



# Release Notes for Cisco ONS 15454 Release 5.0

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## 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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## August, 2007

Release notes address closed (maintenance) issues, caveats, and new features for the Cisco ONS 15454 SONET multiplexer. For detailed information regarding features, capabilities, hardware, and software introduced with this release, refer to the “Release 5.0” version of the *Cisco ONS 15454 DWDM Installation and Operations Guide*; *Cisco ONS 15454 Procedure Guide*; *Cisco ONS 15454 Reference Manual*; *Cisco ONS 15454 Troubleshooting Guide*; and *Cisco ONS 15454 SONET TL1 Command Guide*. For the most current version of the *Release Notes for Cisco ONS 15454 Release 5.0*, visit the following URL:

<http://www.cisco.com/univercd/cc/td/doc/product/ong/15400/454reInt/index.htm>

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

[http://www.cisco.com/cgi-bin/Support/Bugtool/launch\\_bugtool.pl](http://www.cisco.com/cgi-bin/Support/Bugtool/launch_bugtool.pl)

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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 Release 5.0* since the production of the Cisco ONS 15454 System Software CD for Release 5.0.

The following changes have been added to the release notes for Release 5.0.

## Changes to Caveats

The following caveats have been added to the release notes.

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## Caveats

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

## Hardware

### DDTS # CSCed18803

Rarely, the 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 be resolved in a future release. Note, however, that in normal network configurations the muxponder is operated with G.709 and FEC turned on, and the jitter tolerance tests pass.

### DDTS # CSCuk48503

Under specific conditions the 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 release.

### DDTS # CSCuk44284

An optical connector and optical attenuators inserted into the SFP may force the fiber against the shelf door when it is closed. Use the following types of optical connectors and optical attenuators when connecting to the SFP:

- **Optical connectors:** The length of the connector (starting from the ferrule tip) plus the fiber boot must be 50 mm or shorter.
- **Optical Attenuators:** The following attenuator Cisco P/Ns are recommended:
  - 39-0228-XX
  - 39-0229-XX
  - 39-0230-XX

### DDTS # CSCdw57215

In a configuration with OC-48 Any Slot cards and an STS-24c circuit, provisioned between G1000-4 cards with traffic going over the OC-48 span, extracting the G1000-4 card at one end of the STS-24c circuit before deleting the circuit will result in a traffic hit on all existing SONET circuits defined over that same span. This only occurs when the STS-24c is provisioned on timeslot 25.

In the Cisco ONS 15454 Procedure Guide, Release 4.1.x, refer to the “NTP-77 Delete Circuits” procedure to delete the 24c circuit before removing the card. Once you have deleted the circuit, refer to the “DLP-191 Delete a Card from CTC” task (also in the procedure guide) to delete the G1000-4 card. This issue will be resolved in Release 6.0.

## Jitter Performance with XC10G

During testing with the XC10G, jitter generation above 0.10 UI p-p related to temperature gradient testing has been observed. This effect is not expected to be seen under standard operating conditions. Changes are being investigated to improve jitter performance in a future release. DDTS numbers related to this issue include CSCdv50357, CSCdv63567, CSCdv68418, CSCdv68441, CSCdv68389, CSCdv59621, and CSCdv73402.

## DDTS # CSCdz49928

When using KLM type fuses with specific types of fuse and alarm panels, the PWR-REDUN alarm may not be displayed once the fuse is blown. A KLM fuse does not have a blown fuse indicator built into it. As a result, the blown fuse detection circuitry on the FAP may continue to provide voltage on its output despite a blown fuse.

## 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

CTC does not support adding/creating more than 5 circuits in auto-ranged provisioning. This is as designed.



### 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 5.0. Current settings are displayed in CTC (whether they were inherited from an upgrade, or they were set using the current GUI).

## DDTS # CSCeg39851

CTC loses the DS3 detected frame type when a TCC switch occurs or IO (HD DS3) resets. To avoid this issue, change the frame type feeding each port. This issue will be resolved in a future release.

## DDTS # CSCeg37079

When you try to edit a node IP on a FAC tray, it shows a DCN IP address. This only occurs if the node is in non-secure mode and a secure mode database is then downloaded to the node. To avoid this issue, update the node to secure mode prior to downloading the database. To recover from this issue, reboot the node. This issue will be resolved in a future release.

**DDTS # CSCeg21737**

In a 1:N protection group, if you set a facility loopback and then initiate a switch, the facility loopback might clear following the switch clearing. This issue will be resolved in a future release.

**DDTS # CSCef70730**

An AICI user data D4-D12 (DCC) overhead circuit might not pass data correctly. This can occur for both AICI DCC-A and DCC-B circuits. Though CTC indicates the circuit is established correctly, the underlying overhead timeslot connections are not set properly for the user data D4-D12 (DCC) overhead circuits. This issue does not occur with user data F1 (UDC) overhead circuits, however, for which timeslots are set and the circuit behaves correctly. This issue will be resolved in a future release.

**DDTS # CSCeg40369**

Inserting Loss of Multiframe (LOM) defects into VT-1.5 members of a Low Order VCG (VCAT or LCAS) results in a PLM-V alarm, instead of the expected LOM-V alarm. This issue will be resolved in a future release.

**DDTS # CSCeg12770**

To avoid a possible traffic hit, in the final step of 1+1 in-service node addition, avoid forcing traffic to the working path immediately after refibering the working path. Wait about one minute to ensure there are no service affecting alarms, such as LOS, SF-L, or SD-L, before switching traffic back to working path. This issue will be resolved in a future release.

**DDTS # CSCee96164**

The Wait To Restore (WTR) alarm does not appear to be raised for as long as the WTR timer is set for. The WTR is raised correctly, but the alarm is hidden for the first 12 seconds due to the clear soaking time for a CLDRESTART alarm. You can see this behavior if you set up a 1+1 bidirectional revertive protection group, remove the working card, and then reinsert the card. There are no plans to change this behavior.

**DDTS # CSCee25136**

If you create a PM schedule with the Start time for the PM report equal to 00:00 (in TL1, "0-0"), after a few minutes the PM report start time might change to 23:59 (in TL1, "23-59"). This issue will not be resolved.

**DDTS # CSCed23484**

A user might remain in the logged-in state after rebooting the PC while logged into a node running CTC. The user login will time out once the "Idle User Timeout" limit is up. Alternatively, you can log in as a superuser and force the user off. This issue will not be resolved.

## DDTS # CSCea81001

When a fault condition exists against a circuit or port that is in the OOS-MT or OOS-AINS state (or when you are using the “Suppress Alarms” check box on the CTC Alarm Behavior pane), the alarm condition is not assigned a reference number. If you were to place the circuit or port in service at this time, in the absence of the reference number, the CTC alarm pane would display the condition with a time stamp indicating an alleged, but incorrect, time that the autonomous notification was issued. Clicking the CTC alarm “Synchronize” button at this stage will correct the alarm time stamp. There is no way to remedy the lack of reference number. This issue will be resolved in Release 6.0.

## DDTS # CSCdy57891

An LOP-P alarm can be inadvertently cleared by an LOS that is raised and cleared. On OC48AS, OC192, and OC12-4 cards, when an LOP condition and an LOS condition are both present on the input, an LOS will be raised as per Telcordia GR 253 alarm hierarchy. However, upon clearing the LOS with the LOP still present, the LOP alarm, which should then be raised, is not. An AIS-P condition will be visible. This issue will be resolved in Release 6.0.

## DDTS # CSCds88976

When a new circuit is created around a ring (path protection or BLSR), the SD BER or SF BER alarm can be raised depending on the order in which the spans are provisioned. The alarms will eventually clear by themselves. Traffic is not affected. This issue will not be resolved.

## DDTS # CSCdu82934

When you auto-route a VT circuit on an ONS 15454 node, a path is computed based on the availability of STSs on the nodes involved. This selection process, when combined with a lack of VT matrix (or STS-VT connections) on an auto-route selected node, can result in the VT circuit creation failing with the message “unable to create connection object at node.” To correct this situation, manually route VT circuits in cases when auto-routing fails. The error message will indicate which node is at issue.

## DDTS # 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.

## DDTS # 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.

### **DDTS # 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 will be resolved in Release 6.0.

### **DDTS # CSCef18649**

LDCC and MS-DCC do not work at OC12/STM4 line rates (client and trunk side). Use SDCC or RS-DCC (D1..D3) at OC12/STM4 line rates. This issue will be resolved in a future release.

### **DDTS # 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.

### **DDTS # CSCef29516**

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

### **DDTS # 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 LOC 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. It is not known when or if this issue will be resolved.

### **DDTS # 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 has been closed and will not be resolved.

### **DDTS # CSCdx35561**

CTC is unable to communicate with an ONS 15454 that is connected via an Ethernet craft port. CTC does, however, communicate over an SDCC link with an ONS 15454 that is Ethernet connected, yielding a slow connection. This situation occurs when multiple ONS 15454s 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 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 15454s.

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 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.

## DDTS # CSCdy56693

Microsoft Windows XP uses more memory than previous Microsoft operating systems, and this may result in reduced CTC performance. To avoid reduced performance, you can:

- Limit the number of nodes you log into
- Avoid or limit bulk operations
- Avoid bulk circuit deletion
- Prevent CTC's discovery of DCC connected nodes by using the login "Disable Network Discovery" feature
- Prevent CTC's discovery of circuits unless needed by using the login "Disable Circuit Management"

## DDTS # CSCdy62092

When a node connected via SDCC has no Ethernet LAN connectivity, display of SDCC termination alarms is delayed if the fiber connecting a DCC connected node is removed. This issue cannot be resolved.

## DDTS # 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. When this event occurs, Telcordia GR-253 specifies that CVs that occurred during this time be counted, but they are not. There are no plans to resolve this issue at this time.

## DDTS # CSCdy55556

In a 1:N protection group, where a protect card is protecting a failed card and another working card, which is missing, has a lockon condition, upon removing the lockon condition from the missing working card, the protect card may switch from the card it had been protecting to carry the traffic of the missing working card that just had the lockon removed. To avoid this issue, replace the failed working card before removing the lockon. This issue will be resolved in a future release.

## DDTS # 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.

## NE Defaults

The following caveats apply for NE defaults when managing older, non-Release 4.5 nodes.

- OC12-4 allows provisioning of PJStsMon from 0 to 48. The workaround is to limit provisioning to between Off and 1 to 12 only.
- CTC displays “PJStsMon=off” in the standard provisioning pane when provisioning PJStsMon off; however, TL1 and the NE Defaults editor both display 0 for this same condition.
- If you only make changes to a single default in the NE defaults editor, you must click on another default or column before the Apply button becomes functional.

## ONS 15454 Conducted Emissions Kit

If you are deploying the Cisco ONS 15454 within a European Union country that requires compliance with the EN300-386-TC requirements for Conducted Emissions, you must obtain and install the Cisco ONS 15454 Conducted Emissions kit (15454-EMEA-KIT) in order to comply with this standard.

## DDTS # 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 Cards

### DDTS # CSCef70894

Rarely, when performing a software activation or revert, the active TCC2/TCC2P card's temperature sensor might lock up and fail to read correctly. If this occurs, resetting the affected TCC2/TCC2P will clear the lock-up. This issue will be resolved in a future release.

### DDTS # CSCdw27380

Performing cross connect card switches repeatedly might cause a signal degrade condition on the lines or paths that can trigger switching on these lines or paths. If you must perform repeated cross connect card switches, lock out the corresponding span (path protection, BLSR, or 1+1) first. This issue will not be resolved.

## Active Cross Connect (XC10G/XCVT) or TCC2/TCC2P Card Removal

You must perform a lockout in BLSR, path protection, and 1+1 before physically removing an active cross connect (XC10G/XCVT) or TCC2/TCC2P card. The following rules apply.

Active cross connect (XC10G/XCVT) cards should not generally be physically removed. If the active cross connect or TCC2/TCC2P card must be removed, you can first perform an XCVT/XC10G 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 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.



### Caution

If you mistakenly remove an active 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.

## 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.

## Optical IO Cards

### DDTS # CSCeg67366

In an optimized 1+1 configuration with OC3-8 port cards, if the primary protect card is reseated, after it boots up the far end might report an APSINVPRIM alarm. To see this, apply a lockout in an optimized 1+1 and then reseat the primary work card. After the card comes up it might send out 0x00 in the K2 byte instead of the channel number of the primary channel. If this issue occurs, as a recovery procedure you can apply a force switch to secondary and then clear it. This issue will be resolved in a future release.

### DDTS # CSCdw66444

When an SDH signal is sent into an ONS 15454 OC-12/STM-4 (IR, 1310 LR and 1550 LR) or an OC-48/STM-16 high-speed (IR and LR) port which has been configured to support SDH, an SD-P (Signal Degrade) alarm will appear as soon as the circuit is created. This alarm will continue to exist until the circuit is deleted.

To avoid this problem, when provisioning an OC-12/STM-4 (IR, 1310 LR and 1550 LR) or an OC-48/STM-16 high-speed (IR and LR) port to support SDH, disable the signal degrade alarm at the path level (SD-P) on the port.

Also, PM data at the path level will not be reliable. You must set associated threshold values to 0 in order to avoid threshold crossing alerts (TCA) on that port. The path threshold values to set to zero are CV-P, ES-P, SES-P, and UAS-P.

These issues are the result of a hardware limitation, and there are no current plans to resolve them.

### DDTS # CSCdw09604

If you are using an XC10G with OC-48, you must use either OC-48AS or OC-48 cards with a revision number higher than 005D.

## Electrical IO Cards

### DDTS # CSCeg39670

On a path protection path protected DS3XM12 circuit with the path protection selector on the DS3XM12 node, traffic might go down when you perform a span upgrade. This issue will be resolved in a future release.

### DDTS # CSCeg62711

On DS1/E1 cards, PM TCAs fail to appear, or appear against a lower port number than expected. This issue will be resolved in a future release.

**DDTS # CSCeg63061**

You cannot upgrade an unprotected STS-1 circuit on a DS1 card to path protection. If you try to perform this upgrade you will receive a failure message. This issue will be resolved in a future release.

**DDTS # CSCeg72079**

Editing J2 Path Trace for a DS3XM12 VAP circuit source port can cause a TCC2 reset. This issue will be resolved in a future release.

**DDTS # CSCuk54306**

The DS1 port status on the DS3XM-12 card behaves differently from that of other cards. When you modify the DS3 state, the DS1 state is generated based on the DS3 state, and on the existence of STS or VT circuits. This difference will be documented in a future release.

**DDTS # CSCdx40300**

A transient WKSWPR condition is raised upon deletion of a DS3XM 1:1 protection group. This issue will be resolved in a future release.

**DDTS # CSCea58275**

In a 1:N protection group, the DS3N card will attempt to protect a preprovisioned card (that is, when you right-click an empty card slot in the CTC node view and select the DS3 card), leaving it unavailable to protect another, actual card that is also in the protection group, should that card fail. To avoid this issue, do not include the pre-provisioned card in the protection group. Once the card is physically installed, you can edit the protection group and add the card.

**DDTS # CSCec39567**

Deleting a DS3I 1:N protection group may leave the protect card LED in a standby state. This can occur in a DS3I 1:N protection group with a LOCKON applied to the working card (ONS 15454 ANSI chassis only). Upon deleting the protection group, the LED on the protect DS3I card and the CTC display are still in the standby state. Soft reset the protect card to update the LED on the card and in CTC. An alternative workaround is to remove the LOCKON before deleting the protection group. This issue will be resolved in Release 6.0.

**DDTS # CSCdv62565, CSCdv62573**

In a 1:N protection group, traffic loss could occur if a DS-N card is preprovisioned and then added to the group while another working card in the group is removed from its slot. To avoid this, before adding slots to a protection group ensure that:

- The protect card is not actively carrying traffic (that is, the card is in standby)
- Any working slot you add to the group actually contains a working card at the time you add it

This issue will be resolved in Release 6.0.

## Data IO Cards


**Note**

The new [CE-100T-8 Card](#), page 42 will become available for use with maintenance Release 5.0.1.

## SONET and SDH Card Compatibility

Tables 1, 2, and 3 list the cards that are compatible for the ONS 15454 SONET and ONS 15454 SDH platforms. All other cards are platform specific.

**Table 1** *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 2** *SONET Data Cards that are SDH Compatible*

Product Name	Description
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 3** *Miscellaneous Compatible Products*

Product Name	Description
15454-BLANK	Empty slot Filler Panel
15454-GBIC-LX	1000Base-LX, SM or MM, standardized for 15454/327

**Table 3** *Miscellaneous Compatible Products (Continued)*

Product Name	Description
15454-GBIC-SX	1000Base-SX, MM, standardized for 15454/327
15454-FIBER-BOOT=	Bag of 15 90 degree fiber retention boots
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

**DDTS # CSCef46191**

A specifically crafted Transmission Control Protocol (TCP) connection to a telnet or reverse telnet port of a Cisco device running Internetwork Operating System (IOS) might block further telnet, reverse telnet, Remote Shell (RSH), Secure Shell (SSH), and in some cases Hypertext Transport Protocol (HTTP) access to the Cisco device. Telnet, reverse telnet, RSH and SSH sessions established prior to exploitation are not affected.

All other device services will operate normally.

The detail advisory is available at:

<http://www.cisco.com/warp/public/707/cisco-sa-20040827-telnet.shtml>

**DDTS # 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 will be resolved in a future release.

**DDTS # CSCdy37198**

On Cisco ONS 15454s equipped with XCVT cross-connect cards, neither the E100T-12 nor the E1000-2 cards raise an alarm or condition in CTC when Ethernet traffic is predictably lost due to the following circumstances:

Circuits exist between Ethernet cards (E100T-12 and/or E1000-2) built over Protection Channel Access (PCA) bandwidth on BLSR spans. When BLSR issues a switch, the PCA bandwidth is preempted. Since there is no longer a connection between the ends of the Ethernet circuit, traffic is lost.

**Note**

In nodes equipped with XC10G, these Ethernet cards will raise an AIS-P condition.

This issue will be resolved in a future release.

## DDTS # CSCdr94172

Multicast traffic can cause minimal packet loss on the E1000-2, E100-12, and E100-4 cards. Packet loss due to normal multicast control traffic should be less than 1%. This issue was resolved in Release 2.2.1 for broadcast, and in Release 2.2.2 for OSPF, and some multicast frames. As of Release 3.0.3, the ONS 15454 supports HSRP, CDP, IGMP, PVST, and EIGRP, along with the previously supported broadcast and OSPF.



**Note**

If multicast is used for such applications as video distribution, significant loss of unicast and multicast traffic will result. These cards were not designed for, and therefore should not be used for, such applications.



**Note**

If the multicast and flood traffic is very rare and low-rate, as occurs in most networks due to certain control protocols and occasional learning of new MAC addresses, the loss of unicast frames will be rare and likely unnoticeable.



**Note**

A workaround for this issue is to use the port-mapped mode of the E-series cards.

Multicast MAC addresses used by the control protocols in [Table 4](#) have been added to the static MAC address table to guarantee no loss of unicast traffic during normal usage of these MAC addresses.

**Table 4** *Protocols Added to the MAC Address Table*

Protocol	Release Protocol Introduced In
Broadcast MAC (used by many protocols)	2.2.1
Open Shortest Path First (OSPF)	2.2.2
Cisco Discovery Protocol (CDP)	2.2.2
Per-VLAN Spanning Tree (PVST)	2.2.2
Enhanced Interior Gateway Routing Protocol (EIGRP)	2.2.2
Internet Group Management Protocol (IGMP)	2.2.2
Hot Standby Routing Protocol (HSRP)	3.0.3

## E1000-2/E100T

Do not use the repair circuit option with provisioned stitched Ethernet circuits. This issue is under investigation.

## Single-card EtherSwitch

Starting with Release 2.2.0, each E100/E1000 card can be configured as a single-card EtherSwitch configuration to allow STS-12c of bandwidth to be dropped at each card. The following scenarios for provisioning are available:

1. 12c
2. 6c, 6c
3. 6c, 3c, 3c
4. 6c, six STS-1s
5. 3c, 3c, 3c, 3c
6. 3c, 3c, six STS-1s
7. Twelve STS-1s

When configuring scenario 3, the STS-6c must be provisioned before either of the STS-3c circuits.

## Multicard EtherSwitch

When deleting and recreating Ethernet circuits that have different sizes, you must delete all STS circuits provisioned to the EtherSwitch before you create the new circuit scenario. (See the preceding [“Single-card EtherSwitch”](#) section 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.

## DDTS # CSCds02031 E1000-2/E100

Whenever you drop two 3c multicard EtherSwitch circuits onto an Ethernet card and delete only the first circuit, you should not provision STS-1 circuits to the card without first deleting the remaining STS-3c circuit. If you attempt to create an STS-1 circuit after deleting the first STS-3c circuit, the STS-1 circuit will not work and no alarms will indicate this condition. To avoid a failed STS-1 circuit, delete the second STS-3c prior to creating any STS-1 circuit.

## DDTS # CSCeg30605

The diagnostics information provided for ML cards in the diagnostic file is incomplete. This issue will be resolved in a future release.

## DDTS # 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. For documentation of this command, consult the *Ethernet Card Software Feature and Configuration Guide*.

## DDTS # CSCec52443

On an ML-series RPR ring circuit deletion or creation causes an approximately 200 ms traffic loss. 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.

## DDTS # 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.

## DDTS # 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, 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 be resolved in a future release.

## DDTS # CSCea46580

SPR input counters do not increment on a BVI with an SPR interface. This issue will not be resolved.

## DDTS # CSCea35971

A monitor command may disappear from the configuration after a TCC reboots. To avoid this issue, use the exec command, “terminal monitor,” instead (a minor drawback is that this command applies to all VTYS), or, alternatively, reapply the monitor command after connection is lost. This is as designed.

## DDTS # CSCdz49700

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.

## DDTS # 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.

## DDTS # 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.

## DDTS # 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 in Release 4.0. This issue will be resolved in a future release.

## DDTS # CSCin32057

If no BGP session comes up when 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.

## DDTS # CSCdy47284

ML-100 FastEthernet MTU is not enforced. However, frames larger than 9050 bytes may be discarded and cause Rx and Tx errors.

## DDTS # CSCdz74432

Issuing a “clear IP route \*” command can result in high CPU utilization, causing other processes to be delayed in their execution. To avoid this issue do not clear a large number of route table entries at once, or, if you must use the “clear IP route \*” command, do not install more than 5000 EIGRP network routes.

## DWDM Cards

### DDTS # CSCef71428

If two TXPP-MR-2.5G units are connected via trunk ports, with the Working Trunk facility set to OOS,DSBLD state, and a FORCE switch is applied on the working trunk, and then the working port is put into OOS,DSBLD state, the WKSWPR condition in the Conditions pane fails to clear. This issue will be resolved in a future release.

### DDTS # 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.

## DDTS # 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.

## DDTS # CSCuk48503

Under very specific conditions the MXPDP fails the Telcordia GR-253/G.825 Jitter generation mask test on the 10G transmit trunk port. The 2.5 G transmit client jitter generation remains within mask and does not exhibit this issue.

This only occurs when, in SONET mode, with no FEC, no G,709, and client interfaces looped back, with non-synchronous clocking, and performing the following steps.

- Step 1** Connect a jitter testbox TX to Trunk RX port.
  - Step 2** Connect a jitter testbox RX to Trunk TX port.
-

The jitter textbox TX clock recovers from RX with an additional 5 ppm offset added. This issue will not be resolved.

## DDTS # 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.

## DDTS # 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.

**DDTS # CSCuk51184**

When downloading Release 4.7 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.

**DDTS # 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.

**DDTS # 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.

**DDTS # 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.

### **DDTS # CSCuk51185**

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

### **DDTS # 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 be resolved in a future release.

### **DDTS # CSCee45443**

When the FICON bridge does not receive the expected number of idle frames between data packets it will transition to SERV MODE. This issue will be resolved in a future release.

