDH Reference Manual*  
Provides technical reference information for SONET/SDH cards, nodes, and networks
- *Cisco ONS 15454 DWDM Installation and Operations Guide*  
Provides technical reference information for DWDM cards, nodes, and networks

- *Cisco ONS 15454 SDH Troubleshooting Guide*  
Provides a list of SONET alarms and troubleshooting procedures, general troubleshooting information, and hardware replacement procedures
- *Cisco ONS SDH TL1 Command Guide*  
Provides a comprehensive list of TL1 commands

## Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

<http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html>

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