### **DDTS # CSCef18649**

LDCC and MS-DCC do not work at OC12/STM4 line rate on the client or trunk side. Use SDCC or RS-DCC (D1..D3) at OC12/STM4 line rates. This issue will be resolved in a future release.

### **DDTS # 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.

### **DDTS # 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.

### **DDTS # 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.

**DDTS # 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.

**DDTS # 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.

**DDTS # 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 as designed.

**DDTS # CSCea78210**

The TXP\_MR\_2.5G and TXPP\_MR\_2.5G cards do not support TX Optical power performance monitoring on the trunk port. This is as designed.

**DDTS # CSCeb32065**

Once engaged, 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.

**DDTS # 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.

**DDTS # 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.

**DDTS # 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.

**DDTS # CSCea87290**

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

**DDTS # CSCeb12609**

For the TXPP, attenuating Port 2 Rx signal, SD, and SF alarms are not declared before LOC 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.

**DDTS # 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.

**SNMP****DDTS # CSCeg72789**

The SMIV1 version CERENT-HC-RMON-MIB.mib is missing from the ONS Release 5.0 software CD. The file should be located in the /MIBS/CiscoV1 directory on the software CD, but a V2 version is located there instead. The V1 version of CERENT-HC-RMON-MIB.mib can be downloaded as follows.

- 
- Step 1** In your browser window, load the following URL, which leads to all ONS platform download pages:  
<http://www.cisco.com/kobayashi/sw-center/sw-optical.shtml>
  - Step 2** From the Optical Software download page, click the link to your particular platform (ONS 15454, ONS 15327, ONS 15600, or ONS 15310).
  - Step 3** Click the link to the platform-specific MIBS.zip file for Release 5.0.
- 

**DDTS # CSCed05502 and CSCef43911**

SNMP Traps are generated for TCA when the OC3-4 port state is OOS-AINS/MT (whereas TL1 TCAs are inhibited). This issue will be resolved in a future release.

## Alarms

### DDTS # CSCed64269

The “Failed SW-Prot-Ring” alarm reports inconsistently. The alarm only sometimes appears when a Lockout of Protection is present on the BLSR and a transmit or receive fiber is pulled on the node with the Lockout. This issue will be resolved in a future release.

## Interoperability

### DDTS # CSCds13769: Fujitsu FLM-150 and Nortel OC-3 Express

You cannot provision the FLM-150 and OC-3 Express in 1+1 revertive switching mode. The problem occurs when the ONS 15454 issues a user request in revertive mode to the protect channel. When the user request is cleared, the ONS 15454 issues a No Request. However, the FLM-150 and OC-3 Express issues a Do Not Revert, which causes traffic to remain on the protection channel. Based on Telcordia GR-253, section 5.3.5.5, the FLM-150 and the OC-3 Express should respond with a No Request.

## BLSR Functionality

### DDTS # CSCeg64837

Rarely, when you build a new BLSR/MS-SPRing, or add nodes to an existing ring, an APSC-IMPROPER alarm might fail to clear. Issue an exerciser command (ring or span) on the span that raised the alarm in order to clear it. This issue will be resolved in Release 5.0.2.

### DDTS # CSCeg56179

CTC allows you to create a DRI protected circuit that interconnects more than two BLSRs. The circuit protection is correctly discovered as “protected” instead of “DRI.” However, circuit creation should fail because the DRI protection requirement is not met. This can be seen when using TL1 or CTC to create an integrated DRI handoff where the input to the primary handoff is on BLSR #1, one of the handoff interconnect spans is on BLSR #2, and the output handoff toward the drop is on BLSR #3. Interconnecting three BLSRs using a traditional or integrated handoff will always void DRI protection. This issue will be resolved in a future release.

### DDTS # CSCeg20361

When a protection switch such as a force ring switch is issued on a BLSR J1 path trace values displayed in the detailed circuit map might be incorrect for some ports. To see the correct values, either open the port of interest, or view the J1 path trace values from the node view, Maintenance > Path Trace tab. This issue will be resolved in a future release.

## DDTS # CSCef52499

When creating DRI circuits both service and path selectors can either be revertive or non-revertive. To correct this, change the reversion of the selectors after creation of the circuit by editing the circuit. This issue will be resolved in a future release.

## DDTS # CSCed10127

Extra traffic is not restored when an SF-R occurs on the same span where a lockout of protect is applied at the opposite node, and where the extra traffic is sourced, destined, or travels through the node with the SF-R. To work around this, issue a lockout on each end of the span at the node where the SF-R occurs. Extra traffic should then be restored. This issue will not be resolved.

## DDTS # CSCea59342

DS3 PCA traffic may take up to 20 seconds to recover after a BLSR switch is cleared. This can occur with DS3 PCA traffic on two-Fiber or four-Fiber BLSR configuration with XCVT cards in the same nodes as the DS3 cards. This issue will be resolved in a future release.

## DDTS # CSCdw58950

You must lock out protection BLSR, 1+1, and path protection traffic to avoid long, or double traffic hits before removing an active XCVT or XC10G card. You should also make the active cross connect card standby before removing it.

## DDTS # CSCdv53427

In a two ring, two fiber BLSR configuration (or a two ring 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.

## DDTS # CSCct03919

VT1.5 and VC3/VC12 squelching is not supported in BLSR/MS-SPRing.

## Database Restore on a BLSR

When restoring the database on a BLSR, follow these steps:

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

**Step 4** Release the force switch from each node.

---

## Path Protection Functionality

### DDTS # CSCee53579

Traffic hits can occur in an unprotected to path protection topology upgrade in unidirectional routing. If you create an unprotected circuit, then upgrade the unprotected circuit to a path protection circuit using Unprotected to path protection wizard, selecting unidirectional routing in the wizard, the circuit will be upgraded to a path protection circuit. However, during the conversion, traffic hits on the order of 300 ms should be expected. This issue will be resolved in a future release.

### DDTS # CSCef70522

A TL1 created VT path protection circuit in which only one path uses a tunnel is discovered as partial by CTC. Traffic is unaffected. This issue will be resolved in a future release.

### DDTS # CSCec15064

A path protection/SNCP circuit with a defect signal present (for example, AIS-P or AIS-V) on the protect path will produce RDI-P or RDI-V upstream of the detection point, but these signals will not be detected or indicated. This issue will be resolved in a future release.

## Active Cross Connect (XC10G/XCVT) or TCC2/TCC2P Card Removal

As in BLSR and 1+1, you must perform a lockout on path protection before removing an active cross connect or TCC2/TCC2P card. The following rules apply to path protection.

Active cross connect (XC10G/XCVT) cards should not generally be physically removed. If the active cross connect or TCC2/TCC2P card must be removed, you can first perform an XCVT/XC10G 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.

## TL1



### Note

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To be compatible with TL1 and DNS, all nodes must have valid names. Node names should contain alphanumeric characters or hyphens, but no special characters or spaces.

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## DDTS # CSCsh41324

When running release 4.1.4, if a circuit is created within CTC and if that circuit is retrieved via TL1, all looks as expected. However, after the software is upgraded to release 6 and latter, the circuit retrieve does not show the same value as was before. For example FAC-4-1 changes to FAC-4-0. Workaround is to delete and recreate the circuit within CTC.

## DDTS # CSCeg30385

You cannot move any non-processor cards or PPMs to Maintenance state using the TL1 RMV-EQPT command. Also, neither of these equipment types can be moved back to IS. This currently only affects AIC cards and port pluggable modules. This issue will be resolved in Release 5.0.2.

## DDTS # CSCeg87471

Do not set the TID for an ENE to more than 19 characters. Setting the TID for an ENE to 20 characters or more and then issuing a TL1 command on the GNE to execute on the ENE will result in TL1 agent connectivity issues on the ENE. Specifically, if you set the TID on the ENE to 20 characters, reboot the TCC, then try to connect to that ENE from a GNE this will result in a loss of TL1 connectivity to the GNE. This issue will be resolved in Release 5.0.2.

## DDTS # CSCeg68057

When issuing the TL1 command “RTRV-COND-VT1” with an AID block of “SLOT-\*” the TL1 agent will incur an exception and cause the shelf controller to reset. The standby shelf controller will become active. To avoid this, do not use the “SLOT-\*” AID with this command. This issue will be resolved in a future release.

## DDTS # CSCdu53509

When a TL1 session to a remote node (ENE) is established via a gateway node (GNE) and you have changed the node name of the ENE via either TL1, CTC or SNMP, then you must wait for about 30 seconds to issue a TL1 command via the GNE. This delay is to permit the updates to propagate to all nodes in the network. During this transition, neither the old node name nor the new node name can be used in the TL1 session to access the ENE. This 30 second window may be reduced in a future release.

## Online Documentation

### DDTS # CSCeg63382

When you have never previously installed the online user manuals on your workstation (PC or UNIX) and you click the Help > User Manuals menu in CTC, there is no error message instructing you to install the online manuals. You must install the online help from the software or documentation CD prior to selecting it from the menu. An error message for the case in which the help is not installed will be provided in a future release.

# Resolved Software Caveats for Release 5.0

This section documents caveats resolved in Release 5.0. Caveats resolved in DWDM Release 4.7 are also included.

## Maintenance and Administration

### DDTS # CSCec57665

When changing the tunnel type from IP Tunnel to a traditional SDCC tunnel, the rollback does not restore the original tunnel. If this occurs, manually recreate the tunnel. This issue is resolved in Release 5.0.

### DDTS # CSCuk52184

Rarely, after having completed an ONS 15454 MSTP network installation in which all nodes in the network are installed, and Automatic Node setup is provisioned and run, the Optical channel network connection provisioning operation does not go to a final state. OCHCH remains in OOS-AINS state. To recover from this issue, soft reset all nodes in the affected network. This issue is resolved in Release 5.0.

### DDTS # CSCuk52914

Reports of the ports regulated by APC contain some useless ports. The wrong ports are the Channel RX ports of MUX, WSS and AD-xC boards. The behavior is common to the CTC and TL1 interfaces. A MUX, WSS, or AD-xC board must be present in the system and a circuit be provisioned passing through them to see this issue. This issue is resolved in Release 5.0.

### DDTS # CSCdy61275

Far end path FC-P is not counted on EC1 or OC3 cards. When a path defect is transmitted to the far end, it reports RDI-P. However, the condition is not examined and reported as a PM count. This issue is resolved in Release 5.0.

### DDTS # CSCef47990

Certain PM values are not displayed in CTC. In particular, if you perform an FC link down and up and observe FC LinkRecovery counts, the count will not appear to increase. This issue is resolved in Release 5.0.

### DDTS # CSCef57989

Invalid idles are transmitted in a splitter switch. To see this issue perform the following steps.

- 
- Step 1** Set up two MXPP cards connected to each other.
  - Step 2** Provision the client port as FICON ISL 1G with DE on and Auto detect credit on.
  - Step 3** Connect the client port to an MDS switch.

**Step 4** Provision a manual switch.

---

NOS is transmitted by both MXPPs and OLS is received by these cards from the MDS at both ends. However, then the MXPP sends some invalid idles. This issue is resolved in Release 5.0.

## DDTS # CSCuk53088

A splitter protect group might incur a double switch when the protect trunk port is placed in service. The double switch will occur if the working trunk port is already in service and is currently incurring alarms or defects. When the protect trunk is placed in service it will become active. If there are any defects on the trunk (for example, no receive signal) the splitter will immediately switch back to working.



### Note

The double switch will not occur if the working port is error-free.

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Apply a FORCE-TO-WORKING or a LOCKOUT-OF-PROTECT switch command before placing the protect trunk in service to avoid this issue. This issue is resolved in Release 5.0.

## DDTS # CSCef53655

When importing an NE default file, errors are raised for the following defaults.

- FC-MR.config.port.distanceExtension.NumGFPBuffers
- MXP-MR-2\_5G.config.fc.distanceExtension.NumGFPBuffers

This issue is resolved in Release 5.0.

## DDTS # CSCec61769

The time zone shows the incorrect zone when changed via TL1. This issue will correct itself once a TCC2 reset occurs. This issue is resolved in Release 5.0.

## DDTS # CSCec67324

The Generation II SSM value is not sent out correctly when changed from Gen 1 to Gen 2. Perform a TCC2 switch to correct this issue. This issue is resolved in Release 5.0.

## DDTS # CSCec29230

The NE PWR-B alarm is not reported in CTC after an upgrade to Release 3.4.2. You can view the alarm through TL1. This issue is resolved in Release 5.0.

## DDTS # CSCea78364

Simultaneous failure of working and protect cards in 1:N protection groups may not be alarmed as service affecting. This can occur when the working card of the protection group has been removed from the chassis, and the protect card of the protection group is subsequently issued a Manual Reset. Since the working and protect facilities are impaired, the Improper removal alarm should clear and be reissued as a Critical and service affecting condition. This issue is resolved in Release 5.0.

## DDTS # CSCec17281

When the “Status” field for a circuit in the circuit table shows “INCOMPLETE,” this can be interpreted as an alarm or traffic-affecting condition on the circuit. On path protection and BLSR circuits, a circuit is shown as INCOMPLETE if either the working or protect path is missing a network span or connection, even if traffic is flowing without error on the other, redundant path. This can lead to confusion, since the meaning of “INCOMPLETE” is not well-defined. You can see this if you, for example, introduce LOS on a span in a BLSR network such that traffic is switched to another path around the ring. Ignore the INCOMPLETE circuit status in such cases and instead look for any alarms in the network. This issue is resolved in Release 5.0. The circuit Status is defined clearly in the Release 5.0 user documentation.

## Optical IO Cards

### DDTS # CSCed01244

With a 1+1 protection group configured on an OC3-8 card, an APSCM alarm might be raised unexpectedly. Any switch on the protection group will clear the alarm. This issue is resolved in Release 5.0.

### DDTS # CSCec79028

UNEQ-P & LOP-P CR alarms might be reported momentarily when PCA traffic is preempted while applying a force switch ring or manual switch ring. The issue is more common when there are PCA circuits on multiple node OC-192 rings. This issue is resolved in Release 5.0.

## Electrical IO Cards

### DDTS # CSCed34189

An expected far end LOF is never raised, and RAI becomes stuck on the DS3XM. This can occur with two connected DS3XMs, when a loss of frame is raised for one, and then FE-LOF is expected on the other. This issue is resolved in Release 5.0.

### DDTS # CSCed24599

While the DS3E protect card is active, invoking the auto frame format provisioning feature (AUTL) for a port might result in a misprovisioned frame format on that port (as compared to the actual frame format received on the DS3 receive line). If you must provision the frame format for a port while the protect card is active, provision it explicitly (manually select UNFRAMED, M13 or CBIT) instead of using the AUTL feature to ensure appropriate frame format provisioning on that port. This issue is resolved in Release 5.0.

## Data IO Cards

### DDTS # CSCee65395

On ML100T and ML1000, setting one member of a VCG to the OOS admin state can cause the other member to go down. This causes the whole VCG and POS port to go down. This has been seen only on STS12c-2v. This issue is resolved in Release 5.0 and maintenance Release 4.6.4.

## DWDM Cards

### DDTS # CSCef22599

In Release 4.7 it is not possible to configure a Y-Cable protection group when DE is enabled. This issue is resolved in Release 5.0.

### DDTS # CSCef37516

Port LEDs remains red with no alarms reported in the following scenario.

For two nodes with TXP\_MR\_2.5G (TXP-1 and TXP-2):

- 
- Step 1** Connect the TXP-1 trunk to the TXP-2 trunk.
  - Step 2** Connect the TXP-1 and TXP-2 clients to a traffic generator.
  - Step 3** Provision STM16 payload for TXP-1 and TXP-2.
  - Step 4** Provision TXP-1 and TXP-2 in transparent mode with G.709 on.
  - Step 5** Enable Manual ALS for TXP-1 and TXP-2.
  - Step 6** Ensure that traffic is up and running.
  - Step 7** For TXP\_MR\_2.5G TXP-1 and TXP-2 nodes remove the Pluggable Port Modules (PPMs) and replace them with GIGE/FC PPMs.
  - Step 8** Connect a traffic generator to the TXP\_MR\_2.5G TXP-1 client and loop back the TXP\_MR\_2.5G TXP-2 client with an external fiber.
  - Step 9** On the TXP\_MR\_2.5G TXP-1 node, set the client and trunk ports to OOS state.
  - Step 10** Using CTC, delete the STM16 PPM and provision a GIGE PPM payload.
  - Step 11** Set the client and trunk ports to IS state.
  - Step 12** Repeat the same operation on the TXP\_MR\_2.5G in the TXP-2 node.
- 

When you have completed these steps and traffic is up and running, CTC shows that there are no alarms or conditions, while the client and trunk LEDs are still red. To recover from this state, perform a hardware reset on the affected card. This issue is resolved in Release 5.0.

**DDTS # CSCef43317**

For TXP-MR-2.5G cards, the LCD panel displays five wavelengths instead of four. The fifth wavelength is a duplicate of the fourth. This issue is resolved in Release 5.0.

**DDTS # CSCuk52818**

An unsupported state for the PPM module is reported when upgrading the software from Release 4.6.1 to 4.7. This can occur when you preprovision a TXP\_MR\_2.5G card using Release 4.6.1, insert in a different card in the preprovisioned slot, then activate to Release 4.7 from CTC. The PPM reports IS,AINS/OOS-AUMA,UAS&UEQ, which is not an allowed state. The correct state should be IS,AINS/OOS-AUMA,UEQ.

To recover from this incorrect state reporting, manually delete the PPM and recreate it. This issue is resolved in Release 5.0.

**DDTS # CSCuk52818**

An unsupported state for the PPM module is reported when upgrading the software from Release 4.6.1 to 4.7. This can occur when you preprovision a TXP\_MR\_2.5G card using Release 4.6.1, insert in a different card in the preprovisioned slot, then activate to Release 4.7 from CTC. The PPM reports IS,AINS/OOS-AUMA,UAS&UEQ, which is not an allowed state. The correct state should be IS,AINS/OOS-AUMA,UEQ.

To recover from this incorrect state reporting, manually delete the PPM and recreate it. This issue is resolved in Release 5.0.

**DDTS # CSCed05006**

In the Defaults pane, when you change the default ALS mode for the TXP/TXPP\_2.5G\_10G cards to "Manual Restart for Test," CTC issues an error message. The mode can be successfully changed but you must click Reset to proceed with further changes to defaults. Changes to other defaults on that pane may have to be reapplied. To prevent the error, change the default pulse width at the same time as changing the default ALS mode to "Manual Restart for Test." The default pulse width must be in the appropriate range for this mode (80-100). This issue is resolved in Release 4.7.

**DDTS # CSCec78443**

You cannot provision an end-to-end circuit through a TXP regen group (a pair of transponders connected back to back via the client interface that provide for regeneration for DWDM) with G.709 on, and in line termination on the TXP cards, which are feeding traffic to the regen group. To avoid this issue turn G709 off for all TXPs. This issue is resolved in Release 4.7.

**DDTS # CSCeb25490**

Occasionally CTC displays a LO-TXPOWER alarm when SMT4 and STM1 SFP is installed at the client port of a TXP or TXPP card. The LO-TXPOWER alarm is displayed when the alarm threshold is set to the default value in the TX POWER LOW field of the Optical Threshold in the CTC provisioning window. To work around this issue, lower the alarm threshold value (TX POWER LOW (dBm)) of Optical Threshold in the CTC provisioning window. This issue is resolved in Release 4.7.

## Performance Monitoring

### DDTS # CSCeb41916

If you create a 1+1 protection group, create a circuit on the working line, and then try to retrieve the path PMs on the protect side using TL1, the request is denied. To work around this issue, use CTC to retrieve the Path PMs on the protect line. This issue is resolved in Release 5.0.

## Alarms

### DDTS # CSCee60922

When you have dual TCCs and one is faulty, and you remove the faulty TCC, the equipment failure alarm fails to clear after the TCC card is removed. This issue is resolved in Release 5.0.

### DDTS # CSCuk47488

A soft reset of the active TCC2 causes a TCC2 switch. In rare cases, subsequently, all BTC based cards XC. This issue is resolved in Release 5.0.

## BLSR Functionality

### DDTS # CSCee57049

When BLSR circuit is switched, TIM-P is not raised on the switched path. This issue is resolved in Release 5.0.

### DDTS # CSCec77697

With a four-fiber non-revertive BLSR in WTR, a soft reset locks the active XC10G on an adjacent NE, causing traffic loss. To avoid this, issue a lockout on the BLSR prior to the soft reset. This issue is resolved in Release 5.0.

### DDTS # CSCec75064 and CSCec75019

On a four-fiber BLSR after a BLSR switch and soft reset of the XC10G, LOP-P and/or UNEQ-P alarms might become stuck. If this occurs, lock out the span card that report the alarm and soft reboot it. This issue is resolved in Release 5.0.

### DDTS # CSCeb09217

Circuit states are not updated after a span update. If you update a four node OC-12 two-fiber BLSR to a four node OC-192 two-fiber BLSR, the previous PCA circuits should be shown as two-fiber BLSR protected, but they are shown as "UNKNOWN" protected. If you relaunch CTC this situation is corrected. This issue is resolved in Release 5.0.

## DDTS # CSCea81000

In a two-fiber or four-fiber BLSR, MS-RFI is not reported for an LOS or LOF with a ring lockout in place on a different span. This issue is resolved in Release 5.0.

## DDTS # CSCdy45902

Traffic that should be dropped remains unaffected when a BLSR Protection Channel Access (PCA) VT tunnel is placed OOS. You must place all circuits in the tunnel OOS before the traffic will be dropped. This issue is resolved in Release 5.0.

## Path Protection Functionality

### DDTS # CSCee68239

Low order circuits cannot be created over Integrated path protection DRI. Circuit creation fails with an xUpsrSelectorPayloadMismatch error. This issue is resolved in Release 5.0.

### DDTS # CSCdv42151

When a path protection circuit is created end-to-end, CTC might not create the cross-connection on all the nodes along the path at the same time. This might cause an SD-P condition along the path. When the circuit is fully provisioned on all nodes, the SD-P will clear automatically. Other conditions that can be expected while the circuit is being created are LOP-P and UNEQ-P. To reduce the risk of unexpected transient conditions, circuits should be created in the OOS\_AINS state. This issue is resolved in Release 5.0.

## TL1

### DDTS # CSCed08144

Rarely, TL1 autonomous messages might not be displayed in a session after several days of PM-related provisioning changes. This issue is resolved in Release 5.0.

### DDTS # CSCeb33033

An exception is raised when retrieving PM stats via TL1 for the protect card of a 1:1 protection group when the working card is active. To avoid this issue, retrieve stats from the working card instead of the protect card. This issue is resolved in Release 5.0.

### DDTS # CSCdz26071

The TL1 COPY-RFILE command, used for SW download, database backup, and database restore, currently does not allow a user-selected port parameter to make connections to the host. The command expects the default parameter of Port 21 and will only allow that number. This issue is resolved in Release 5.0.

## DDTS # CSCdz79471

The default state, when no PST or SST inputs are given for The TL1 command, RMV-<MOD2\_IO>, is OOS instead of OOS-MT. Thus, if you issue a RMV statement, followed by maintenance-state-only commands, such as OPR-LPBK, the maintenance state commands will not work, since the port will be in the out-of-service state (OOS), instead of the out-of-service maintenance state (OOS-MT). To work around this issue, place ports in the OOS-MT state, by specifying the primary state as OOS and a secondary state of MT in either the RMV-<MOD2\_IO> command or the ED-<MOD2\_IO> command.

Scripts that depend on the RMV-<MOD2\_IO> command defaulting to OOS-MT without specifying the primary and secondary states should be updated to force the primary and secondary state inputs to be populated. This issue is resolved in Release 4.7.

## New Features and Functionality

This section highlights new features and functionality for Release 5.0. For detailed documentation of each of these features, consult the user documentation.



**Note**

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Features introduced in the Release 4.7 DWDM platform are repeated herein for ease of access.

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## New Hardware

### TCC2P Card

The Advanced Timing, Communications, and Control Plus (TCC2P) card is an enhanced version of the TCC2 card. The primary enhancements are Ethernet security features and 64K composite clock BITS timing.

The TCC2P card performs system initialization, provisioning, alarm reporting, maintenance, diagnostics, IP address detection/resolution, SONET SOH DCC/GCC termination, and system fault detection for the ONS 15454. The TCC2P also ensures that the system maintains Stratum 3 (Telcordia GR-253-CORE) timing requirements. It monitors the supply voltage of the system.

The TCC2P card requires Software Release 4.0 or later.

The LAN interface of the TCC2P card meets the standard Ethernet specifications by supporting a cable length of 328 ft (100 m) at temperatures from 32 to 149 degrees Fahrenheit (0 to 65 degrees Celsius). The interfaces can operate with a cable length of 32.8 ft (10 m) maximum at temperatures from -40 to 32 degrees Fahrenheit (-40 to 0 degrees Celsius).

### TCC2P Functionality

The TCC2P card supports multichannel, high-level data link control (HDLC) processing for the DCC. Up to 84 DCCs can be routed over the TCC2P card and up to 84 section DCCs can be terminated at the TCC2P card (subject to the available optical digital communication channels). The TCC2P selects and processes 84 DCCs to facilitate remote system management interfaces.

The TCC2P also originates and terminates a cell bus carried over the module. The cell bus supports links between any two cards in the node, which is essential for peer-to-peer communication. Peer-to-peer communication accelerates protection switching for redundant cards.

The node database, IP address, and system software are stored in TCC2P nonvolatile memory, which allows quick recovery in the event of a power or card failure.

The TCC2P performs all system-timing functions for each ONS 15454. The TCC2P monitors the recovered clocks from each traffic card and two BITS ports for frequency accuracy. The TCC2P selects a recovered clock, a BITS, or an internal Stratum 3 reference as the system-timing reference. You can provision any of the clock inputs as primary or secondary timing sources. A slow-reference tracking loop allows the TCC2P to synchronize with the recovered clock, which provides holdover if the reference is lost.

The TCC2P supports 64/8K composite clock and 6.312 MHz timing output.

The TCC2P monitors both supply voltage inputs on the shelf. An alarm is generated if one of the supply voltage inputs has a voltage out of the specified range.

Install TCC2P cards in Slots 7 and 11 for redundancy. If the active TCC2P fails, traffic switches to the protect TCC2P. All TCC2P protection switches conform to protection switching standards when the bit error rate (BER) counts are not in excess of  $1 * 10 \text{ exp} - 3$  and completion time is less than 50 ms.

The TCC2P card has two built-in RJ-45 Ethernet interface ports for accessing the system: one on the front faceplate for on-site craft access and a second on the backplane for user interfaces. The rear Ethernet interface is for permanent LAN access and all remote access via TCP/IP as well as for Operations Support System (OSS) access. The front and rear Ethernet interfaces have different IP addresses that are in different subnets.

Two EIA/TIA-232 serial ports, one on the faceplate and a second on the backplane, allow for craft interface in TL1 mode.

Cisco does not support operation of the ONS 15454 with only one TCC2P card. For full functionality and to safeguard your system, always operate with two TCC2P cards.

When a second TCC2P card is inserted into a node, it synchronizes its software, its backup software, and its database with the active TCC2P. If the software version of the new TCC2P does not match the version on the active TCC2P, the newly inserted TCC2P copies from the active TCC2P, taking about 15 to 20 minutes to complete. If the backup software version on the new TCC2P does not match the version on the active TCC2P, the newly inserted TCC2P copies the backup software from the active TCC2P again, taking about 15 to 20 minutes. Copying the database from the active TCC2P takes about 3 minutes. Depending on the software version and backup version the new TCC2P started with, the entire process can take between 3 and 40 minutes.

## Environmental/Compliance

The TCC2P meets the following environmental and compliance standards.

- I-Temp
- Heat dissipation of 26 watts maximum
- EMI/ESD compliant

For TCC2P card-level indicators, card specifications, communication interfaces, system timing, and other details consult the user documentation.

## DS3XM-12 Card

Release 5.0 introduces the DS3XM-12 transmux card, which provides twelve Telcordia-compliant, GR-499-CORE M13 multiplexing functions. The DS3XM-12 converts up to twelve framed DS-3 network connections to 28 x12 VT1.5s.

The DS3XM-12 card operates at the VT1.5 level and supports a maximum of 6 or 12 ports of “portless” (DS-3-mapped STS1s) interface, depending on the shelf configuration. DS3XM-12 cards installed in drop slots and used with the XC or XCVT card provide a maximum of 6 portless transmux interfaces. DS3XM-12 cards installed in trunk slots when using any cross connect card type, or in drop slots when using the XC10G card provide a maximum of 12 portless transmux interfaces. Each shelf can carry a maximum of 96 DS3XM-12 ports.

### DS3XM-12 Slots and Connectors

The DS3XM-12 card supports 1:1 or 1:N protection (where  $N \leq 5$  when using electrical protection, and  $N \leq 7$  when using portless protection) with the proper backplane EIA. EIAs are available with BNC, SMB, SCSI (UBIC), or MiniBNC connectors.

You can install the DS3XM-12 in Slots 1 to 6 or 12 to 17, using Slots 3 and 15 for the protect cards with 1:N protection. Each DS3XM-12 port features DSX-level outputs supporting distances up to 137 meters (450 feet) depending on facility conditions. Consult the user documentation for more information about electrical card slot protection and restrictions.

### DS3XM-12 Hardware and Software Features

The following list provides at-a-glance hardware and software features for the DS3XM-12.

- Improves the transmux density of the ONS 15454, featuring 12 ports per card
  - Ported mode - 1:1 and 1:N protection ( $N \leq 5$ ); up to 120 ports per shelf
  - Portless mode – 1:1 and 1:N protection ( $N \leq 7$ ); up to 120 ports per shelf
  - Each port can be individually configured for ported or portless mode
- Improves transmux PM and test support capability
  - Near end and far end DS3 (C-Bit/P-Bit)
  - Near end and far end DS1 (ESF-FDL)
  - Near end and far end SONET STS and VT path PMs
- Test support
  - Initiate FEAC codes
  - FEAC code responsive for DS3/DS1
  - Initiate ESF-FDL/inband loopback codes
  - DS1/DS3 terminal and facility loopbacks

### Supported Configurations

The DS3XM-12 supports all ONS 15454 (ANSI) configurations with either XC10G or XCVT.



#### Note

The portless configuration with a legacy XCVT is bandwidth limited by the XCVT to 6 portless ports.

The DS3XM-12 operates in any drop or trunk slot. The protect slots in 1:N ported configurations are Slot 3 (Left Half) and Slot 15 (Right Half). Any slot can be protected in 1:N portless configuration. The DS3XM-12 supports all electrical interface adapter types (SMB, BNC, UBIC, MiniBNC). The card does not require high density backplane.

## Protection

The DS3XM-12 continues support for 1:1 protection, as with the 6 port card. 1:N support (where  $N = 7$ ) can include the 6 port card; however, the 12 port card must be the protect card, and the cards on far side of shelf must be 12 port, and portless only.

## Environmental/Compliance

The DS3XM-12 meets the following environmental and compliance standards.

- I-Temp
- Heat dissipation of 34 watts maximum
- EMI/ESD compliant

## Line Interface

The DS3XM-12 meets the following line interface standards.

- Meets pulse mask with 450 feet of cable
- Meets RX sensitivity with 900 feet of cable
- DS3 with line build out for short distances
- Transmit and receive line side monitoring

## Port Numbering

The following port numbering scheme is used with the DS3XM-12.

- Ported ports are numbered 1-12
- Portless ports are numbered 13-36
- Portless port paired (for example, 13, 14)
- 13-vt1.5, 14 - DS3
- STS 12 backplane rate limited to 12 ported ports or 6 portless port pairs



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**Note** Changing from STS 12 to STS 48 causes a greater than 50 ms traffic hit.

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## Provisioning

Ported provisioning for the DS3XM-12 is the same as for every other card. In addition, the DS3XM-12 offers portless VAP provisioning, and portless STS/DS3 conversion provisioning.

For DS3XM-12 card level indicators and port level indicators, consult the user documentation.

## DS3/EC1-48 Card

The ONS 15454 DS3/EC1-48 card provides 48 Telcordia-compliant, GR-499 DS-3 ports per card. Each port operates at 44.736 Mbps over a single 75-ohm 728A or equivalent coaxial span. The DS3/EC1-48 card operates as a working or protect card in 1:N protection schemes, where  $N \leq 2$ .

EC-1 functionality is not supported in Release 5.0. When a protection switch moves traffic from the DS3/EC1-48 working/active card to the DS3/EC1-48 protect/standby card, ports on the now active/standby card cannot be taken out of service. Lost traffic can result if you take a port out of service even if the DS3/EC1-48 standby card no longer carries traffic.

### DS3/EC1-48 Slots and Connectors

The DS3/EC1-48 requires a high-density (HD) shelf (15454-SA-HD) and EIA (UBIC, MiniBNC), and an XC10G card. You can install the DS3/EC1-48 card in Slots 1 to 3 or 15 to 17 on the ONS 15454, but installing this card in certain slots will block the use of other slots.

Each DS3/EC1-48 card port features DSX-level outputs supporting distances up to 137 meters (450 feet) depending on facility conditions. With the proper backplane EIA, the card supports BNC or SCSI (UBIC) connectors. Consult the user documentation for detailed electrical card slot protection and restrictions.

### DS3/EC1-48 Hardware and Software Features

The following list provides at-a-glance hardware and software features for the DS3/EC1-48 card.

- DS3 mode - 1:N protection ( $N \leq 2$ ); up to 192 ports per shelf
- EC1 mode - 1:N protection ( $N \leq 2$ ); up to 192 ports per shelf
- Ports can be individually configured for DS3 or EC1 mode
- I/O slots 1 and 2 protected by slot 3
- I/O slots 17 and 16 protected by slot 15
- Remaining I/O slots available for optical I/O cards
- Run time diagnostics on working and protect card
- B1 error checking on the back plane
- LD to HD protection switching

### Supported Configurations

The DS3/EC1-48 card provides a new, 48-port configuration. The DS3/EC1-48 card operates with a high density electrical backplane in an ONS 15454 configuration, using XC10G cards. Designated drop slots are 1-3, and 15-17.

The node must be equipped with a UBIC-V, UBIC-H, or MiniBNC electrical interface adapter. The cards supports a 12 port upgrade configuration, and can be used as a protect card for low density DS3 cards.

### Environmental/Compliance

The DS3/EC1-48 meets the following environmental and compliance standards.

- I-Temp compliant (-40C to +65C)
- Low heat dissipation (30 watts max)
- EMI/ESD compliant

For line and backplane interface specifications, consult the user documentation.

## CE-100T-8 Card

Release 5.0 introduces the CE-100T-8 card, which provides eight RJ45 10/100 Mbps Ethernet ports and an RJ45 console port, all of which are accessible at the faceplate. The CE-100T-8 card also provides mapping of 8-port 10/100 Mbps Ethernet encapsulated traffic into SONET STS-12 payloads, making use of low order (VT1.5) virtual concatenation, high order (STS-1) virtual concatenation, and generic framing procedure (GFP) point-to-point protocol/high-level data link control (PPP/HDLC) framing protocols. The card also supports the link capacity adjustment scheme (LCAS), which allows hitless dynamic adjustment of SONET link bandwidth.

The CE-100T-8 card supports the following circuit types.

- HO-CCAT
- LO-VCAT with no HW-LCAS
- LO-VCAT with HW-LCAS
- STS-1-2v SW-LCAS with ML only

Each 10/100 Ethernet port can be mapped to a SONET channel in increments of VT1.5 or STS-1 granularity. Also, the CE-100T-8 card supports packet processing, classification, QoS based queuing, traffic scheduling, STS-3c packet ring, and packet multiplexing services for Layer1+ and Layer 2/3. These capabilities allow a more efficient transport of Ethernet and IP over the SONET infrastructure with multilayer intelligence. For more details about the CE-100T-8 card, consult the user documentation.



### Note

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The CE-100T-8 card will become available for use with maintenance Release 5.0.1.

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## New Electrical Interface Assemblies

Optional Electrical Interface Assembly (EIA) backplane covers are typically preinstalled when ordered with the ONS 15454. EIAs must be ordered when using DS-1, DS-3, DS3XM, or EC-1 cards. With Release 5.0 six different EIA backplane covers are available for the ONS 15454: BNC, High-Density BNC, MiniBNC, SMB, AMP Champ, UBIC-H (Universal Backplane Interface Connector), and UBIC-V (SCSI). EIAs are attached to the shelf assembly backplane to provide electrical interface cable connections. In general, EIAs are available with SMB and BNC connectors for DS-3 or EC-1 cards. EIAs are available with AMP Champ connectors for DS-1 cards.

The new EIAs for Release 5.0 are MiniBNC, UBIC-H, and UBIC-V. UBIC-V EIAs have SCSI connectors. They are available for use with any DS-1, DS-3, or EC-1 card, but are intended for use with high-density electrical cards. For EIA installation and configurations consult the user documentation.

### MiniBNC EIA

The ONS 15454 MiniBNC EIA supports a maximum of 96 DS-3 circuits on each side of the ONS 15454 (96 transmit and 96 receive connectors). If you install BNC EIAs on both sides of the unit, the ONS 15454 hosts up to 192 circuits. The MiniBNC EIA supports Trompeter UCBJ224 (75-ohm) 4-leg connectors (King or ITT are also compatible). Use straight connectors on 735 C cable to connect to the MiniBNC EIA. Cisco recommends these cables for connection to a patch panel. You can use MiniBNC EIAs for DS-3 (including the DS3XM-6 and DS3XM-12) or 12-port EC-1 cards. For further details on this EIA, its specifications, and installation, consult the user documentation.

### MiniBNC Protection

When used with the MiniBNC EIA, the ONS 15454 supports unprotected, 1:1, or 1:N ( $N < 5$ ) electrical card protection for DS-1, DS-3 and EC-1 signals (as defined in the user documentation). The MiniBNC EIA provides 192 MiniBNC connectors for terminating up to 96 transmit and 96 receive signals per EIA, enabling 384 MiniBNC connectors for terminating up to 192 transmit and receive signals per shelf with two MiniBNC panels installed. With an A-Side MiniBNC EIA, Slots 1, 2, 4, 5, and 6 can be used for working slots and on a B-Side panel, Slots 12, 13, 14, 16, and 17 can be used for working slots. Each of these slots is mapped to 24 MiniBNC connectors on the EIA panel to support up to 12 transmit/receive signals. In addition, working Slots 1, 2, 16 and 17 can be mapped to 96 MiniBNC connectors to support the high-density electrical card. These slots can be used with or without equipment protection for DS-3 and EC-1 services.

### UBIC-H EIA

UBIC-H EIAs are attached to the shelf assembly backplane to provide up to 112 transmit and receive DS-1 connections through 16 SCSI connectors per side (A and B) or 96 transmit and receive DS-3 connections. The UBIC-H EIAs are designed to support DS-1, DS-3, and EC-1 signals. The appropriate cable assembly is required depending on the type of signal.

You can install UBIC-Hs on one or both sides of the ONS 15454. As you face the rear of the ONS 15454 shelf assembly, the right side is the A side (15454-EIA-UBICH-A) and the left side is the B side (15454-EIA-UBICH-B). The diagrams adjacent to each row of SCSI connectors indicate the slots and ports that correspond with each SCSI connector in that row, depending on whether you are using a high density (HD) or low density (LD) configuration.

UBIC-H EIAs will support use with the high-density (48-port DS-3, 56-port DS-1, and 12-port DS3XM) electrical cards, as well as existing low-density electrical cards.

The UBIC-H EIA supports the following cards:

- 14-port DS-1
- 12-port DS-3
- 12-port EC-1
- 6-port DS-3 Transmux
- 56-port DS-1
- 12-port DS-3 Transmux
- 48-port DS-3/EC-1

EC-1 functionality will be available on the 48-port DS-3/EC-1 card in a future software release.

The 56-port DS-1 card will be available in a future release.

The A and B sides each host 16 high-density, 50-pin SCSI connectors. The A-side maps to Slots 1 through 6 and the B-side maps to Slots 12 through 17.

With Software Releases prior to Release 5.0, UBIC-Hs support unprotected, 1:1, and 1:N (where  $N < 5$ ) protection groups. As of Release 5.0, UBIC-Hs additionally support available high-density cards in unprotected and 1:N protection (where  $N < 2$ ) protection groups. For further details on this EIA, its specifications, and installation, consult the user documentation.

## UBIC-V EIA

UBIC-V EIAs are attached to the shelf assembly backplane to provide up to 112 transmit and receive connections through 16 SCSI connectors per side (A and B). The UBIC-V EIAs are designed to support DS-1, DS-3, and EC-1 signals. The appropriate cable assembly is required depending on the type of signal. You can install UBIC-Vs on one or both sides of the ONS 15454.

UBIC-V EIAs support high-density (48-port DS-3 and 12-port DS3XM) electrical cards, as well as low-density electrical cards.

The UBIC-V EIA supports the following cards:

- 14-port DS-1
- 12-port DS-3
- 12-port EC-1
- 6-port DS-3 Transmux
- 48-port DS-3
- 56-port DS-1
- 12-port DS-3 Transmux

The A and B sides each host 16 high-density, 50-pin SCSI connectors. The A-side maps to Slots 1 through 6 and the B-side maps to Slots 12 through 17.

With Releases 4.1.x and 4.6, UBIC-Vs support unprotected, 1:1, and 1:N ( $N \leq 5$ ) protection groups. As of Release 5.0, UBIC-Vs also support available high-density cards in unprotected and 1:N ( $N \leq 2$ ) protection groups. For further details on this EIA, its specifications, and installation, consult the user documentation.

## UBIC Protection

When used with the UBIC EIA, the ONS 15454 supports unprotected, 1:1, or 1:N ( $N \leq 5$ ) electrical card protection for DS-1, DS-3 and EC-1 signals. The UBIC EIA provides 16 SCSI connectors for terminating up to 96 transmit and 94 receive signals per EIA, enabling 32 SCSI connectors for terminating up to 192 transmit and receive signals per shelf with two UBIC EIAs installed. With an A-side UBIC EIA, Slots 1, 2, 3, 4, 5, and 6 can be used for working slots and with a B-Side EIA, Slots 12, 13, 14, 15, 16, and 17 can be used for working slots. Each of these slots is mapped to two SCSI connectors on the EIA to support up to 14 transmit/receive signals. In addition, working slots 1, 2, 16 and 17 can be mapped to 8 SCSI connectors to support the high-density electrical card. These slots can be used with or without equipment protection for DS-1, DS-3 and EC-1 services.

## DWDM Cards

### 32-Channel Demultiplexer Card

The 32-Channel Demultiplexer card (32DMX) 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 card can be installed in Slots 1 to 6 and in Slots 12 to 17.

The 32DMX card is designed specifically for use in ONS 15454 MSTP nodes. The 32DMX card operates in conjunction with the 32WSS card to create a software-controlled node with ROADM functionality. ROADM functionality requires two 32DMX single-slot cards and two 32WSS double-slot cards (six slots in the ONS 15454 chassis).

Both the 32DMX card and 32WSS card use Planar Lightwave Circuit (PLC) technology to perform wavelength-level processing.

The 32DMX has the following two types of ports.




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**Note** For port type descriptions and uses, consult the *Cisco ONS 15454 DWDM Installation and Operations Guide*.

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- Common Receive (COM RX) port
- Drop ports (1-32)

### 32-Channel Wavelength Selective Switch Card

The 32-Channel Wavelength Selective Switch (32WSS) card performs channel add/drop processing within the ONS 15454 MSTP node. The 32WSS operates in conjunction with the 32DMX to implement Reconfigurable OADM (ROADM) functionality. Equipped with ROADM functionality, the ONS 15454 MSTP can be configured to add or drop individual optical channels using CTC, Cisco MetroPlanner, and CTM.

A ROADM node uses two 32WSS cards (two slots each) and two 32DMX cards (one slot each), for a total of six slots in the chassis. The 32WSS card can be installed in slots 1-2, 3-4, 5-6, or in slots 12-13, 14-15, or 16-17. A terminal site can be configured using only a 32WSS card and a 32DMX card plugged into the east or west side of the shelf. The 32WSS has the following six types of ports.




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**Note** For port type descriptions and uses, consult the *Cisco ONS 15454 DWDM Installation and Operations Guide*.

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

## Client Cards

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

Two new 2.5 Gbps 100 GHz datamux cards, the MXP\_MR\_2.5G and MXPP\_MR\_2.5G, are available for the ONS 15454. These cards can be used for data and SAN applications in a DWDM network. The cards are capable of translating the client input GE and FC optical signal into an optical signal with an optical frequency on the 100 GHz spacing frequency grid, as defined in ITU-T G.692. The cards are available in card protected and unprotected versions.

Long transmission distances are achieved through the use of flat gain optical amplifiers.

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, and Fibre Channel) 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.

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, and Fibre Channel) 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 100GHz grid standard, G.692, and Telcordia GR-2918-CORE, Issue 2. 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.

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



#### Note

ESCON is not supported for Releases 4.7/5.0, and FICON support is limited (see the caveat for DDTs # CSCee45443 for applicable Release 4.7/5.0 FICON limitations). The changes required to support ESCON and to eliminate the FICON limitations will be made available in a future release with a software upgrade.

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. Client interface data rates and encapsulation methods are documented in the *Cisco ONS 15454 DWDM Installation and Operations Guide*.

All of the client interfaces supported use the Transparent Generic Framing Procedure (GFP-T) encapsulation method. (For data rates, see the *Cisco ONS 15454 DWDM Installation and Operations Guide*.) The current version of the GFP-T, G.7041, supports transparent mapping of 8B/10B block-coded protocols, including Gigabit Ethernet, Fibre Channel, and FICON.

In addition to the GFP mapping, 1 Gbps traffic on port 1 or port 2 of the high-speed SERDES is mapped to an STS-24c channel. If two 1 Gbps client signals are present at port 1 and port 2 of the high-speed SERDES, the port 1 signal is mapped into the first STS-24c channel and the port 2 signal into the second STS-24c channel. The two channels are then mapped into an OC-48 trunk channel.

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

### Client to STS Mapping

Only Contiguous concatenation is supported for the MXP\_MR\_2.5G and MXPP\_MR\_2.5G (no VCAT).

Port one supports:

- 1GE and 1G-FC mapped over first STS-24c payload
- 2G-FC mapped over STS-48c

Port two supports:

- 1GE and 1G-FC mapped over second STS-24c payload

### Muxponder Protection

MXP\_MR\_2.5G card protection is accomplished 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. MXPP\_MR\_2.5G card protection is accomplished using splitter protection, which provides protection against failures due to fiber cuts or unacceptable signal degradation on the trunk side. Switching is performed only if the protect line is error free.

### Buffer-to-Buffer Credit Management

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 may be enabled or disabled.

### Buffer-to-Buffer Distance Extension

Releases 4.7 and 5.0 can examine the B2B client credit and allow the client equipment to run at full rate even with hundreds of Km adopting proprietary exchange of memory information between the two cards. This does not involve termination of the FC link. Only protocol error monitoring and flow control are terminated.

End systems interoperate through this solution transparently. The number of frames in transit cannot exceed the far end buffer capacity. “Ready” indicators (called R\_RDYs) are terminated locally and not part of flow control, so they do not waste WAN bandwidth. Releases 4.7 and 5.0 support maximum FC throughput independent of attached FC Switch BB Credit Allocation. IDLE frames are terminated locally and regenerated at the far end.

### DWDM Laser Features

The MXP\_MR\_2.5G and MXPP\_MR\_2.5G support the following DWDM laser features.

- 2.5 Gb/s operation; tunable over four separate channels at 100 GHz spacing
- Integrated wavelength-locker
- Entire C band ITU wavelengths available (1528 to 1563 nm)
- 14 pin butterfly package with optical isolator
- Internal TEC with precision NTC thermistor
- Extended reach performances up to 360 Km with 2 dB dispersion power penalty

## MXP\_2.5G\_10E Card

The 2.5-Gbps–10-Gbps Muxponder–100 GHz–Tunable xx.xx-xx.xx (MXP\_2.5G\_10E) card is a DWDM muxponder for the ONS 15454 platform that supports full optical transparency on the client side. The card multiplexes 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 provides wavelength transmission service for the four incoming 2.5 Gbps client interfaces. The MXP\_2.5G\_10E muxponder passes 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 general communication channels (GCC) for data communications, enable forward error correction, or facilitate performance monitoring.

The MXP\_2.5G\_10E works with Optical Transparent Network (OTN) devices defined in ITU-T G.709. The card supports Optical Data Channel Unit 1 (ODU1) to Optical Channel Transport Unit (OTU2) multiplexing, an industry standard method for asynchronously mapping a SONET/SDH payload into a digitally wrapped envelope.

**Note**

The MXP\_2.5G\_10E card is not compatible with the MXP\_2.5G\_10G card, which does not support full optical transparency.

The MXP\_2.5G\_10E features a 1550-nm laser on the trunk port and four 1310-nm lasers on the client ports and contains five transmit and receive connector pairs (labeled) on the card faceplate. The card uses a dual LC connector on the trunk side and uses 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 card has the following high level features:

Four 2.5 Gbps client interfaces (OC-48/STM-16) and one 10 Gbps trunk. The four OC-48 signals are mapped into a ITU-T G.709 OTU2 signal using standard ITU-T G.709 multiplexing.

**Onboard Enhanced Forward Error Correction (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 card has modular interfaces. Two types of optics modules can be plugged into the card: 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.

**High level provisioning support:** The MXP\_MP\_10E card is initially provisioned using Cisco MetroPlanner software. Subsequently, the card may be monitored and provisioned using CTC software.

**Link monitoring and management:** The MXP\_MP\_10E card uses standard OC-48 OH (overhead) bytes to monitor and manage incoming interfaces. The card passes the incoming SDH/SONET data stream and its overhead bytes transparently.

**Control of layered SONET/SDH transport overhead:** The card is 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 normally synchronizes from the TCC2 card. If for some reason, such as maintenance or upgrade activity, the TCC2 is not available, the MXP\_MP\_10E automatically synchronizes to one of the input client interface clocks.

**Configurable squelching policy:** The card 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.

**Client Interfaces**

The MXP\_2.5G\_10E provides 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 utilize SFP connectors. The client interfaces use four wavelengths in the 1310-nm, ITU 100-MHz spaced channel grid.

### DWDM Interface

The MXP\_MP\_10E serves as an OTN multiplexer, transparently mapping four OC-48 channels asynchronously to ODU1 into one 10-Gbps trunk. The DWDM trunk is tunable for transmission over four wavelengths in the 1550-nm, ITU 100-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 MXP\_MP\_10E 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 MXP\_2.5G\_10E card.

The MXP\_2.5G\_10E card performs ODU to OTU multiplexing as defined in ITU-T G.709.

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 card is synchronized to the TCC2 clock during normal conditions and transmits the ITU-T G.709 frame using this clock.

The MXP\_2.5G\_10E card supports Y-cable protection. Two MXP\_2.5G\_10E 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 MXP\_2.5G\_10E in three modes: NO FEC, FEC, and E-FEC. So, as client side traffic passes through the MXP\_2.5G\_10E 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*.

## TXP\_MR\_10E Card

The 10-Gbps Transponder–100-GHz–Tunable xx.xx-xx.xx (TXP\_MR\_10E) card is a multirate transponder for the ONS 15454 platform. The card is fully backward compatible with the TXT\_MR\_10G card. It processes one 10-Gbps signal (client side) into one 10-Gbps, 100-GHz DWDM signal (trunk side) that is tunable on four wavelength channels (ITU-T 100-GHz grid).

The TXP\_MR\_10E card can be used in any of the twelve I/O slots in the ONS 15454, including both high-speed and multirate ports (Slots 1 to 6 and Slots 12 to 17 can be used). Two TCC2 cards must be present in the system for the board to function. TCC2 fault replacement can be performed without impacting the traffic.

The TXP\_MR\_10E port features a 1550-nm laser for the trunk port and a ONS-XC-10G-S1 XFP module for the client port and contains two transmit and receive connector pairs (labeled) on the card faceplate.

### Key Features

The key features of the TXP\_MR\_10G card are:

- A tri-rate XFP client interface
- OC-192 (SR1)
- 10GE (10GBASE-LR)
- 10G-FC (1200-SM-LL-L)
- OC-192 to G.709 OTU2 provisionable synchronous and asynchronous mapping

### Client Interface

The client interface is implemented by an on-board XFP module, a tri-rate transponder that provides a single port that can be configured in the field to support STM-64/OC-192 (with an SR-1 optics module that plugs into the XFP module), 10GE (10GBASE-LR), or 10G FC protocols. The XFP module supports 10 GE LAN PHY, 10 GE WAN PHY, STM-64, and OC-192 client signals.

Two types of pluggable client-side optics modules are available for the XFP module on the TXP\_MR\_10E card: an OC-192 SR-1/I-64.2 interface (ITU-T G.691) or an S-64.2 optical interface (ITU-T G.691). The SR-1 is a 1310-nm optical interface that uses LC connectors. SR-1 is typically used in short-reach intra-office applications with ranges typically up to 7 km.

### DWDM Trunk Interface

On the trunk side, the TXP\_MR\_10E card provides a 10 Gbps STM-64/OC-192 interface. Four tunable channels are available in the 1550-nm band on the 100-GHz ITU grid for the DWDM interface. The TXP\_MR\_10E card provides 3R transponder functionality for this 10 Gbps trunk interface, so, 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 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.

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



#### Note

Because the transponder has no visibility into the data payload and detect circuits, a TXP\_MR\_10E card does not display circuits under the card view.

### Client-to-Trunk Mapping

The TXP\_MR\_10E card can perform ODU2-to-OCh mapping, which allows operators to provision data payloads in a standard way across 10-Gbps optical links. For further card details, specifications, and functionality, see the *Cisco ONS 15454 DWDM Installation and Operations Guide*.

## Small Form-Factor Pluggables

The following small form-factor pluggables (SFPs and XFPs) are new for Releases 4.7/5.0. For SFP and XFP installation or removal consult the document, *Installing GBIC, SFP and XFP Optical Modules in Cisco ONS 15454, 15327, 15600, and 15310 Platforms*.

### XFP

The 10 Gbps 1310 nm XFP transceiver is an integrated fiber optic transceiver that provides a high-speed serial link at the following signaling rates: 9.95 Gbps, 10.31 Gbps, 10.51 Gbps, and 10.66/10.71/11.10 Gbps which apply to 10GBASE-LR (fibre channel and Ethernet) as well as OC-192 STM-64 SONET-SDH. The XFP integrates the receiver and transmit path. The transmit side recovers and re-times the 10 Gbps serial data and passes it to a laser driver. The laser driver biases and modulates a 1310 nm DFB (distributed feed-back) laser, enabling data transmission over SMF through an LC connector. The receive side recovers and re-times the 10 Gbps optical data stream from a PIN photo detector, transimpedance amplifier and passes it to an output driver.

**SFP**

Small Form-factor Pluggables (SFPs) are integrated fiber optic transceivers that provide high speed serial links from a port or slot to the network. Various latching mechanisms can be used on the SFP modules. There is no correlation between the type of latch to the model type (such as SX or LX/LH) and technology type (such as Gigabit Ethernet). See the label on the SFP for technology type and model.

## New Software Features and Functionality as of Release 5.0

### TCC2P Card Software Support

Release 5.0 introduces several new software features, as described below, that support the TCC2P card.

#### IP Addressing with Secure Mode Enabled

TCC2P cards provide a secure mode option allowing you to provision two IP addresses for the ONS 15454. One IP address is provisioned for the ONS 15454 backplane LAN port. The other IP address is provisioned for the TCC2P TCP/IP craft port. The two IP addresses provide an additional layer of separation between the craft access port and the ONS 15454 LAN. If secure mode is enabled, the IP addresses provisioned for the TCC2P TCP/IP ports must follow general IP addressing guidelines. In addition, TCC2P IP addresses must reside on a different subnet from the ONS 15454 backplane port and ONS 15454 default router IP addresses.

The IP address assigned to the backplane LAN port becomes a private address, which is used to connect the ONS 15454 GNE to an OSS (Operations Support System) through a central office LAN or private enterprise network. In secure mode, by default, the backplane's LAN IP address is not displayed in the CTC node view or to a technician directly connected to the node. This default can be changed to allow the backplane's address to be displayed on CTC only by a Superuser.

**Note**


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Secure mode is not available if TCC2 cards are installed, or if only one TCC2P card is installed.

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#### Synchronization/64k Clock Support

The TCC2P card supports 64k composite clock BITS in, with only DS1/6M allowed for BITS out. The clock enforces a user selectable SSM (Admin SSM), which defaults to STU, and is available for other synchronization sources.

#### Backwards Compatibility

The TCC2P card is backwards compatible with Releases 4.0 and forward. In these releases, the card is identified as TCC2 in the inventory. View the CLEI codes to determine the actual card type. The TCC2P card is displayed as TCC2P in CTC as of Release 5.0. For card compatibility, the same rules apply with the TCC2P as with the TCC2 when combined with TCC+/TCCi. Additionally, when combined with a TCC2, the TCC2P functions as a TCC2 card: Security/Clock options available with dual TCC2Ps are not available with mixed TCC2 and TCC2P nodes. A TCC2 will be MEA if inserted in a node requiring TCC2P (a node in which security/clock options are being used). The TCC2 card will not accept a "Secure" database at all. The TCC2 will accept a database marked for 64K clock selection, but will default to DS1.

## In-Service Topology Upgrades

In Release 5.0 in-service topology upgrades are supported for unprotected to path protection/SNCP, terminal to linear (add a node to a 1+1), and path protection/SNCP to 2F-BLSR/MS-SPRing. Release 5.0 provides both manual methods and CTC wizards for completing these upgrades.



### Note

Traffic hits resulting from an in service topology upgrade are less than 50 ms; however, traffic might not be protected during certain upgrades: in the case where you are upgrading from unprotected to path protection/SNCP, with unidirectional routing, traffic hits might be greater than 50 ms. Cisco recommends waiting for a maintenance window to perform the topology upgrade in this case.

## CTC Topology Upgrade Wizards

The following CTC topology upgrade wizards have been added for Release 5.0 to support in service topology upgrades.

### Unprotected to Path Protection/SNCP

With this feature you can convert an unprotected circuit to path protection/SNCP, or you can convert unprotected segments of a partially protected circuit to path protection/SNCP.

### Path Protection/SNCP to Two Fiber BLSR/MS-SPRing

This feature creates a two fiber BLSR/MS-SPRing and converts all path protection/SNCP circuits on the selected ring to BLSR/MS-SPRing circuits.

### Terminal to Linear—Add a Node to 1+1

The wizard for this feature is invoked by right-clicking on a 1+1 link and then selecting the “terminal to linear” option. The option adds a node between a two nodes connected by a 1+1.

## Additional Support for In Service Topology Upgrades

### Circuit Routing

With Release 5.0 you can choose between manually or automatically routing path protection/SNCP circuits for a topology upgrade.

The following circuit types are supported for topology upgrades.

- One way and two way
- Automatically-routed and manually-routed
- CTC-created and TL1-created
- Ethernet (unstitched)
- DWDM
- Multiple source and destination (both sources should be on one node and both drops on one node)
- VCAT/CCAT

## Circuit Merge and Reconfigure

The circuit merge and reconfigure features enable you to merge selected CTC, TL1, or Hybrid circuits into one or more discovered CTC circuits based on the alignment of the circuit cross-connects, rather than the circuit ID.

Circuit Merge merges *m* circuits into one circuit. This feature takes one master circuit and merges aligned circuits with the master.

Circuit Reconfigure merges *m* circuits into *n* circuits. This feature takes *m* circuits and reconfigures them based on cross-connect alignment. To merge circuits choose the Merge subtab of the Edit Circuits tab in CTC. To merge circuits choose the Merge subtab of the Edit Circuits tab in CTC. To reconfigure circuits, choose the CTC Tools > Circuits tab, and select “Reconfigure Circuits...”

## Dual-ring Interconnect

Dual-ring interconnect (DRI) topology provides an extra level of path protection for circuits on interconnected rings. DRI allows users to interconnect BLSR/MS-SPRings, path protection/SNCs, or a path protection/SNCP with a BLSR/MS-SPRing, with additional protection provided at the transition nodes. In a DRI topology, ring interconnections occur at two or four nodes.

### DRI Features

The following list provides supported BLSR/MS-SPRing DRI features at a glance.

- BLSR/MS-SPRing two fiber and four fiber configurations
- BLSR/MS-SPRing with path protection/SNCP supported at the STS level (VT level not supported)
- Traditional DRI and integrated (IDRI)
- Traditional four node interconnect
- Integrated two node interconnect
- BLSR/MS-SPRing path level protection
- Drop and continue included
- Circuit routing, both manual and automatic
- Same side, or opposite side interconnect
- Ring interconnect on protect (RIP)
- Interconnection with mixed OCn
- Open ended DRI (supported for multi-vendor)



#### Note

Interconnection links do not support 1+1, 1:1, or 1:n.



#### Note

Dual transmit is not supported for Release 5.0 BLSR/MS-SPRing DRI.

### BLSR/MS-SPRing DRI

Unlike BLSR/MS-SPRing automatic protection switching (APS) protocol, BLSR/MS-SPRing DRI is a path-level protection protocol at the circuit level. Drop-and-continue BLSR-DRI requires a service selector in the primary node for each circuit routing to the other ring. Service selectors monitor signal

conditions from dual feed sources and select the one that has the best signal quality. Same-side routing drops the traffic at primary nodes set up on the same side of the connected rings, and opposite-side routing drops the traffic at primary nodes set up on the opposite sides of the connected rings. For BLSR/MS-SPRing DRI, primary and secondary nodes cannot be the circuit source or destination.

A DRI circuit cannot be created if an intermediate node exists on the interconnecting link. However, an intermediate node can be added on the interconnecting link after the DRI circuit is created.

DRI protection circuits act as protection channel access (PCA) circuits. In CTC, you set up DRI protection circuits by selecting the PCA option when setting up primary and secondary nodes during DRI circuit creation.

### Path Protection/SNCP to BLSR/MS-SPRing DRI Handoff Configurations

Path protection/SNCPs and BLSR/MS-SPRings can also be interconnected. In path protection/SNCP to BLSR/MS-SPRing DRI handoff configurations, primary and secondary nodes can be the circuit source or destination, which is useful when non-DCC optical interconnecting links are present.

### SL-Series Fibre Channel Card Enhancements

With Release 5.0 the FC\_MR-4 card features a new enhanced mode. The FC\_MR-4 card can now operate in two different modes:

- Line Rate mode. This mode is backward compatible with the 4.6 release Line Rate mode.
- Enhanced mode. This mode supports subrate transport mapping, distance extension, and other enhancements.



#### Note

The FC\_MR-4 card reboots when changing card modes (a traffic hit will result). The FPGA running on the card will be upgraded to the required image. However, the FPGA image in the card's flash will not be modified.

### Enhanced Card Mode

The following features are available in enhanced card mode.

#### Mapping

1 Gbps Fibre Channel/FICON is mapped into:

- SONET CCAT: STS1c, STS3c, STS6c, STS9c, STS12c, STS18c, STS24c, STS48c
- SONET VCAT: STS3c-Nv (N is 1 to 8), STS1c-Nv (N is 1 to 24)
- SDH CCAT: VC4-1c, VC4-2c, VC4-3c, VC4-4c, VC4-6c, VC4-8c, VC4-16c
- SDH VCAT: VC4-Nv (N is 1 to 8)

2 Gbps Fibre Channel/FICON is mapped into:

- SONET CCAT: STS1c, STS3c, STS6c, STS9c, STS12c, STS18c, STS24c, STS36c, STS48c
- SONET VCAT: STS3c-Nv (N is 1 to 16), STS1c-Nv (N is 1 to 48)
- SDH CCAT: VC4-1c, VC4-2c, VC4-3c, VC4-4c, VC4-6c, VC4-8c, VC4-12c, VC4-16c
- SDH VCAT: VC4-16v (N is 1 to 16)
- SW -LCAS

Virtual Concatenation Group (VCG) is reconfigurable with the software link capacity adjustment scheme (SW-LCAS) enabled, as follows.

- Out of service and out of group members can be removed from VCG.
- Members with deleted cross connect can be removed from VCG.
- Errored members can be autonomously removed from VCG.
- Degraded bandwidth VCGs are supported.

VCG is flexible with SW-LCAS enabled (VCG can run traffic as soon as the first cross-connect is provisioned on both sides of the transport).

#### **Distance Extension**

FC\_MR-4 card enhanced mode distance extension enables the following features and support.

- SAN extension over long distances through buffer-to-buffer (B2B) credit spoofing
- 2300 Km for 1G ports (longer distances supported with lesser throughput)
- 1150 Km for 2G ports (longer distances supported with lesser throughput)
- A negotiation mechanism to identify if the far end FC-over-SONET card supports the Cisco proprietary B2B mechanism
- Auto detection of FC switch B2B credits from FC-SW standards based ELP frames
- Support for manual provisioning of credits based on FC switch credits
- Automatic GFP buffer adjustment based on round trip latency between two SL ports
- Automatic credit recovery during SONET switchovers or failures
- Insulation for FC switches from any SONET switchovers (No FC fabric reconvergences will occur for SONET failures of less than or equal to 60 ms.)

#### **Interoperability Features**

FC\_MR-4 card enhanced mode interoperability features a Maximum Frame Size setting to prevent accumulation of oversized PMs for VSAN frames, as well as an Ingress Filtering Disable feature for attachment to third party GFP over SONET/SDH equipment.

For other details on enhancements to FC\_MR-4 card functionality, consult the user documentation.

## **Open GNE**

Release 5.0 supports open GNE configurations, through which the ONS 15454 can communicate with non-ONS nodes that do not support point-to-point protocol (PPP) vendor extensions or OSPF type 10 opaque link-state advertisements (LSA), both of which are necessary for automatic node and link discovery. An open GNE configuration allows the DCC-based network to function as an IP network for non-ONS nodes. To support open GNE Release 5.0 provides provisionable foreign DCC terminations, provisionable proxy server tunnels, and provisionable firewall tunnels.

### **Foreign DCC termination**

To configure an open GNE network, you can provision SDCC, LDCC, and GCC terminations to include a far-end, non-ONS node using either the default IP address of 0.0.0.0 or a specified IP address. You provision a far-end, non-ONS node by checking the “Far End is Foreign” check box during SDCC, LDCC, and GCC creation. The default 0.0.0.0 IP address allows the far-end, non-ONS node to provide the IP address; if you set an IP address other than 0.0.0.0, a link is established only if the far-end node identifies itself with that IP address, providing an extra level of security.

## Proxy Server Tunnels and Firewall Tunnels

By default, the SOCKS proxy server only allows connections to discovered ONS peers, and the firewall blocks all IP traffic between the DCC network and LAN. You can, however, provision proxy tunnels to allow up to 12 additional destinations for SOCKS version 5 connections to non-ONS nodes. You can also provision firewall tunnels to allow up to 12 additional destinations for direct IP connectivity between the DCC network and LAN. Proxy and firewall tunnels include both a source and destination subnet. The connection must originate within the source subnet and terminate within the destination subnet before either the SOCKS connection or IP packet flow is allowed.

To set up proxy and firewall subnets in CTC, use the Provisioning > Network > Proxy and Firewalls subtabs. The availability of proxy and/or firewall tunnels depends on the network access settings of the node. See the user documentation for further details.

## VC-11 Tunneling

Release 5.0 allows provisioning of VT1.5 for SDH ports in ONS 15454 SONET nodes. VC-11 (VT1.5) can be created from any optical or electrical card except for DS3 series cards, while the trunk cards are in SDH mode.

## Optimized 1+1 Protection

Release 5.0 introduces optimized 1+1 protection, an alternative to the traditional linear 1+1 bidirectional protection scheme. Optimized 1+1 is a line-level, bidirectional protection scheme using two lines, working and protect. One of the two lines assumes the role of the primary channel, where traffic is selected, and the other line acts as a secondary channel, protecting the primary channel. Traffic switches from the primary channel to the secondary channel based on either line conditions or an external switching command performed by the user.

After a line condition (or user-initiated switch) clears, traffic remains on the secondary channel. The secondary channel is automatically renamed as the primary channel and the former primary channel is automatically renamed as the secondary channel. This approach eliminates the need for revertive or nonrevertive selection associated with traditional 1+1.

Optimized 1+1 protection takes place on the port level (port-to-port). Any number of ports on the protect card can be assigned to protect the corresponding ports on the working card, using all ports for protection, or only some. This differs from 1:1 or 1:N protection (electrical cards) in that, for those protection schemes, the protect card must protect an entire slot (all ports).

In optimized 1+1 port-to-port protection, the working and protect cards do not have to be installed side by side in the node. A working card must, however, be paired with a protect card of the same type and number of ports. You cannot create an optimized 1+1 protection group if the number of ports on each card in the pair does not match, even if the OC-N rates for the paired cards are the same. The 1+1 optimized span protection scheme is supported only for Cisco ONS 15454 SONET using either OC3-4 or OC3-8 cards with ports that are provisioned for SDH payloads.

Channel numbers for K1 and K2 bytes in optimized 1+1 are “1” and “2” instead of the “0” and “1” channel numbers used by traditional 1+1. Primary or secondary status of a channel for optimized 1+1 is indicated by a condition in the management interface, and K bytes are consistent for all management interfaces. In the node view, Maintenance > Protection tab, optimized 1+1 is indicated by a plus sign with an octagon around it. The following additional differences exist between optimized 1+1 and traditional 1+1.

- Force to Primary is not supported for optimized 1+1; only Force to Secondary is supported.
- Optimized 1+1 supports the Lockout Switch operation, but not Lockout of Protect.

- During an optimized 1+1 Lockout Switch, K1 and K2 bytes will remain frozen.
- The Manual switch command is not used in 1+1 optimized span protection.

Optimized 1+1 is fully compliant with Nippon Telegraph and Telephone Corporation (NTT) specifications, and with ITU-T G.841 (1998), Types and characteristics of SDH network protection architectures.

## 1+1 VT Protection Support

With Release 5.0 support for VT 1+1 protection increases from 224 to 336 VTs. The CTC Resource Allocation Usage screen is updated to display the working and protect allocation.

## Provisionable Patchcords

Release 5.0 introduces provisionable patchcord functionality. A provisionable patchcord is a user-provisioned link that is advertised by OSPF throughout the network. Provisionable patchcords, also called virtual links, are needed in the following situations:

- An optical port is connected to a transponder or muxponder client port provisioned in transparent mode.
- An optical ITU port is connected to a DWDM optical channel card.
- Two transponder or muxponder trunk ports are connected to a DWDM optical channel card and the generic control channel (GCC) is carried transparently through the ring.
- Transponder or muxponder client and trunk ports are in a regenerator group, the cards are in transparent mode, and DCC/GCC termination is not available.

Provisionable patchcords are required on both ends of a physical link. The provisioning at each end includes a local patchcord ID, slot/port information, remote IP address, and remote patchcord ID. Patchcords appear as dashed lines in CTC network view. Patchcords can be provisioned through CTC, or through TL1. For provisioning details and application specifics consult the user documentation.

## State Verification Scan Before Activation

Before allowing a software activation or reversion to proceed, Release 5.0 nodes verify that their current state meets required activation criteria. Activation criteria must be met in order to avoid traffic hits. For ONS 15454, ONS 15454 SDH, ONS 15327, and ONS 15310 nodes, all BLSR/MS-SPRing spans on the node must be locked-out, and no 1:1, 1:N, 1+1 or Y-Cable protection switches can be in progress. For ONS 15600 nodes, all BLSR spans on the node must be locked-out.

## Runtime Diagnostics

Release 5.0 features background ASIC monitoring for all line cards and cross connect cards, standby assurance for DS3 cards, and BLSR PCA Pseudo Random Bit Signal (PRBS) generation and detection.

## Background ASIC Monitoring

In Release 5.0 all line cards and cross connect cards continuously run background ASIC monitoring. This inhibits switching to a failed line card, if such a card exists, by generating a diagnostic failure alarm.

The feature also causes a switch-away on the cross connect cards via an equipment failure alarm. All diagnostic failures are logged in the alarm history. The feature accomplishes these goals by adding three new timers that ensure the correct state of the cards at key points in card communication. A verification guard timer is used when a Force is issued, to ensure that the far end has a chance to respond. A detection guard timer is used to ensure the presence of an SF/SD condition before switching away from a card. A recover guard timer ensures the absence of SF/SD prior to switching to a card.

### Standby Assurance for DS3 Cards

The Release 5.0 standby assurance software feature runs a PRBS loopback test on standby DS3 cards, for both working and protect. This tests the entire data path, from relays through the BTC. The result is that switching to a failed line card is inhibited. Standby assurance does not affect switch times.

### BLSR PCA PRBS Generation/Detection

Release 5.0 BLSR PCA PRBS generation and detection allows you to create a circuit on which you can run a PRBS diagnostic. The feature uses a cross connect to generate PRBS on a VT within an STS. Additional circuit creation can route a PRBS signal (STS) through your entire network and back to the originating cross connect card. The PRBS detector on the cross connect card verifies PRBS integrity. A diagnostic alarm is raised when PRBS errors are detected. The feature also verifies network integrity without corrupting user data. BLSR PCA PRBS generation/detection is intended for use on four fiber BLSR PCA paths, but is not restricted to this use. A new VT Circuit Creation check box specifies the circuit type as diagnostic.

### 64+8kHz Clock Support

Release 5.0 supports a new 64+8kHz clock type, per Telcordia G.703 Table II.1. The 64+8kHz clock features AMI with 8 kHz bipolar violation, and works with the ONS 15454 SONET platform and dual TCC2P cards.

### 64K Clock Specific Alarms

The following alarms are supported with the 64k clock.

- LOS – Loss of Signal
- HI-CCVOLT – Composite Clock High Line Voltage
- BPV - Bipolar Violation

### Admin SSM

Synchronization status messaging (SSM) is a protocol that communicates information about the quality of the timing source. SSM messages enable nodes to automatically select the highest quality timing reference and to avoid timing loops. With Release 5.0 you can configure an SSM value for a timing source (either BITS-IN or Optical Line) by selecting from the “ADMIN. SSM” selection box in the BITS Facilities subtab of the node view, Provisioning > Timing tabs. This feature is useful when the selected external timing source has no SSM information. When you select the Admin SSM value, all switching decisions are subsequently made based on your selection. The same SSM value is transmitted out of the interface configured for BITS Out, and in transmit Optical S1. The DS1 BITS type with framing type SF(D4) only supports Admin SSM. The 64KHz+8KHz clock also only supports Admin SSM. ESF Framing must have Sync Messaging turned off (uncheck the check box) in order to enable Admin SSM

selection. SONET nodes use the SSM Generation II message set, as defined in Table 4 of ANSI T1.101-1999. SDH nodes support SDH generation 1 SSM and STU. SONET nodes support only SONET SSM (GR-253).

## Linear Port-Mapped Ethernet Mode (8-port 10/100 Ethernet Linear Mapper)

Port-mapped mode, also referred to as linear mapper, configures the E-Series card to map a specific E-Series Ethernet port to one of the card's specific STS/VC circuits. Port-mapped mode ensures that Layer 1 transport has low latency for unicast, multicast, and mixed traffic. Ethernet and Fast Ethernet on the E100T-G or E10/100-4 card operate at line-rate speed. Gigabit Ethernet transport is limited to a maximum of 600 Mbps because the E1000-2-G card has a maximum bandwidth of STS-12c/VC4-4c. Ethernet frame sizes up to 1522 bytes are also supported, which allow transport of IEEE 802.1Q tagged frames. The larger maximum frame size of Q-in-Q frames (IEEE 802.1Q in IEEE 802.1Q wrapped frames) is not supported.

### E-Series Mapping Ethernet Ports to STS/VC Circuits

Port-mapped mode disables Layer 2 functions supported by the E-Series in single-card and multcard mode, including STP, VLANs, and MAC address learning. It significantly reduces the service-affecting time for cross-connect and TCC2/TCC2P card switches.

Port-mapped mode does not support VLANs in the same manner as multcard and single-card mode. The ports of E-Series cards in multcard and single-card mode can join specific VLANs. E-Series cards in port-mapped mode do not have this Layer 2 capability and only transparently transport external VLANs over the mapped connection between ports. An E-Series card in port-mapped mode does not inspect the tag of the transported VLAN, so a VLAN range of 1 through 4096 can be transported in port-mapped mode.

Port-mapped mode does not perform any inspection or validation of the Ethernet frame header. The Ethernet CRC is validated, and any frame with an invalid Ethernet CRC is discarded.

Port-mapped mode also allows the creation of STS/VC circuits between any two E-Series cards, including the E100T-G, E1000-2-G, and the E10/100-4 (the ONS 15327 E-Series card). Port-mapped mode does not allow ONS 15454 E-Series cards to connect to the ML-Series or G-Series cards, but does allow an ONS 15327 E10/100-4 card provisioned with LEX encapsulation to connect to the ML-Series or G-Series cards.

## GFP-F Framing

Generic Framing Procedure (GFP) defines a standard-based mapping for different types of services onto SONET/SDH. With Release 5.0 the ML-Series and CE-Series cards support frame-mapped GFP (GFP-F), the PDU-oriented client signal adaptation mode for GFP. GFP-F maps one variable length data packet onto one GFP packet. GFP defines common functions and payload specific functions. Common functions are those shared by all payloads. Payload-specific functions differ depending on the payload type. The GFP standard is detailed in ITU recommendation G.7041.

### Provisionable Framing Mode

Release 5.0 provides a method to provision framing mode in the card view, Provisioning > Card tab, which displays the framing mode selections for the card in a drop-down list, and allows you to change the framing mechanism to either HDLC or GFP-F. You can also preprovision the framing mode prior to installing the card, and the card will boot up in the pre-provisioned mode. For details on framing mode provisioning consult to user documentation.

## Cisco IOS Version Support

Cisco IOS Version 12.2(18)SO comes preloaded on the ONS 15454 SONET/SDH TCC2/TCC2P card. Cisco IOS software controls the data functions of the ML-Series cards (ML1000-2 or ML100T-12). The ML-series cards download the IOS software from the TCC2/TCC2P when they first reset. The Cisco IOS image is also included on the standard ONS 15454 SONET/SDH System Software CD under the package file name M\_I.bin and full file name ons15454m-i7-mz. The image is not available for download or shipped separately.



### Note

You cannot update the ML-Series Cisco IOS image in the same manner as the Cisco IOS system image on a Cisco Catalyst Series. An ML-Series Cisco IOS image upgrade is accomplished only through the ONS 15454 SONET/SDH CTC, and Cisco IOS images for the ML-Series cards are available only as part of an ONS 15454 SONET or SDH software release.

## VCAT Member Routing Enhancements

Release 5.0 supports two types of automatic and manual routing for VCAT members: common fiber routing (previously supported) and split routing. CE-100T-8, FC\_MR-4 (both line rate and enhanced mode), and ML-Series cards support common fiber routing. CE-100T-8 cards also support split fiber routing, which allows the individual members to be routed on different fibers, or each member to have different routing constraints. This mode offers both the greatest bandwidth efficiency and the possibility of differential delay (handled by buffers on the terminating cards). Both common fiber and split fiber routing support Fully Protected, PCA, and Unprotected protection schemes. Split fiber routing also supports DRI protection. In both common fiber and split fiber routing, each member can use a different protection scheme; however, for common fiber routing, CTC checks the combination to make sure a valid route exists. If it does not, the user must modify the protection type. In both common fiber and split fiber routing, intermediate nodes treat the VCAT members as normal circuits that are independently routed and protected by the SONET network. At the terminating nodes, these member circuits are multiplexed into a contiguous stream of data. For more information on VCAT member routing consult the user documentation.

## Link Capacity Adjustment

The CE-100T-8 card supports Link Capacity Adjustment Scheme (LCAS), which is a signaling protocol that allows dynamic bandwidth adjustment of VCAT circuits. When a member fails, a brief traffic hit occurs. LCAS temporarily removes the failed member from the VCAT circuit for the duration of the failure, leaving the remaining members to carry the traffic. When the failure clears, the member circuit is automatically added back into the VCAT circuit without affecting traffic. You can select LCAS during VCAT circuit creation.

Although LCAS operations are errorless, a SONET error can affect one or more VCAT members. If this occurs, the VCAT Group Degraded (VCG-DEG) alarm is raised. For information on clearing this alarm, refer to the Cisco ONS 15454 Troubleshooting Guide.

## Software–Link Capacity Adjustment

Instead of LCAS, the FC\_MR-4 (enhanced mode) and ML-Series cards support Software–Link Capacity Adjustment Scheme (Sw-LCAS). Sw-LCAS is a limited form of LCAS that allows the VCAT circuit to adapt to member failures and keep traffic flowing at a reduced bandwidth. Sw-LCAS uses legacy SONET failure indicators like AIS-P and RDI-P to detect member failure. Sw-LCAS removes the failed member from the VCAT circuit, leaving the remaining members to carry the traffic. When the failure clears, the

member circuit is automatically added back into the VCAT circuit. For ML-Series cards, Sw-LCAS allows circuit pairing over two-fiber BLSRs. With circuit pairing, a VCAT circuit is set up between two ML-Series cards; one is a protected circuit (line protection) and the other is PCA. For four-fiber BLSR, member protection cannot be mixed. You select Sw-LCAS during VCAT circuit creation. The FC\_MR-4 (line rate mode) does not support Sw-LCAS.

### Additional VCAT Support

Also, you can create non-LCAS VCAT circuits, which do not use LCAS or Sw-LCAS. While LCAS and Sw-LCAS member cross-connects can be in different service states, all In Group non-LCAS members must have cross-connects in the same service state. A non-LCAS circuit can mix Out of Group and In Group members, as long as the In Group members are in the same service state. Non-LCAS members do not support the OOS-MA,OOG service state; to put a non-LCAS member in the Out of Group VCAT state, use OOS-MA,DSBLD.

## SNMP

### High Capacity RMON

Remote Network Monitoring (RMON) is a feature commonly used to monitor the health of a network. The Internet Engineering Task Force (IETF) specifies a standard MIB, RFC 2819 [1], to be deployed for this purpose. Release 5.0 adds enhancements to the SNMP agent on the ONS 15454, ONS 15454 SDH, and ONS 15327 platforms to supplement existing RMON SNMP support. This enhancement includes support for the HC-RMON-MIB. High Capacity RMON (HC-RMON) is an extension of RMON. RMON counters are 32-bit while HC-RMON counters are 32-bit and 64-bit as defined in the MIB. Release 5.0 supports the following HC-RMON tables.

- mediaIndependentTable
- etherStatsHighCapacityTable
- etherHistoryHighCapacityTable

The MIB variable hcRMONCapabilities is supported along with these tables.

### STS Around Ring

Release 5.0 supports manual provisioning of contiguous concatenation (CCAT) STS circuits around the ring (traffic travels around the ring, starting and ending at the same node). In previous releases, if you selected the circuit source and destination as starting and ending on different I/O ports of the same node, the result would be an intra-node circuit only. With Release 5.0, you can manually route this type of circuit all the way around the ring. STS around the ring is supported for an unprotected path, in an unprotected ring, unless the underlying topology is line protected, in which case the around the ring circuit will also be line protected. STS around the ring is supported for all circuit sizes, starting with STS1 (SONET), or STM1 (SDH), and for all supported management interfaces.

## CTC Enhancements

### 64+8KHz Clock Provisioning in CTC

With Release 5.0 you can select the 64+8kHz clock from the Facility Type selection box in the BITS Facilities subtab of the node view, Provisioning > Timing tabs. Release 5.0 supports 64K composite clock BITS in for nodes with dual TCC2Ps only. When using the 64+8kHz clock as a source, only

DS1/6M are allowed for BITS out, and the user selected Admin SMM message type is enforced, with the Sync Messaging check box disabled and grayed out. With the 64+8kHz clock selected as the source, the user selectable Admin SSM defaults to STU. The following configurations are supported for the 64+8kHz clock.

- BITS INBITS OUT
- DS1None
- DS1DS1
- 64 KHzNone
- 64 KHzDS1
- 64 KHz6132 kHz (6MHz)

### CTC Circuits State Default

The Release 5.0 circuit creation wizard uses the new node default value, CTC.circuits.state, as the default circuit state when creating a circuit. This default can be set in the NE Defaults window, and will not be overridden by the “sticky” command feature, which caused the default value to be abandoned when using the wizard in previous releases.

### Shell Login Challenge

Release 5.0 supports the requirement of a specific shell password, set initially by the first shell user and then required of subsequent shell users at login. When this feature is enabled, the password is required of all shell users (rather than each user having a separate account) from the time it is set or changed. In the CTC node view, Provisioning > Security > Access tabs, check the “Enable Shell Password” check box to enable the shell password feature. The password can then be set or changed in a telnet or SSH shell session using the “passwd” command.



#### Note

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The password should be 8 characters or less to avoid possible conflicts with certain FTP clients.

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### CTC ENE Launch

With Release 5.0, Cisco Transport Manager (CTM) can now display the node view of an end network element (ENE) without first displaying the node view of the associated gateway network element (GNE) when launching the CTC client.

### Provisionable Patchcord Tab

Release 5.0 features a Provisionable Patchcord subtab in CTC that displays physical links and their associated protection types, so that, when a control channel cannot be terminated on either end of a physical link, and as a result, the physical link cannot be automatically discovered by OSPF, you can still view the physical link and its protection type in the management software interface. You can view the physical links and their terminations from the CTC network view > Provisioning > Provisionable Patchcords tabs; or from the CTC node view > Provisioning > Comm Channels > Provisionable Patchcords tabs. To provision the patchcord, you select the Node Name, Slot, Port, and ID for both ends of the physical link. The ID is a unique 16-bit number used to identify a virtual link on a node. IDs are only unique for the particular node.

## Date Format Selection

Release 5.0 adds a date format option to CTC, enabling you to choose between U.S. (MM/DD/YY) and European (DD/MM/YY) date formats. To choose the date format, click the Edit menu and choose Preferences. Select the desired date format (the default is MM/DD/YY) and click OK. The name/value pair (“ctc.dateFormat=DD/MM/YY” or “ctc.dateFormat=MM/DD/YY”) will be updated in the ctc.ini (Windows), or .ctrc (UNIX) file, where preferences are stored. Subsequently, the date format used in all tables, dialogs, and tabs will be changed to the format you selected in the Preferences dialog.

## TL1-CTC Circuit Unification

In Release 5.0 CTC fully supports TL1-created circuits and TL1 fully supports CTC-created circuits. Release 5.0 circuit behavior and appearance is unified across both management interfaces, and you can easily alternate between the two. It is also no longer necessary to upgrade a TL1 circuit for CTC, or to downgrade a CTC circuit for TL1. The following circuit unification enhancements are supported with Release 5.0.

- Release 5.0 cross-connects can be given names via TL1 using ENT-CRS and ED-CRS (use the “CKTID” parameter).
- CTC-created circuits can now be fully deleted if all cross-connects are deleted via TL1. (Deleting a source node cross-connect automatically deletes the CTC “circuitInfo” database object.)
- VCAT group objects (VCGs) can be given names via TL1 using ENT-VCG and ED-VCG commands (with the “CKTID” parameter).
- CTC-created VCAT circuits can now be fully deleted if both VCGs are deleted via TL1. (Deleting a source node VCG automatically deletes the CTC “circuitInfo” database object.)
- TL1 circuits now have names (like CTC circuits).
- You can use TL1 to change the name of any circuit, TL1-created or CTC-created.
- Low order (LO) tunnels and LO aggregation point circuits created via TL1 are now recognized and displayed in CTC.
- You can use TL1 to add cross-connects to a CTC-created circuit.
- You can edit TL1 circuits using CTC. (No need for upgrading the circuit first.)
- Circuit “upgrade” and “downgrade” functions have been removed.
- You can merge two or more CTC circuits into a single CTC circuit. (Circuit Merge and Circuit Reconfigure.)
- “ACTIVE” circuits are now called “DISCOVERED.”
- “INCOMPLETE” circuits are now called “PARTIAL.”
- “UPGRADABLE” circuits are now called “DISCOVERED\_TL1.”
- “INCOMPLETE\_UPGRADABLE” circuits are now called “PARTIAL\_TL1.”

# New Software Features and Functionality as of Release 4.7

## Enhanced State Model

Releases 4.7 and 5.0 introduce new administrative and service states for Cisco ONS 15454 cards, ports, and cross-connects. Administrative and service states are based on the generic state model defined in Telcordia GR-1093 Core, Issue 2 and ITU-T X.731 and are available for all support management interfaces. The following state types and state transition types are defined for Release 5.0. Consult the *Cisco ONS 15454 Reference Manual* for specific states and their applications.

### Service States

Service states include a Primary State (PST), a Primary State Qualifier (PSTQ), and one or more Secondary States (SST).

### Administrative States

Administrative states are used to manage service states. Administrative states consist of a PST and an SST. A change in the administrative state of an entity does not change the service state of supporting or supported entities (except for certain DWDM entities).

### Service State Transitions

The possible transitions from one service state to the next state for cards, ports, and cross-connects. A service state transition is based on the action performed on the entity and any autonomous activity.

#### Card Service State Transitions

The service state transitions for cards and for pluggable modules.

#### Port and Cross-Connect Service State Transitions

Port states do not impact cross-connect states with the following exceptions.

- A cross-connect in the OOS-AU,AINS service state cannot transition autonomously into the IS-NR service state until the parent port is IS-NR.
- DWDM ports and OCHNC connections might be impacted.

The following ports do not support all of the service states:

- E-Series Ethernet ports do not support service states; these ports are either enabled or disabled.
- G-Series and FC\_MR-4 ports support the IS-NR; OOS-MA,DSBLD; and OOS-MA,MT service states; they do not support the OOS-AU,AINS service state.

## Circuit State Model

Releases 4.7 and 5.0 add support for circuit service and administrative states in CTC. For more information consult the user documentation.

## ROADM

ROADM allows you to add and drop wavelengths without changing the physical fiber connections. ROADM technology is useful in network applications that require the ability to optically pass DWDM wavelengths without a physical fiber jumper. ROADM also provides channel equalization allowing all 32 wavelengths to be optically balanced. ROADM offers significant insertion loss reduction over previous back-to-back multiplexing or demultiplexing solutions. Configurations using ROADM support up to 16 node rings.

ROADM technology also supports any-to-any connection capability, spans from 1 dB to 15 dB, and SONET, data, or video multirate traffic.

### Any-to-Any Rings

The any-to-any ring topology contains only ROADM nodes. Optical service channel (OSC) regeneration or amplifier nodes can be installed between ROADM nodes, if required. This topology potentially allows you to route every wavelength from any source to any destination node inside the network.

For optical performance information for ROADM rings and linear networks refer to the *Cisco ONS 15454 DWDM Installation and Operations Guide*.

## New DWDM Node Types

Releases 4.7 and 5.0 provide support for the following new node types.

### ROADM Node

ROADM nodes are equipped with at least one 32-Channel Wavelength Selective Switch (32WSS). A 32DMX or 32DMX-O demultiplexer can be installed, but is not required. For ROADM node installation options, management, and turnup, consult the *Cisco ONS 15454 DWDM Installation and Operations Guide*.

#### ROADM Power Equalization Monitoring

Reconfigurable OADM (ROADM) nodes allow you to monitor the 32WSS card equalization functions on the **Maintenance > DWDM > Power Monitoring** subtab. The tab compares the input channel power Add (Padd) and express or pass-through (Ppt) with the power level at output (Pout).

### OSC Regeneration Line Site

An OSC Regeneration line site can be built using two OSC-CSMs for the single purpose of providing an electrical regeneration of the OSC channel.

MetroPlanner plans an OSC regeneration site every time there is a link longer than 37 db on which payload amplification or add and drop capabilities are not required.

NDT splits this link into n sublinks of maximum length 31 dB, then places an OSC regeneration site between each sublink and the next, as needed.

Although it is not commonly the case (due to the span length), in a limited set of cases the OSC Regeneration site can be crossed by pass through traffic (for example single channel 2.5 Gbps).

The OSC Regeneration Site feature also supports hybrid configurations.

## HUB or Terminal Nodes with 32WSS and 32DMX

The 32WSS and 32DMX are normally installed in ROADM nodes, but they can be installed in hub and terminal nodes, as well. If the cards are installed in a hub node, the 32WSS express (EXP RX and EXP TX) ports are not cabled.

## Provisioning Parameters for Terminal and HUB Sites

On Hub and Terminal sites, ANS algorithms require setting a value for VOA Target Channel Power (TPVOACh(i)) on all demultiplex and multiplex paths. Specifically, Hub and Terminal Site setup requires the use of the following parameters.

- West/East Side Add and Drop Stage Output Power [WestPoutad; EastPoutad]
- West/East Side Add and Drop Stage Input Power [WestPinad; EastPinad]
- West/East Side Add and Drop Stage By-Pass Power [WestPby-passad; EastPby-passad]
- West/East Side Add and Drop Stage Channel (i) Drop Power (for  $i = 1..32$ ) [WestPDropCh(i); EastPDropCh(i)]
- West/East Side Add and Drop Stage Drop Power [WestPDrop; EastPDrop]

WestPdrop and EastPdrop are used when the 32-DMX West or East is equipped. WestPDropCh(i) and EastPDropCh(i) are used when the 32DMX-O West or East is equipped.

For a terminal site only one set (East or West) of these parameters is used according to the node line direction:

- East side parameters in the case of terminal site West
- West side parameters in the case of terminal site East

For further details on these and other Hub and Terminal site parameters, consult the *Cisco ONS 15454 DWDM Installation and Operations Guide*.

## Y-Cable Protection

Y-cable protection is available for the following ONS 15454 transponder and muxponder cards:

- TXP\_MR\_10G
- TXP\_MR\_2.5G
- MXP\_MR\_2.5G
- MXP\_2.5G\_10G

In Y-cable protection, the client ports of the two cards are joined by Y-cables. A single receive client signal is injected into the receive Y-cable and is split between the working and protect cards in the protection group. The transmit client signals from the two protection group cards are connected via the transmit Y-cable with only the active card signal passing through as the single transmit client signal. The other card must have its laser turned off to avoid signal degradation where the Y-cable joins. To create Y-cable protection, first create a Y-cable protection group for two TXP or MXP cards using CTC, then connect the client ports of the two cards physically with a Y-cable. The single client signal is then sent into the receive Y-cable and is split between the two TXP or MXP cards.

## Automatic Laser Shutdown

With Releases 4.7 and 5.0 Automatic Laser Shutdown (ALS) is supported on both the 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.

## MSTP Fiber Support

Releases 4.7 and 5.0 provide qualification of MSTP over the following fibers in addition to SMF-28.

- FiberSupported ConfigurationsNode typology
- SMF-28RingHub
- E-LeafLinearActive OADM
- TW-RSLinear w/o OADMPassive OADM

For further information on use of these fibers with Releases 4.7 and forward consult the *Cisco ONS 15454 DWDM Installation and Operations Guide*.

## OC3/STM1 Performance Monitoring for OSCM and OSC-CSM Cards

The following new PMs are supported in Releases 4.7 and 5.0 for OC3/STM1 facility equipped on OSCM and OSC-CSM cards.

### SONET

Number of Coding violations (CV).

- CV-S: section
- CV-L-NE: line near end
- CV-L-FE: line far end

Number of Error seconds (ES).

- ES-S: section
- ES-L-NE: line near end
- ES-L-FE: line far end

Number of Severely Error Seconds (SES).

- SES-S: section
- SES-L-NE: line near end
- SES-L-FE: line far end

Number of Severely Error Framing Seconds (SEF).

- SEF-S: section

Unavailable Seconds (UAS).

- UAS-L-NE: line near end
- UAS-L-FE: line far end

Failure Counts (FC).

- UAS-L-NE: line near end
- UAS-L-FE: line far end

## SDH

Error Blocks (EB). A block in which one or more bits are in error.

- EB-RS: regeneration section
- EB-MS-NE: multiplex section, near end
- EB-MS-FE: multiplex section, far end

Background Block Errors (BBE). An error block not occurring as part of an SES.

- BBE-RS: regeneration section
- BBE-MS-NE: multiplex section, near end
- BBE-MS-FE: multiplex section, far end

Errored Seconds (ES). A one second period with one or more errored blocks or at least one defect.

- ES-RS: regeneration section
- ES-MS-NE: multiplex section, near end
- ES-MS-FE: multiplex section, far end

Number of Severely Error Seconds (SES).

- SES-RS: regeneration section
- SES-MS-NE: multiplex section, near end
- SES-MS-FE: multiplex section, far end

Unavailable Seconds (UAS).

- UAS-MS-NE: multiplex section, near end
- UAS-MS-FE: multiplex section, far end

## System Type Removal

Release 4.7 and forward removes the System Type parameters, System Type West and System Type East. These parameters are replaced in Releases 4.7 and forward with the following four pairs of parameters:

- West Side Tx Amplifier Working Mode ([`dwdm.tx.amp.WkgModeW`]) and West Side Tx Amplifier Ch Power ([`dwdm.tx.amp.ChPwrW`]), applicable for all OPT-BST facing west.
- West Side Rx Amplifier Working Mode ([`dwdm.rx.amp.WkgModeW`]) and West Side Rx Amplifier Ch Power ([`dwdm.rx.amp.ChPwrW`]), applicable for all OPT-PRE facing west.
- East Side Tx Amplifier Working Mode ([`dwdm.tx.amp.WkgModeE`]) and East Side Tx Amplifier Ch Power ([`dwdm.tx.amp.ChPwrE`]), applicable for all OPT-BST facing east.
- East Side Rx Amplifier Working Mode ([`dwdm.rx.amp.WkgModeE`]) and East Side Rx Amplifier Ch Power ([`dwdm.rx.amp.ChPwrE`]), applicable for all OPT-PRE facing east.

For further details on these new parameters and their uses, consult the *Cisco ONS 15454 DWDM Installation and Operations Guide*.

## LOS-P Threshold Configuration on OPT-BST/OSC-CS/OPT-PRE COM-RX Port

Release 4.7 and forward LOS-P Threshold configuration provides the following ANS provisioning parameters:

- West Side Fiber Stage Input Threshold [WestFSInTh]
- East Side Fiber Stage Input Threshold [EastFSInTh]
- West Side Rx Amplifier Input Power Fail Threshold [WestRxAmpInPwrFailTh]
- East Side Rx Amplifier Input Power Fail Threshold [EastRxAmpInPwrFailTh]
- Release 4.7 and forward ANS sets:
- LOS-P Threshold on West OPT-BST LINE-1-RX port, or West OSC-CSM LINE-1-RX to WestFSInTh
- LOS-P Threshold on East OPT-BST LINE-1-RX port, or East OSC-CSM LINE-1-RX port to EastFSInTh
- LOS-P Threshold on West OPT-PRE LINE-1-RX port to WestRxAmpInPwrFailTh
- LOS-P Threshold on East OPT-PRE LINE-1-RX port to EastRxAmpInPwrFailTh

## Circuit Size Label Removed from OCHNC Circuits

As of Release 4.7, the circuit size specification or modification option is no longer supported for any of the interfaces, as follows.

- CTC Circuit Creation wizard
- CTC Edit Circuit function
- TL1 commands for OCHNC x-connection creation
- TL1 commands for OCHNC x-connection editing

## Wavelength Path Provisioning Changes

As of Release 4.7, the following changes have been made for Wavelength Path Provisioning (WPP). Consult the *Cisco ONS 15454 DWDM Installation and Operations Guide* for details.

- Warning message for last OSC deletion
- Conditions when last OSC cannot be deleted are listed

## Calibration Value by Port Service State

As of Release 4.7 you can modify calibration values independently by port service state, with the exception of amplifier Offset (former power calibration), when the OPT-BST LINE-3-TX LINE-1-RX or OPT-PRE LINE-1-TX is in IS-NR service state.

The following table summarizes the calibration functions that can be performed in the different service states.

**Table 5 Calibration Functions**

Function	IS-NR	OOS-AU,AINS	OOS-MA,DSLBD	OOS-MA,MT
Offset	No	Yes	Yes	Yes
VOA Attenuation Calib	Yes	Yes	Yes	Yes
VOA Power Calib	Yes	Yes	Yes	Yes

## New Alarms and Conditions

The following alarms and conditions are new as of Release 4.7. For details consult the *Cisco ONS 15454 Troubleshooting Guide*.

- New LOS-P, LOS-O alarms
- New PARAM\_MISM condition
- OSRI ON raises conditions in specific instances
- ALS standing condition is revised

## New CTC Functionality

### ANS Provisioning Tab

In Releases 4.7 and 5.0 CTC, ANS NE Update and Provisioning tabs have been removed and merged in a new pane having a tree format. Parameters in tree view are organized according to four main layout sectors: West RX, West TX, East RX and West TX. In each sector parameters are grouped according to their type category: amplifier, thresholds, power.



#### Note

The System type has been removed. See the [“System Type Removal” section on page 68](#).

Only parameters applicable for the node type are presented in the tree view. By using the Import button can load a MetroPlanner provisioning file. Provisioning information can be exported in two formats: for a future import (by Export button), for node commissioning (csv/tsv/html) by selecting from the **File > Export** menu. All settings will become effective only after having launched the ANS application.

### ANS Results Report

For every MSTP port for which a regulation is required, ANS provides details about parameters set or unset.

Possible results values are:

- “Success - Changed” when a calculated set-point differs from the old one
- “Success - Unchanged” when a calculated set-point is equal to the old one
- “Fail - Out of Range” when a calculated set-point is outside of the acceptable range
- “Fail - Port in IS state” when the set-point cannot be applied because port is in service
- “Not Applicable” when the set-point is not calculable for that particular node layout

## OCHNC Bidirectional Circuits

In release 4.6.x OCHNC bidirectional circuit support existed in the creation wizard only. Creation of a bidirectional circuit in the wizard resulted in the actual creation of two unidirectional circuits with no link between them. Releases 4.7 and 5.0 add full support for bidirectional circuits both in CTC and in the TL1 interface. OCHNC bidirectional circuit forward and reverse components always use the same wavelength and always cross the same optical path. Support for unidirectional circuits remains unchanged.

## Changes to Automatic Power Control

### APC Interface

Releases 4.7 and forward enable you to manually launch, enable, or disable APC. These functions can be performed upon any network node, by CTC or TL1.



#### Note

The APC interface is a maintenance function for use by maintenance personnel. Improper use of this function can have undesirable effects at the network level.

### APC States

An “APC State” flag indicates the APC working condition for all nodes in a given network. The APC state flag can be any of the following values.

- “Disable - Internal”—Displayed when APC has been automatically disabled for an internal cause.
- “Disable - User”—Displayed when APC has been disabled by the user.
- “Not Applicable - Network Type”—Displayed when the Network Type is set to “Not DWDM” or “Metro Access,” types that do not support the APC application.
- “Enable”—Displayed when APC is enabled.

### APC Outputs

CTC and TL1 users can retrieve “Last monitored time” and “Last modified time” for every parameter whose set point is monitored by APC. APC updates the last check time value every time it checks a parameter set point for correctness. APC updates the last modification time value every time it modifies the parameter set point. Last check time and Last modification time will then be displayed on the CTC and TL1 interfaces only for those parameters effectively checked by APC. This implies that parameters associated to ports that are not in IS-NR service state will not be reported (since they are not carrying traffic).

## Span Loss Check

The Network Design Tool guarantees optical performance on a given span if its length is included between two values:

- Start of Life (SoL)—A span loss value provided by the user
- End of Life (EoL)—A span loss value given by the SoL plus aging margins

Releases 4.7 and 5.0 also provide a measurement of actual span loss in field, comparing the far end OSC power with the near end OSC power. This measurement can be performed in every MSTP node because for each such node OSC channel is regenerated.

From a network management point of view, span loss measurement can be useful when equipment is installed, or anytime a fiber is repaired after a cut. The NE will raise the Span Loss Out of Range Transient Condition on CTC, TL1 and SNMP interfaces when the measured span loss is higher than the

maximum expected span loss, or when it is lower than the minimum expected span loss, and the difference between the MaxExpSpanLoss and MinExpSpanLoss is greater than 1 dB. The condition is not raised in case of a software release upgrade. The maximum and minimum expected span loss data is provided by MetroPlanner and provisioned via the CTC or TL1 interface. Expected and Measured span loss are displayed in the tool-tip associated with the particular link in the Network View.

### Optical Channel Graphical Equalizer

In an ROADM node you can monitor the 32-WSS equalization functions comparing channel power level at the input ports (ADD(i) and EXP-RX) with channel power level at the output port (COM-TX). You can access this feature every time a 32-WSS is equipped or provisioned; however, the feature's use in Hub and Terminal site configurations is not warranted, since these nodes do not allow provisioning of pass-through traffic.

Line direction is identified by a double notation:

- Functional (W->E and E->W)
- Physical (slot/port on which both incoming and outgoing signals are associated)

### New Provisioning Interface for Amplifiers

The CTC interface for the OPT-PRE and OPT-BST amplified port in the card view > **Provisioning** tab is modified in Releases 4.7 and forward for thoroughness and readability as follows.

- Working Mode—Control Power or Control Gain. This is set by ANS.
- Signal Output Power—ASE compensated power value.
- Total Output Power—Sum of ASE and signal power.
- Total Output Power Set-Point—Power set point, applicable only if the working mode is control power.
- Gain—Applicable only when the working mode is control gain.
- Gain Set Point—Gain set-point calculated by APC or user-provided via the ANS interface.
- Offset—This is the former “Power Calibration,” applicable for both amplifier working modes.
- Per Channel Power Reference—Set by ANS.
- Tilt Reference—Set by ANS.
- Tilt Calibration—Read and write parameter used to modify the amplifier tilt.

### Pluggable Port Module Support

Release 4.7/5.0 CTC provides a new “PPM” subtab in the Provisioning tab of the card view for the transponder, and muxponder cards. This tab enables you to provision the pluggable port modules (PPMs) for SFPs (with a muxponder) and XFPs (with a transponder). When you create a PPM you can choose the slot number for the SFP or XFP, and then choose the appropriate PPM type for that card, selecting as many ports as you wish within the range of supported ports for the card. For specific instructions on provisioning PPMs, consult the *Cisco ONS 15454 DWDM Installation and Operations Guide*.

### Buffer-to-Buffer in CTC

Release 4.7/5.0 CTC supports the following features related to buffer-to-buffer technology.

- CTC enables distance extension (B2B).
- CTC allows Autodetect, or manual setting of the client buffer credit.

## MetroPlanner 2.5

**Note**

DWDM operation requires that you have a network plan calculated for your DWDM network with Cisco MetroPlanner, Release 2.5. Cisco MetroPlanner is a DWDM planning tool that is available from your Cisco account representative. Cisco MetroPlanner prepares a shelf plan for each network node and calculates the power and attenuation levels for the DWDM cards installed in the node. For information about Cisco MetroPlanner, contact your Cisco account representative. For more information about MetroPlanner, refer to the Cisco MetroPlanner DWDM Installation and Operations Guide, Release 2.5.

Release 4.7/5.0 integrates the ability to use Cisco MetroPlanner 2.5. The primary purpose of MetroPlanner is to assist sales engineers (SEs) in the design and validation of optical networking deployment using Cisco Optical Networking System (ONS) platforms. MetroPlanner provides a means to construct and test optical networks in a modelled graphical environment, enabling you to efficiently model multiple network design options for customers across a wide range of Cisco optical network products. You can enter specific configurations, or site distances alone, and from them build the desired network type. You can enter topology and service requirement specifications, then choose the type of platform or equipment for the network design. Several solutions can correspond to one type of equipment or platform. The MetroPlanner graphical user interface (GUI) models general specifications and produces detailed BOMs to provision optimized networks. Using MetroPlanner you can verify multiple constraints such as optical budget limitations and platform architecture. MetroPlanner automatically models and tests both simple and complex optical network designs. Optical networks designed using MetroPlanner can take advantage of the availability of dark fiber to build a common infrastructure that supports data, storage area network (SAN), and time-division multiplexing (TDM) traffic.

### Topology Support

MetroPlanner supports the following network topologies.

- Bus (single span, point-to-point, and linear)
- Open (or hubbed) ring
- Closed (or meshed) ring

### Protection Scheme Support

MetroPlanner designs support the following protection schemes.

- Client-based 1+1 protection
- Fiber switched protection
- Y-cable protection
- Unprotected

### Service Support

Depending on the platform selected, MetroPlanner can support any subset of the following services.

- 2R Any Rate
- Gigabit Ethernet
- 10 Gigabit Ethernet
- Enterprise System Connection (ESCON)

- Fibre Channel
- Fibre Channel 2G
- Fast Ethernet
- FDDI
- STM-1
- STM-4
- STM-16
- STM-64
- OC-3
- OC-12
- OC-48
- OC-192
- Inter-System Channel (ISC)
- Sysplex Control Link Oscillator (CLO)
- Sysplex External Throughput Rate (ETR)
- D1 Video
- Serial Data Input (SDI)
- Fiber Connection (FICON)
- FICON 2G
- HDTV
- Reserved

## TL1

### High Level Functional Differences

The following high level support is added for Release 5.0.

#### Enhanced State Model Support

In Release 5.0, equipment, ports and circuits support additional Primary and Secondary states. Messages of the form REPT^DBCHG^MSG contain new Enhanced State Model (ESM) states in Release 5.0. The following are the new SONET states in ESM, as defined for TL1.

#### PST-PSTQ

[Table 6](#) describes each service state of the entity described by the Primary State (PST) and a Primary State Qualifier (PSTQ).

**Table 6 Primary States**

<b>PST_PSTQ Values</b>	<b>Description</b>
IS-NR	In Service - Normal
OOS-AU	Out of Service - Autonomous
OOS-AUMA	Out of Service - Autonomous and Management
OOS-MA	Out of Service - Management

**SST**

[Table 7](#) describes the Secondary States (SST). This parameter provides additional information pertaining to PST and PSTQ.

**Table 7 Secondary States**

<b>SST Values</b>	<b>Description</b>
AINS	AutoInService
DSBLD	Disabled
LPBK	Loopback
MEA	Mismatch of Equipment Alarm
MT	Maintenance
OOG	OutOfGroup
SWDL	Software Download
UAS	UnAssigned
UEQ	UnEquipped

**Remote Monitoring**

TL1 support for Remote Monitoring (RMON) is added in Release 5.0. All the “8B10B” related SONET PMs (VPC, IPC, CGV, IOS, NIOS, DCG) in Release 4.6.x have been changed and are supported by RMON-managed PMs in Release 5.0.

**New Card Support**

The following new cards are supported by TL1 in Release 5.0.

- DS3XM12
- DS3-EC1-48
- CE-100T-8
- MXP-MR-2.5G
- MXPP-MR-2.5G
- TXP-MR-10E
- MXP-2.5G-10E
- TCC2P

## GFP/HDLC

TL1 GFP/HDLC support is added in Release 5.0 for following cards:

- ML100T-12
- ML1000-2
- ML-100T-8
- FC-MR-4
- MXP-MR-2.5G
- MXPP-MR-2.5G

## VCAT Enhancements

In Release 5.0. Low Order VCAT support is added for the CE-100T-8 card. The DLT-VCG and DLT-CRS-PATH commands support the new parameter “CMDMDE” (Command Mode).

## Pluggable Port Module

PPM interface support is added for the following cards:

- TXP-MR-2.5G
- TXPP-MR-2.5G
- TXP-MR-10E
- MXP-2.5G\_10G
- MXP-2.5G\_10E
- MXP-MR-2.5G  
MXPP-MR-2.5G

## Additional Functional Support

The following additional high level features add functional support in Release 5.0 TL1.

- Naming TL1 Cross-Connect feature is added to Release 5.0.
- Port naming support is added in Release 5.0.
- TL1 support for static routes is added in Release 5.0.
- TL1 support for SNMP configuration is added in Release 5.0.
- The “CLNT” (Client) modifier is removed from Release 5.0. The new commands, ENT-<MOD1PAYLOAD> and <DLT-MOD1PAYLOAD>, are introduced instead.
- Support for a RTRV-NETTYPE command is added over all platforms. This command is used to retrieve equipment-related information for the NE.
- Provisionable Patch Cord support is added in Release 5.0.
- Separation of Flow Control and Auto Negotiation support is added in Release 5.0.
- Optimized 1+1, 64K Bits Facility and SSM Selectable Feature (ADMIN SSM) support is added in Release 5.0. The optimized 1+1 Feature is supported only on OC3 and OC3-8 cards.
- For DS3 type cards, Port Layer is added in STS and VT aids.
- A new cross-connect type, “DIAG” (CCT = DIAG), is added in Release 5.0.
- Fiber Channel-Multi Rate (FC-MR) Distance Extension feature is supported in Release 5.0 TL1.

- TL1 BLSR DRI support is added in Release 5.0.

## TL1 Command Changes

### New Commands

The following commands are added in Release 5.0. (Also see the [“New DWDM Commands”](#) section on page 79.)

- DLT-<MOD1PAYLOAD>
- DLT-RMONTH-<MOD2>
- DLT-ROUTE
- ED-10GIGE
- ED-ALS
- ED-APC
- ED-FSTE
- ED-GFP
- ED-GIGE
- ED-HDLC
- ED-LNKTERM
- ED-<MOD1FCPAYLOAD>ED-<MOD1FICONPAYLOAD>
- ED-<MOD2DWDMPAYLOAD>
- ED-POS
- ED-SLV-WDMANS
- ED-TRAPTABLE
- ED-VCG
- ENT-LNKTERM
- ENT-<MOD1PAYLOAD>
- ENT-RMONTH-<MOD2>
- ENT-ROUTE
- ENT-TRAPTABLE
- OPR-APC
- OPR-SLV-WDMANS
- RMV-EQPT
- RST-EQPT
- RTRV-10GIGE
- RTRV-APC
- RTRV-GFP
- RTRV-LNKTERM
- RTRV-<MOD1FCPAYLOAD>

- RTRV-<MOD1FICONPAYLOAD>
- RTRV-<MOD2DWDMPAYLOAD>
- RTRV-NE-APC
- RTRV-OPM
- RTRV-RMONTH-<MOD2>
- RTRV-ROUTE
- RTRV-SLV-WDMANS
- RTRV-NETTYPE

### Commands No Longer Supported

The following commands are no longer supported in Release 5.0. (Also see the [“DWDM Commands Removed”](#) section on page 80.)

- DLT-FFP-CLNT
- ED-CLNT
- ED-FC
- ED-FFP-CLNT
- ED-TRC-CLNT
- ED-VCM
- ENT-FFP-CLNT
- INIT-REG-CLNT
- OPR-LASER-OTS
- OPR-LPBK-CLNT
- OPR-PROTNSW-CLNT
- RLS-LASER-OTS
- RLS-LPBK-CLNT
- RLS-PROTNSW-CLNT
- RMV-CLNT
- RST-CLNT
- RTRV-ALM-CLNT
- RTRV-ALM-VCM
- RTRV-ALMTH-CLNT
- RTRV-CLNT
- RTRV-COND-CLNT
- RTRV-COND-VCM
- RTRV-DWDM
- RTRV-FC
- RTRV-FFP-CLNT
- RTRV-PM-CLNT

- RTRV-PMSCHED-CLNT
- RTRV-PROTNSW-CLNT
- RTRV-TH-CLNT
- RTRV-TRC-CLNT
- RTRV-VCM
- SCHED-PMREPT-CLNT
- SET-ALMTH-CLNT
- SET-TH-CLNT

### New DWDM Commands

The following DWDM commands are new in Releases 4.7 and 5.0.

- DLT-EQPT
- DLT-PAYLOAD
- ED-10GIGE
- ED-ALS
- ED-APC
- ED-ESCON
- ED-EQPT
- ED-GIGE
- ED-<MOD2DWDMPAYLOAD>
- ED-<OCN\_TYPE>
- ED-SLV-WDMANS
- ENT-EQPT
- ENT-<PAYLOAD>
- INIT-REG-<MOD2>
- OPR-ALS
- OPR-APC
- OPR-SLV-WDMANS
- OPR-WDMANS
- RMV-<MOD2\_IO>
- RST-<MOD2\_IO>
- RTRV-10GIGE
- RTRV-ALM-ALL
- RTRV-ALM-EQPT
- RTRV-ALM-<MOD2ALM>
- RTRV-ALS
- RTRV-APC
- RTRV-COND-ALL

- RTRV-COND-EQPT
- RTRV-COND-<MOD2ALM>
- RTRV-ESCON
- RTRV-EQPT
- RTRV-FAC
- RTRV-GIGE
- RTRV-INV
- RTRV-<MOD2DWDMPAYLOAD>
- RTRV-NE-APC
- RTRV-<OCN\_TYPE>
- RTRV-OPM
- RTRV-PM-<MOD2>
- RTRV-PMSCHED-<MOD2>
- RTRV-SLV-WDMANS
- RTRV-TH-<MOD2>
- SCHED-PMREPT-<MOD2>
- SET-TH-<MOD2>

#### DWDM Commands Removed

The following DWDM commands were in Release 4.5, but are removed as of Release 4.7.

- DLT-FFP-CLNT
- ED-CLNT
- ED-DWDM
- ED-FFP-CLNT
- ED-TRC-CLNT
- ENT-FFP-CLNT
- OPR-AONS
- OPR-LASER-OTS
- OPR-PROTNSW-CLNT
- RLS-LASER-OTS
- RLS-PROTNSW-CLNT
- RTRV-CLNT
- RTRV-DWDM
- RTRV-FFP-CLNT
- RTRV-PROTNSW-CLNT
- RTRV-TRC-CLNT

## Command Syntax Changes

The syntax of the following commands is changed in Release 5.0.

### ALW-MSG-ALL syntax:

```
ALW-MSG-ALL:<TID>::<CTAG>[::,];
```

Is changed to:

```
ALW-MSG-ALL:<TID>:<aid>:<CTAG>[::,];
```

### DLT-WLEN syntax:

```
DLT-WLEN:<TID>:<aid>:<CTAG>:::[CMDMDE=<cmdmde>];
```

Is changed to:

```
DLT-WLEN:<TID>:<aid>:<CTAG>:::[CMDMDE=<cmdmde>],[CKTID=<cktId>];
```

### ED-BITS syntax:

```
ED-BITS:<TID>:<aid>:<CTAG>:::[LINECDE=<linecde>],[FMT=<fmt>],[SABIT=<sabit>],[IMPEDANCE=<impedance>],[LBO=<lbo>],[SYNCMSG=<syncmsg>],[AISTHRSHLD=<ai  
isthrshld>][:<pst>];
```

Is changed to:

```
ED-BITS:<TID>:<aid>:<CTAG>:::[LINECDE=<linecde>],[FMT=<fmt>],[SABIT=<sabit>],[IMPEDANCE=<impedance>],[LBO=<lbo>],[SYNCMSG=<syncmsg>],[AISTHRSHLD=<a  
isthrshld>],[BITSFAC=<bitsfac>],[ADMSSM=<admssm>][:<pst>];
```

### ED-CRS-STS-PATH syntax:

```
ED-CRS-STS-PATH:<TID>:<src>,<dst>:<CTAG>::[<cct>]:[ADD=<add>],[REMOVE=<re  
move>]:<pst>],[<sst>];
```

Is changed to:

```
ED-CRS-STS-PATH:<TID>:<src>,<dst>:<CTAG>::[<cct>]:[ADD=<add>],[REMOVE=<re  
move>],[CKTID=<cktid>],[CMDMDE=<cmdmde>]:<pst>],[<sst>];
```

### ED-CRS-VT-PATH syntax:

```
ED-CRS-VT-PATH:<TID>:<src>,<dst>:<CTAG>:::[ADD=<add>],[REMOVE=<remove>]:<  
pst>],[<sst>];
```

Is changed to:

```
ED-CRS-VT-PATH:<TID>:<src>,<dst>:<CTAG>:::[ADD=<add>],[REMOVE=<remove>],[  
CKTID=<cktid>],[CMDMDE=<cmdmde>]:<pst>],[<sst>];
```

### ED-DS1 syntax:

```
ED-DS1:<TID>:<aid>:<CTAG>:::[TACC=<tacc>],[TAPTYPE=<taptype>];
```

Is changed to:

```
ED-DS1:<TID>:<aid>:<CTAG>:::[TACC=<tacc>],[TAPTYPE=<taptype>],[MODE=<mode  
>],[FMT=<fmt>];
```

**ED-DS3I** syntax:

```
ED-DS3I:[<TID>]:<aid>:<CTAG>:::[FMT=<fmt>],[LINECDE=<linecde>],[LBO=<lbo>],[I
NHFELPBK=<inhfelpbk>],[TACC=<tacc>],[TAPTYPE=<tatype>],[SFBER=<sfber>],[SDB
ER=<sdber>],[SOAK=<soak>]:[<pst>],[<sst>];
```

Is changed to:

```
ED-DS3I:[<TID>]:<aid>:<CTAG>:::[FMT=<fmt>],[LINECDE=<linecde>],[LBO=<lbo>],[I
NHFELPBK=<inhfelpbk>],[TACC=<tacc>],[TAPTYPE=<tatype>],[SFBER=<sfber>],[SDB
ER=<sdber>],[SOAK=<soak>],[NAME=<name>],[CMDMDE=<cmdmde>]:[<pst>],[<sst>];
```

**ED-E1** syntax:

```
ED-E1:[<TID>]:<aid>:<CTAG>:::[LINECDE=<linecde>],[FMT=<fmt>],[TACC=<tacc>],[T
APTYPE=<tatype>],[SFBER=<sfber>],[SDBER=<sdber>],[SOAK=<soak>]:[<pst>],[<sst>]
;
```

Is changed to:

```
ED-E1:[TID]:<aid>:[CTAG]:::[LINECDE=<linecde>],[FMT=<fmt>],[TACC=<tacc>],[TAP
TYPE=<tatype>],[SFBER=<sfber>],[SDBER=<sdber>],[SOAK=<soak>],[NAME=<name>],[
CMDMDE=<cmdmde>]:[<pst>],[<sst>];
```

**ED-E3** syntax:

```
ED-E3:[<TID>]:<aid>:<CTAG>:::[TACC=<tacc>],[TAPTYPE=<tatype>],[SFBER=<sfber>,
][SDBER=<sdber>],[SOAK=<soak>]:[<pst>],[<sst>];
```

Is changed to:

```
ED-E3:[TID]:<aid>:[CTAG]:::[TACC=<tacc>],[TAPTYPE=<tatype>],[SFBER=<sfber>],[S
DBER=<sdber>],[SOAK=<soak>],[NAME=<name>],[CMDMDE=<cmdmde>]:[<pst>],[<sst
>];
```

**ED-E4** syntax:

```
ED-E4:[<TID>]:<src>:<CTAG>:::[SFBER=<sfber>],[SDBER=<sdber>],[SOAK=<soak>]:[<
pst>],[<sst>];
```

Is changed to:

```
ED-E4:[TID]:<src>:[CTAG]:::[SFBER=<sfber>],[SDBER=<sdber>],[SOAK=<soak>],[NAM
E=<name>],[CMDMDE=<cmdmde>]:[<pst>],[<sst>];
```

**ED-EC1** syntax:

```
ED-EC1:[<TID>]:<aid>:<CTAG>:::[PJMON=<pjmon>],[LBO=<lbo>],[SOAK=<soak>],[SF
BER=<sfber>],[SDBER=<sdber>]:[<pst>],[<sst>];
```

Is changed to:

```
ED-EC1:[<TID>]:<aid>:<CTAG>:::[PJMON=<pjmon>],[LBO=<lbo>],[SOAK=<soak>],[SF
BER=<sfber>],[SDBER=<sdber>],[NAME=<name>],[CMDMDE=<cmdmde>]:[<pst>],[<sst
>];
```

**ED-EQPT** syntax:

```
ED-EQPT:[<TID>]:<aid>:<CTAG>:::[PROTID=<protid>],[PRTYPE=<prtype>],[RVRTV=<r
rvtv>],[RVTM=<rvtm>],[CMDMDE=<cmdmde>]:[<pst>];
```

Is changed to:

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

**ED-G1000** syntax:

```
ED-G1000:[<TID>]:<aid>:<CTAG>:::[MFS=<mfs>],[FLOW=<flow>],[LOWMRK=<int>],[
HIWMRK=<int>],[<pst>],[<sst>];
```

Is changed to:

```
ED-G1000:[<TID>]:<aid>:<CTAG>:::[MFS=<mfs>],[FLOW=<flow>],[LOWMRK=<int>],[
HIWMRK=<int>],[NAME=<name>],[CMDMDE=<cmdmde>]:[<pst>],[<sst>];
```

**ED-OCH** syntax:

```
ED-OCH:[<TID>]:<aid>:<CTAG>:::[RDIRN=<rdirn>],[EXPWLEN=<expwlen>],[VOAATT
N=<voaattn>],[VOAPWR=<voapwr>],[CALOPWR=<calopwr>],[CHPOWER=<chpower>],[
NAME=<portname>],[SFBER=<sfber>],[SDBER=<sdber>],[OSDBER=<osdber>],[ALSMOD
E=<alsmode>],[ALSRCINT=<alsrcint>],[ALSRCPW=<alsrcpw>],[COMM=<comm>],[GCC
RATE=<gccrate>],[DWRAP=<drwrap>],[FEC=<fec>],[MACADDR=<macaddr>],[SYNCMS
G=<syncmsg>],[SENDDUS=<senddus>],[RLASER=<rlaser>],[SOAK=<soak>],[OSPF=<osp
f>]:[<pst>],[<sst>];
```

Is changed to:

```
ED-OCH:[<TID>]:<aid>:<CTAG>:::[RDIRN=<rdirn>],[EXPWLEN=<expwlen>],[VOAATT
N=<voaattn>],[VOAPWR=<voapwr>],[CALOPWR=<calopwr>],[CHPOWER=<chpower>],[
NAME=<portname>],[SFBER=<sfber>],[SDBER=<sdber>],[OSDBER=<osdber>],[COMM=<
comm>],[GCCRATE=<gccrate>],[DWRAP=<drwrap>],[FEC=<fec>],[PAYLOADMAP=<payl
oadmap>],[MACADDR=<macaddr>],[SYNCMSG=<syncmsg>],[SENDDUS=<senddus>],[S
OAK=<soak>],[OSPF=<ospf>],[CMDMDE=<cmdmde>]:[<pst>],[<sst>];
```

**ED-OMS** syntax:

```
ED-OMS:[<TID>]:<aid>:<CTAG>:::[RDIRN=<rdirn>],[EXPBAND=<expband>],[VOAATT
N=<voaattn>],[VOAPWR=<voapwr>],[CALOPWR=<calopwr>],[CHPOWER=<chpower>]:[
<pst>],[<sst>];
```

Is changed to:

```
ED-OMS:[<TID>]:<aid>:<CTAG>:::[RDIRN=<rdirn>],[EXPBAND=<expband>],[VOAATT
N=<voaattn>],[VOAPWR=<voapwr>],[CALOPWR=<calopwr>],[CHPOWER=<chpower>],[
NAME=<name>],[SOAK=<soak>],[CMDMDE=<cmdmde>]:[<pst>],[<sst>];
```

**ED-OTS** syntax:

```
ED-OTS:[<TID>]:<aid>:<CTAG>:::[RDIRN=<rdirn>],[VOAATTN=<voaattn>],[VOAPWR=
<voapwr>],[CALOPWR=<calopwr>],[CALTILT=<caltilt>],[OSRI=<osri>],[ALSMODE=<als
mode>],[ALSRCINT=<alsrcint>],[ALSRCPW=<alsrcpw>],[EXPGAIN=<gain>]:[<pst>],[<ss
t>];
```

Is changed to:

```
ED-OTS:[<TID>]:<aid>:<CTAG>:::[RDIRN=<rdirn>],[VOAATTN=<voaattn>],[VOAPWR=
<voapwr>],[OFFSET=<offset>],[CALTILT=<caltilt>],[OSRI=<osri>],[AMPLMODE=<ampl
mode>],[CHPOWER=<chpower>],[EXPGAIN=<expgain>],[NAME=<name>],[SOAK=<soak
>],[CMDMDE=<cmdmde>]:[<pst>],[<sst>];
```

**ED-STM1E** syntax:

```
ED-STM1E:[<TID>]:<src>:<CTAG>:::[SYNCSMSG=<syncmsg>],[SENDDUS=<senddus>],[
SFBER=<sfber>],[SDBER=<sdber>],[SOAK=<soak>]:[<pst>],[<sst>];
```

Is changed to:

```
ED-STM1E:[<TID>]:<src>:<CTAG>:::[SYNCSMSG=<syncmsg>],[SENDDUS=<senddus>],[
SFBER=<sfber>],[SDBER=<sdber>],[SOAK=<soak>],[NAME=<name>],[CMDMDE=<cmd
mde>]:[<pst>],[<sst>];
```

**ED-T1** syntax:

```
ED-T1:[<TID>]:<aid>:<CTAG>:::[LINECDE=<linecde>],[FMT=<fmt>],[LBO=<lbo>],[TAC
C=<tacc>],[TAPTYPE=<taptype>],[SOAK=<soak>],[SFBER=<sfber>],[SDBER=<sdber>]:[
<pst>],[<sst>];
```

Is changed to:

```
ED-T1:[<TID>]:<aid>:<CTAG>:::[LINECDE=<linecde>],[FMT=<fmt>],[LBO=<lbo>],[TAC
C=<tacc>],[TAPTYPE=<taptype>],[SOAK=<soak>],[SFBER=<sfber>],[SDBER=<sdber>],[
NAME=<name>],[CMDMDE=<cmdmde>]:[<pst>],[<sst>];
```

**ED-T3** syntax:

```
ED-T3:[<TID>]:<aid>:<CTAG>:::[FMT=<fmt>],[LINECDE=<linecde>],[LBO=<lbo>],[INH
FELPBK=<inhfelpbk>],[TACC=<tacc>],[TAPTYPE=<taptype>],[SOAK=<soak>],[SFBER=<
sfber>],[SDBER=<sdber>]:[<pst>],[<sst>];
```

Is changed to:

```
ED-T3:[<TID>]:<aid>:<CTAG>:::[FMT=<fmt>],[LINECDE=<linecde>],[LBO=<lbo>],[INH
FELPBK=<inhfelpbk>],[TACC=<tacc>],[TAPTYPE=<taptype>],[SOAK=<soak>],[SFBER=<
sfber>],[SDBER=<sdber>],[NAME=<name>],[CMDMDE=<cmdmde>]:[<pst>],[<sst>];
```

**ED-VC3** syntax:

```
ED-VC3:[<TID>]:<src>:<CTAG>:::[RVRTV=<rvrtv>],[RVTM=<rvtm>],[HOLDOFFTIMER
=<holdofftimer>],[TACC=<tacc>],[TAPTYPE=<taptype>]:[<pst>],[<sst>];
```

Is changed to:

```
ED-VC3:[<TID>]:<src>:<CTAG>:::[RVRTV=<rvrtv>],[RVTM=<rvtm>],[HOLDOFFTIMER
=<holdofftimer>],[TACC=<tacc>],[TAPTYPE=<taptype>],[CMDMDE=<cmdmde>],[EXPTR
C=<exptrc>],[TRC=<trc>],[TRCMODE=<trcmode>]:[<pst>],[<sst>];
```

**ED-VT1** syntax:

```
ED-VT1:[<TID>]:<aid>:<CTAG>:::[RVRTV=<rvrtv>],[RVTM=<rvtm>],[HOLDOFFTIMER
=<holdofftimer>],[TACC=<tacc>],[TAPTYPE=<taptype>]:[<pst>],[<sst>];
```

Is changed to:

```
ED-VT1:[<TID>]:<aid>:<CTAG>:::[RVRTV=<rvrtv>],[RVTM=<rvtm>],[HOLDOFFTIMER
=<holdofftimer>],[TACC=<tacc>],[TAPTYPE=<taptype>],[CMDMDE=<cmdmde>],[EXPTR
C=<exptrc>],[TRC=<trc>],[TRCMODE=<trcmode>]:[<pst>],[<sst>];
```

**ED-WDMANS** syntax:

```
ED-WDMANS:[<TID>]:<aid>:<CTAG>:::[POWER-IN=<powerIn>],[POWER-OUT=<powerOut>],[POWER-EXP=<powerExp>],[POWER-DROP=<powerDrop>],[SYS-TYPE=<sysType>],[NTW-TYPE=<ringType>];
```

Is changed to:

```
ED-WDMANS:[<TID>]:<aid>:<CTAG>:::[POWERIN=<powerIn>],[POWEROUT=<powerOut>],[POWEREXP=<powerExp>],[NTWTYPE=<ringType>];
```

**ED-WLEN** syntax:

```
ED-WLEN:[<TID>]:<aid>:<CTAG>:::[SIZE=<size>]:[<pst>],[<sst>];
```

Is changed to:

```
ED-WLEN:[<TID>]:<aid>:<CTAG>:::[SIZE=<size>],[CKTID=<cktId>],[CMDMDE=<cmdmde>]:[<pst>],[<sst>];
```

**ENT-EQPT** syntax:

```
ENT-EQPT:[<TID>]:<aid>:<CTAG>:::<aidtype>:[PROTID=<protid>],[PRTYPE=<prtype>],[RVRTV=<rvrtv>],[RVTM=<rvtm>],[CMDMDE=<cmdmde>][:];
```

Is changed to:

```
ENT-EQPT:[<TID>]:<aid>:<CTAG>:::<aidtype>:[PROTID=<protid>],[PRTYPE=<prtype>],[RVRTV=<rvrtv>],[RVTM=<rvtm>],[CARDMODE=<cardmode>],[PEERID=<protid>],[REGENNAME=<regenname>],[PWL=<pwl>],[CMDMDE=<cmdmde>][:];
```

**ENT-VCG** syntax:

```
ENT-VCG:[<TID>]:<src>:<CTAG>:::TYPE=<type>,TXCOUNT=<txcount>,[CCT=<cct>],[LICAS=<lcas>]:;
```

Is changed to:

```
ENT-VCG:[TID]:<src>:[CTAG]:::TYPE=<type>,TXCOUNT=<txcount>,[CCT=<cct>],[LICAS=<lcas>],[BUFFERS=<buffers>],[NAME=<name>][:];
```

**ENT-WLEN** syntax:

```
ENT-WLEN:[<TID>]:<aid>:<CTAG>:::[SIZE=<size>]:[<pst>],[<sst>];
```

Is changed to:

```
ENT-WLEN:[<TID>]:<aid>:<CTAG>:::[<wct>]:[SIZE=<size>],[CKTID=<cktId>]:[<pst>],[<sst>];
```

**RTRV-ALM-ALL** syntax:

```
RTRV-ALM-ALL:[<TID>]::<CTAG>:::<ntfcncde>],[<condtype>],[<srveff>][,,,];
```

Is changed to:

```
RTRV-ALM-ALL:[<TID>]:[<aid>]:<CTAG>:::<ntfcncde>],[<condtype>],[<srveff>][,,,];
```

**RTRV-COND-ALL** syntax:

```
RTRV-COND-ALL:[<TID>]::<CTAG>:::<typereq>][,,,];
```

Is changed to:

```
RTRV-COND-ALL:[<TID>]:[<aid>]:<CTAG>:::<typereq>][,,,];
```

**RTRV-CRS** syntax:

RTRV-CRS:[<TID>]:<aid>:<CTAG>[:::CRSTYPE=<crstype>][:];

Is changed to:

RTRV-CRS:[<TID>]:[<aid>]:<CTAG>[:::CRSTYPE=<crstype>][:];

**RTRV-GIGE** syntax:

RTRV-GIGE:[<TID>]:<aid>:<CTAG>;

Is changed to:

RTRV-GIGE:[<TID>]:<aid>:<CTAG>[:::];

**RTRV-NE-WDMANS** syntax:

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

Is changed to:

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

**RTRV-WDMANS** syntax:

RTRV-WDMANS[:<TID>]:<aid>:<CTAG>;

Is changed to:

RTRV-WDMANS[:<TID>]:<aid>:<CTAG>[:::];

## TL1 Response Changes

The following TL1 responses have changed in Release 5.0.

**RTRV-BITS** response:

<aid>::[<linecde>],[<fmt>],[<lbo>],[<syncmsg>],[<aisthrshld>],[<saBit>]:[<pst>]

Is changed to:

<aid>::[<linecde>],[<fmt>],[<lbo>],[<syncmsg>],[<aisthrshld>],[<saBit>],[<bitsfac>],[<admssm>]:[<pst>]

**RTRV-CRS** response:

<from>,<to>:<cct>,<level>::<pst>,[<sst>]

Is changed to:

<from>,<to>:<cct>,<level>::[<dritype>],[<drinode>],[<cktId>]:<pst>-<pstq>[,<sst>[&<sst>]\*]

**RTRV-DS1** response:

<aid>::[<tacc>],[<tatype>]

Is changed to:

<aid>::[<tacc>],[<tatype>],[<mode>],[<fmt>]

**RTRV-DS3I** response:

```
<aid>::<fmt>,<linecde>,<lbo>,<tacc>,<taptype>,<sfber>,<sdber>,<soak>:<pst>,<sst>
```

Is changed to:

```
<aid>::<fmt>,<linecde>,<lbo>,<tacc>,<taptype>,<sfber>,<sdber>,<soak>,<name>:<pst>-<pstq>,<sst>[&<sst>]*]
```

**RTRV-E1** response:

```
<aid>::<linecde>,<fmt>,<tacc>,<taptype>,<sfber>,<sdber>,<soak>:<pst>,<sst>
```

Is changed to:

```
<aid>::<linecde>,<fmt>,<tacc>,<taptype>,<sfber>,<sdber>,<soak>,<name>:<pst>-<pstq>,<sst>[&<sst>]*]
```

**RTRV-E4** response:

```
<aid>::<payload>,<sfber>,<sdber>,<soak>:<pst>,<sst>
```

Is changed to:

```
<aid>::<payload>,<sfber>,<sdber>,<soak>,<name>:<pst>-<pstq>,<sst>[&<sst>]*]
```

**RTRV-EC1** response:

```
<aid>::<pjmon>,<lbo>,<rxequal>,<soak>,<soakleft>,<sfber>,<sdber>:<pst>,<sst>
```

Is changed to:

```
<aid>::<pjmon>,<lbo>,<rxequal>,<soak>,<soakleft>,<sfber>,<sdber>,<name>:<pst>-<pstq>,<sst>[&<sst>]*]
```

**RTRV-EQPT** response:

```
<aid>:<aidtype>,<equip>,<role>,<status>:<protid>,<prtype>,<rvrtv>,<rvtm>,<cardname>,<ioscfg>:<pst>,<sst>
```

Is changed to:

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

**RTRV-FSTE** response:

```
<aid>::<adminstate>,<linkstate>,<mtu>,<flowctrl>,<duplex>,<speed>
```

Is changed to:

```
<aid>::<adminstate>,<linkstate>,<mtu>,<flowctrl>,<duplex>,<speed>,<flow>,<expduplex>,<expspeed>,<vlancostthreshold>,<iptosthreshold>,<name>:<pst>-<pstq>,<sst>[&<sst>]*]
```

**RTRV-G1000** response:

```
<aid>::<mfs>,<flow>,<lan>,<optics>,<soak>,<als>,<trans>,<tport>,<lwmrk>,<hiwmrk>,<buff>:<soakleft>:<pst>,<sst>
```

Is changed to:

```
<aid>::<mfs>,<flow>,<lan>,<optics>,<soak>,<trans>,<tport>,<lwmrk>,<hiwmrk>,<buff>:<soakleft>,<autoneg>,<name>,<encap>:<pst>-<pstq>,<sst>[&<sst>]*]
```

**RTRV-GIGE** response:

```
<aid>::[<adminstate>],[<linkstate>],[<mtu>],[<flowctrl>],[<optics>],[<duplex>],[<speed>]
```

Is changed to:

```
<aid>::[<adminstate>],[<linkstate>],[<mtu>],[<flowctrl>],[<optics>],[<duplex>],[<speed>],[<name>]:<pst>-<pstq>[,<sst>[&<sst>]*]
```

**RTRV-NE-WDMANS** response:

```
<aid>,<aidtype>::[<regulated>]
```

Is changed to:

```
<aid>,<aidtype>::[<regulated>],[<param>]:
```

**RTRV-OCH** response:

```
<aid>:.,[<role>],[<status>]:[<rdirn>],[<opticalPortType>],[<power>],[<expWlen>],[<actWlen>],[<iloss>],[<voamode>],[<voaattn>],[<voapwr>],[<voarefattn>],[<voarefpwr>],[<refopwr>],[<calopwr>],[<chpower>],[<portname>],[<sfber>],[<sdber>],[<alsmode>],[<alsrcint>],[<alsrcpw>],[<comm>],[<gccrate>],[<dwrap>],[<fec>],[<osfber>],[<osdber>],[<macaddr>],[<syncmsg>],[<senddus>],[<lsrstat>],[<soak>],[<soakleft>],[<ospf>]:<pst>[,<sst>]
```

Is changed to:

```
<aid>:.,[<role>],[<status>]:[<rdirn>],[<opticalPortType>],[<power>],[<expWlen>],[<actWlen>],[<iloss>],[<voamode>],[<voaattn>],[<voapwr>],[<voarefattn>],[<voarefpwr>],[<refopwr>],[<calopwr>],[<chpower>],[<portname>],[<sfber>],[<sdber>],[<comm>],[<gccrate>],[<dwrap>],[<fec>],[<payloadmap>],[<lbclcurr>],[<optcurr>],[<oprcurr>],[<osfber>],[<osdber>],[<macaddr>],[<syncmsg>],[<senddus>],[<soak>],[<soakleft>],[<ospf>]:<pst>-<pstq>[,<sst>[&<sst>]*]
```

**RTRV-OCN-TYPE** response:

```
<aid>:[<stringValue>],[<role>],[<status>]:[<dcc>],[<area>],[<tmgref>],[<syncmsg>],[<senddus>],[<pjmon>],[<sfber>],[<sdber>],[<mode>],[<wvlen>],[<ringid>],[<blsrtype>],[<mux>],[<unic>],[<ccid>],[<nbrix>],[<soak>],[<soakleft>],[<ssmrcv>],[<ospf>],[<ldcc>],[<alsmode>],[<alsrcint>],[<alsrcpw>],[<lsrstat>]:<pst>[,<sst>]
```

Is changed to:

```
<aid>:[<stringValue>],[<role>],[<status>]:[<dcc>],[<area>],[<tmgref>],[<syncmsg>],[<senddus>],[<pjmon>],[<sfber>],[<sdber>],[<mode>],[<wvlen>],[<ringid>],[<blsrtype>],[<mux>],[<unic>],[<ccid>],[<nbrix>],[<soak>],[<soakleft>],[<ssmrcv>],[<ospf>],[<ldcc>],[<lbclcurr>],[<optcurr>],[<oprcurr>],[<name>],[<exptrc>],[<trc>],[<inctrc>],[<trcmode>],[<trcformat>],[<admssm>],[<senddusff>]:<pst>-<pstq>[,<sst>[&<sst>]*]
```

**RTRV-OMS** response:

```
<aid>::<rdirn>,<opticalPortType>,<power>,<expBand>,<actBand>,[<iloss>],[<voamode>],[<voaattn>],[<voapwr>],[<voarefattn>],[<voarefpwr>],[<refopwr>],[<calopwr>],[<chpower>]:<pst>[,<sst>]
```

Is changed to:

```
<aid>::<rdirn>,<opticalPortType>,<power>,<expBand>,<actBand>,[<iloss>],[<voamode>],[<voaattn>],[<voapwr>],[<voarefattn>],[<voarefpwr>],[<refopwr>],[<calopwr>],[<chpower>],[<name>],[<soak>],[<soakleft>]:<pst>-<pstq>[,<sst>[&<sst>]*]
```

**RTRV-OSC** response:

```
<aid>::[<ringId>],[<nodeId>],[<east>],[<west>]
```

Is changed to:

```
<aid>::[<ringId>],[<nodeId>],[<east>],[<west>],[<name>]
```

**RTRV-OTS** response:

```
<aid>::<rdirn>,<opticalPortType>,[<power>],[<iloss>],[<voamode>],[<voaattn>],[<voapwr>]
,[<voarefattn>],[<voarefpwr>],[<laserst>],[<osri>],[<alsmode>],[<alsrcint>],[<alsrcpw>],[<a
mplmode>],[<gain>],[<expgain>],[<refopwr>],[<calopwr>],[<reftilt>],[<caltilt>],[<dculoss>]
,[<awgst>],[<heatst>]:<pst>,<sst>
```

Is changed to:

```
<aid>::<rdirn>,<opticalPortType>,[<power>],[<iloss>],[<voamode>],[<voaattn>],[<voapwr>]
,[<voarefattn>],[<voarefpwr>],[<osri>],[<amplmode>],[<chpower>],[<gain>],[<expgain>],[<
refopwr>],[<offset>],[<reftilt>],[<caltilt>],[<aseopwr>],[<dculoss>],[<awgst>],[<heatst>],[<n
ame>],[<soak>],[<soakleft>]:<pst>-<pstq>,<sst>[&<sst>]*]
```

**RTRV-POS** response:

```
<aid>::[<adminstate>],[<linkstate>],[<mtu>]
```

Is changed to:

```
<aid>::[<adminstate>],[<linkstate>],[<mtu>],[<encap>],[<name>]:<pst>-<pstq>,<sst>[&<sst>
]*]
```

**RTRV-STM1E** response:

```
<aid>::[<payload>],[<syncmsg>],[<senddus>],[<sfber>],[<sdber>],[<soak>]:<pst>,<sst>
```

Is changed to:

```
<aid>::[<payload>],[<syncmsg>],[<senddus>],[<sfber>],[<sdber>],[<soak>],[<name>]:<pst>
-<pstq>,<sst>[&<sst>]*]
```

**RTRV-T1** response:

```
<aid>::[<linecde>],[<fmt>],[<lbo>],[<tacc>],[<taptype>],[<soak>],[<soakleft>],[<sfber>],[<s
dber>]:<pst>,<sst>
```

Is changed to:

```
<aid>::[<linecde>],[<fmt>],[<lbo>],[<tacc>],[<taptype>],[<soak>],[<soakleft>],[<sfber>],[<s
dber>],[<name>],[<syncmsg>],[<senddus>],[<retime>]:<pst>-<pstq>,<sst>[&<sst>]*]
```

**RTRV-T3** response:

```
<aid>::[<fmt>],[<linecde>],[<lbo>],[<inhfelpbk>],[<tacc>],[<taptype>],[<soak>],[<soakleft>]
,[<sfber>],[<sdber>]:<pst>,<sst>
```

Is changed to:

```
<aid>::[<fmt>],[<linecde>],[<lbo>],[<inhfelpbk>],[<tacc>],[<taptype>],[<soak>],[<soakleft>]
,[<sfber>],[<sdber>],[<name>]:<pst>-<pstq>,<sst>[&<sst>]*]
```

**RTRV-VCG** response:

```
<src>::<type>,<txcount>,<cct>,<lcas>
```

Is changed to:

```
<src>::<type>,<txcount>,<cct>,<lcas>,<buffers>,<name>]:<pst>
```

**RTRV-WDMANS** response:

```
<aid>::[<powerIn>],[<powerOut>],[<powerExp>],[<powerDrop>],[<sysType>],[<apcEnable>],
[<ringType>]
```

Is changed to:

```
<aid>::[<powerIn>],[<powerOut>],[<powerExp>],[<ringType>],[<_opticalNodeType>],[<last
rundat>],[<lastruntm>]
```

**RTRV-WLEN** response:

```
<aid>::[<mode>],[<size>]:[<pst>],[<sst>]
```

Is changed to:

```
<aid>::[<wct>]:[<size>],[<cktId>]:<pst>-<pstq>[,<sst>[&<sst>]*]
```

## TL1 ENUM Changes

The following section, including [Table 8](#) through [Table 68](#), highlights ENUM items changed (added or removed) for Release 5.0, by ENUM type.

**Table 8** *APC\_STATE enum items added to Release 5.0*

Enum Name	Enum Value
APC_STATE_DISABLE	“DISABLE”
APC_STATE_FORCED_DISABLE	“FORCED-DISABLE”
APC_STATE_WORKING	“WORKING”

APC\_STATE is used in the following commands:

- RTRV-APC

**Table 9** *BITS\_FAC enum items added to Release 5.0*

Enum Name	Enum Value
RATE_2MHZ	“2M”
RATE_64K	“64K”
RATE_6MHZ	“6M”
RATE_E1	“E1”
RATE_T1	“T1”

BITS\_FAC is used in the following commands:

- ED-BITS
- RTRV-BITS

**Table 10** *BUFFERS enum items added to Release 5.0*

Enum Name	Enum Value
BUFFERS_DEFAULT	“DEFAULT”
BUFFERS_EXPANDED	“EXPANDED”

BUFFERS is used in the following commands:

- ENT-VCG
- RTRV-VCG

**Table 11** *CARDMODE enum items added to Release 5.0*

Enum Name	Enum Value
CARDMODE_DS3XM12_STS12	“DS3XM12-STS12”
CARDMODE_DS3XM12_STS48	“DS3XM12-STS48”
CARDMODE_DWDM_LINE	“DWDM-LINE”
CARDMODE_DWDM_SECTION	“DWDM-SECTION”
CARDMODE_DWDM_TRANS_AIS	“DWDM-TRANS-AIS”
CARDMODE_DWDM_TRANS_SQUELCH	“DWDM-TRANS-SQUELCH”
CARDMODE_FCMR_DISTANCE_EXTENSIO N	“FCMR-DISTEXTN”
CARDMODE_FCMR_LINERATE_ONLY	“FCMR-LINERATE”
CARDMODE_ML_GFP	“ML-GFP”
CARDMODE_ML_HDLC	“ML-HDLC”
CARDMODE_MXPMR25G_ESCON	“MXPMR25G-ESCON”
CARDMODE_MXPMR25G_FCGE	“MXPMR25G-FCGE”
CARDMODE_MXPMR25G_MIXED	“MXPMR25G-MIXED”
CARDMODE_UNKNOWN	“UNKNOWN”

CARDMODE is used in the following commands:

- ED-EQPTENT-EQPT
- RTRV-EQPT

**Table 12** *CCT enum items added to Release 5.0*

Enum Name	Enum Value
CCT_CCT_BERT	“DIAG”

CCT is used in the following commands:

- ED-CRS-STS-PATH
- ENT-CRS-MOD2-PATH
- ENT-CRS-STS-PATH

- ENT-CRS-VT-PATH
- ENT-VCG
- RTRV-CRS
- RTRV-VCG

**Table 13** *COMM\_TYPE enum items added to Release 5.0*

Enum Name	Enum Value
COMM_TYPE_CT_LDCC	“LDCC”

COMM\_TYPE is used in the following commands:

- ED-CLNTED-OCH
- RTRV-CLNT
- RTRV-OCH

**Table 14** *CRS\_TYPE enum items added to Release 5.0*

Enum Name	Enum Value
CRS_TYPE_STS18C	“STS18C”
CRS_TYPE_STS36C	“STS36C”

CRS\_TYPE is used in the following commands:

- RTRV-CRS

**Table 15** *DETECTION\_GUARD\_TIMER enum items added to Release 5.0*

Enum Name	Enum Value
DETECTION_GUARD_TIMER_0	“0.0”
DETECTION_GUARD_TIMER_1	“1.0”
DETECTION_GUARD_TIMER_100	“0.1”
DETECTION_GUARD_TIMER_2	“2.0”
DETECTION_GUARD_TIMER_3	“3.0”
DETECTION_GUARD_TIMER_4	“4.0”
DETECTION_GUARD_TIMER_5	“5.0”
DETECTION_GUARD_TIMER_50	“0.05”
DETECTION_GUARD_TIMER_500	“0.5”

DETECTION\_GUARD\_TIMER is used in the following commands:

- ED-FFP-MOD2
- ENT-FFP-MOD2
- RTRV-FFP-MOD2

**Table 16** *DIAGTYPE enum items added to Release 5.0*

Enum Name	Enum Value
DIAGTYPE_ASIC	“ASIC”
DIAGTYPE_BERT	“BERT”
DIAGTYPE_CLOCK	“CLOCK”
DIAGTYPE_CPU	“CPU”
DIAGTYPE_INTERCARD	“INTERCARD”
DIAGTYPE_MEMORY	“MEMORY”
DIAGTYPE_RAM	“RAM”
DIAGTYPE_ROM	“ROM”
DIAGTYPE_TEMP	“TEMP”
DIAGTYPE_VOLTAGE	“VOLTAGE”

DIAGTYPE is used in the following commands:

- DGN-EQPT

**Table 17** *DRINODE enum items added to Release 5.0*

Enum Name	Enum Value
DRINODE_INT	“INT”
DRINODE_NA	“NA”
DRINODE_PRI	“PRI”
DRINODE_SEC	“SEC”

DRINODE is used in the following commands:

- ENT-CRS-MOD2-PATH
- RTRV-CRS

**Table 18** *DRITYPE enum items added to Release 5.0*

Enum Name	Enum Value
DRITYPE_BLSR	“BLSR”
DRITYPE_BLSR_SDH	“MSSPR”
DRITYPE_UPSR	“UPSR”
DRITYPE_UPSR_BLSR	“UPSR-BLSR”
DRITYPE_UPSR_BLSR_SDH	“SNCP-MSSPR”
DRITYPE_UPSR_SDH	“SNCP”

DRITYPE is used in the following commands:

- ENT-CRS-MOD2-PATH

- RTRV-CRS

**Table 19 DS1MODE enum items added to Release 5.0**

Enum Name	Enum Value
DS1MODE_BFDL	“BFDL”
DS1MODE_FDL	“FDL”

DS1MODE is used in the following commands:

- ED-DS1
- RTRV-DS1

**Table 20 ENCAP enum items added to Release 5.0**

Enum Name	Enum Value
ENCAP_GFP_F	“GFP-F”
ENCAP_GFP_T	“GFP-T”
ENCAP_HDLC	“HDLC”
ENCAP_HDLC_LEX	“HDLC-LEX”
ENCAP_HDLC_X86	“HDLC-X86”
ENCAP_UNKNOWN	“UNKNOWN”

ENCAP is used in the following commands:

- ED-G1000
- ED-POS
- RTRV-G1000
- RTRV-POS

**Table 21 EQPT\_TYPE enum items added to Release 5.0**

Enum Name	Enum Value
EQPT_TYPE_EQPT_ID_32_DMX	“32-DMX”
EQPT_TYPE_EQPT_ID_32_DMX_O	“32-DMX-O”
EQPT_TYPE_EQPT_ID_32_MUX_O	“32-MUX-O”
EQPT_TYPE_EQPT_ID_32_WSS	“32-WSS”
EQPT_TYPE_EQPT_ID_CTX	“CTX”
EQPT_TYPE_EQPT_ID_CTX_CL_DS1	“CTX-CL-DS1”
EQPT_TYPE_EQPT_ID_CTX_CL_DS3	“CTX-CL-DS3”
EQPT_TYPE_EQPT_ID_CTX_CL_EC1	“CTX-CL-EC1”
EQPT_TYPE_EQPT_ID_CTX_CL_OC12	“CTX-CL-OC12”
EQPT_TYPE_EQPT_ID_CTX_CL_OC3	“CTX-CL-OC3”
EQPT_TYPE_EQPT_ID_DS3XM_12	“DS3XM-12”

**Table 21** EQPT\_TYPE enum items added to Release 5.0 (Continued)

Enum Name	Enum Value
EQPT_TYPE_EQPT_ID_DS3_EC1_48	“DS3-EC1-48”
EQPT_TYPE_EQPT_ID_ML2_EXIGE_MAPPER_CARD	“CE-100T-8”
EQPT_TYPE_EQPT_ID_ML2_L2L3	“ML-100T-8”
EQPT_TYPE_EQPT_ID_ML2_MAPPER	“CE-100T-8”
EQPT_TYPE_EQPT_ID_MUX2G	“MXP-MR-2.5G”
EQPT_TYPE_EQPT_ID_MUX2G_P	“MXPP-MR-2.5G”
EQPT_TYPE_EQPT_ID_MXP_2_5G_10E	“MXP-2.5G-10E”
EQPT_TYPE_EQPT_ID_PPM_1_PORT	“PPM-1”
EQPT_TYPE_EQPT_ID_TXP_MR_10E	“TXP-MR-10E”
EQPT_TYPE_EQPT_ID_XTC_DS1_STS	“DS1-STS”
EQPT_TYPE_EQPT_ID_XTC_DS3_STS	“DS3-STS”

EQPT\_TYPE is used in the following commands:

- REPT-ALM-<MOD2ALM>
- REPT-ALM-EQPT
- REPT-EVT-<MOD2ALM>
- REPT-EVT-EQPT
- REPT-EVT-SYCN

**Table 22** EQUIPMENT\_TYPE enum items added to Release 5.0

Enum Name	Enum Value
EQUIPMENT_TYPE_ET_32_DMX	IDL_ET_32_DMX
EQUIPMENT_TYPE_ET_32_DMX_O	IDL_ET_32_DMX_O
EQUIPMENT_TYPE_ET_32_MUX_O	IDL_ET_32_MUX_O
EQUIPMENT_TYPE_ET_32_WSS	IDL_ET_32_WSS
EQUIPMENT_TYPE_ET_CTX	IDL_ET_CTX
EQUIPMENT_TYPE_ET_DS3_EC1_48	IDL_ET_DS3_EC1_48
EQUIPMENT_TYPE_ET_DS3XM_12	IDL_ET_DS3XM12
EQUIPMENT_TYPE_ET_ML2_EXIGE_MAPPER_CARD	IDL_ET_ML2_EXIGE_MAPPER_CARD
EQUIPMENT_TYPE_ET_ML2_L2L3	IDL_ET_ML2_L2L3
EQUIPMENT_TYPE_ET_ML2_MAPPER	IDL_ET_ML2_MAPPER
EQUIPMENT_TYPE_ET_MUX2G	IDL_ET_MUX2G
EQUIPMENT_TYPE_ET_MUX2G_P	IDL_ET_MUX2G_P
EQUIPMENT_TYPE_ET_MXP_2_5G_10E	IDL_ET_MXP_2_5G_10E

**Table 22** *EQUIPMENT\_TYPE enum items added to Release 5.0 (Continued)*

Enum Name	Enum Value
EQUIPMENT_TYPE_ET_32_DMXX	IDL_ET_32_DMXX
EQUIPMENT_TYPE_ET_PPM_1_PORT	IDL_ET_PPM_1_PORT
EQUIPMENT_TYPE_ET_TXP_MR_10E	IDL_ET_TXP_MR_10E

EQUIPMENT\_TYPE is used in the following commands:

- ENT-EQPT

**Table 23** *FCS enum items added to Release 5.0*

Enum Name	Enum Value
FCS_16	“FCS-16”
FCS_32	“FCS-32”
FCS_NONE	“NONE”

FCS is used in the following commands:

- ED-GFP
- ED-HDLC
- RTRV-GFP
- RTRV-HDLC

**Table 24** *FEC\_MODE enum items added to Release 5.0*

Enum Name	Enum Value
FEC_ENH	“ENH”
FEC_OFF	“OFF”
FEC_STD	“STD”

FEC\_MODE is used in the following commands:

- ED-OCH
- RTRV-OCH

**Table 25** *GFP\_FILTER enum items added to Release 5.0*

Enum Name	Enum Value
GFP_FILTER_ENUM_INGRESS	“INGRESS”
GFP_FILTER_ENUM_NONE	“NONE”

GFP\_FILTER is used in the following commands:

- ED-GFP
- RTRV-GFP

**Table 26** *LASER\_STATUS* enum items no longer supported in Release 5.0

Enum Name	Enum Value
LASER_STATUS_LASER_OFF	“OFF”
LASER_STATUS_LASER_ON	“ON”

LASER\_STATUS is used in the following commands:

- RTRV-OTS

**Table 27** *LASER\_STATUS* enum items added to Release 5.0

Enum Name	Enum Value
LASER_STATUS_LASER_DOWN	“DOWN”
LASER_STATUS_LASER_UP	“UP”

LASER\_STATUS is used in the following commands:

- RTRV-OTS

**Table 28** *LPBK\_TYPE* enum items added to Release 5.0

Enum Name	Enum Value
LPBK_TYPE_FE_CMD_ESF_PAYLD_LPBK	“PAYLOAD”

LPBK\_TYPE is used in the following commands:

- OPR-LPBK-MOD2
- RLS-LPBK-MOD2

**Table 29** *MFS\_TYPE* enum items added to Release 5.0

Enum Name	Enum Value
MFS_TYPE_FC_2149	“2149”
MFS_TYPE_FC_2150	“2150”
MFS_TYPE_FC_2151	“2151”
MFS_TYPE_FC_2152	“2152”
MFS_TYPE_FC_2153	“2153”
MFS_TYPE_FC_2154	“2154”
MFS_TYPE_FC_2155	“2155”
MFS_TYPE_FC_2156	“2156”
MFS_TYPE_FC_2157	“2157”
MFS_TYPE_FC_2158	“2158”
MFS_TYPE_FC_2159	“2159”
MFS_TYPE_FC_2160	“2160”

**Table 29** *MFS\_TYPE enum items added to Release 5.0 (Continued)*

Enum Name	Enum Value
MFS_TYPE_FC_2161	"2161"
MFS_TYPE_FC_2162	"2162"
MFS_TYPE_FC_2163	"2163"
MFS_TYPE_FC_2164	"2164"
MFS_TYPE_FC_2165	"2165"
MFS_TYPE_FC_2166	"2166"
MFS_TYPE_FC_2167	"2167"
MFS_TYPE_FC_2168	"2168"
MFS_TYPE_FC_2169	"2169"
MFS_TYPE_FC_2170	"2170"
MFS_TYPE_FC_2171	"2171"
MFS_TYPE_FC_2172	"2172"
MFS_TYPE_FC_DEFAULT	"2148"

MFS\_TYPE is used in the following commands:

- ED-G1000
- RTRV-G1000

**Table 30** *MOD1PAYLOAD enum items added to Release 5.0*

Enum Name	Enum Value
MOD1PAYLOAD_10GFC	"10GFC"
MOD1PAYLOAD_10GIGE	"10GIGE"
MOD1PAYLOAD_1GFC	"1GFC"
MOD1PAYLOAD_1GFICON	"1GFICON"
MOD1PAYLOAD_2GFC	"2GFC"
MOD1PAYLOAD_2GFICON	"2GFICON"
MOD1PAYLOAD_D1VIDEO	"D1VIDEO"
MOD1PAYLOAD_DV6000	"DV6000"
MOD1PAYLOAD_EC1	"EC1"
MOD1PAYLOAD_ESCON	"ESCON"
MOD1PAYLOAD_ETRCLO	"ETRCLO"
MOD1PAYLOAD_GIGE	"GIGE"
MOD1PAYLOAD_HDTV	"HDTV"
MOD1PAYLOAD_ISC1	"ISC1"
MOD1PAYLOAD_ISC3	"ISC3"
MOD1PAYLOAD_OC12	"OC12"

**Table 30** *MOD1PAYLOAD enum items added to Release 5.0 (Continued)*

Enum Name	Enum Value
MOD1PAYLOAD_OC192	“OC192”
MOD1PAYLOAD_OC3	“OC3”
MOD1PAYLOAD_OC48	“OC48”
MOD1PAYLOAD_PASSTHRU	“PASSTHRU”
MOD1PAYLOAD_T1	“T1”
MOD1PAYLOAD_T3	“T3”
MOD1PAYLOAD_UNKNOWN	“UNKNOWN”

MOD1PAYLOAD is used in the following commands:

- ENT-<MOD1PAYLOAD>
- DLT-<MOD1PAYLOAD>

**Table 31** *MOD2 enum items no longer supported in Release 5.0*

Enum Name	Enum Value
MOD2_M2_CLNT	“CLNT”
MOD2_M2_OSC	“OSC”

MOD2 is used in the following commands:

- REPT-PM-<MOD2>
- RTRV-LNK-MOD2LNK
- RTRV-NE-WDMANS
- RTRV-PMSCHED-ALL
- RTRV-PMSCHED-<MOD2>
- RTRV-TH-<MOD2>
- RTRV-TRC-CLNT
- RTRV-TRC-OCH

**Table 32** *MOD2 enum items added to Release 5.0*

Enum Name	Enum Value
MOD2_M2_10GFC	“10GFC”
MOD2_M2_10GIGE	“10GIGE”
MOD2_M2_1GFC	“1GFC”
MOD2_M2_1GFICON	“1GFICON”
MOD2_M2_2GFC	“2GFC”
MOD2_M2_2GFICON	“2GFICON”
MOD2_M2_D1VIDEO	“D1VIDEO”

**Table 32** *MOD2 enum items added to Release 5.0 (Continued)*

<b>Enum Name</b>	<b>Enum Value</b>
MOD2_M2_DV6000	“DV6000”
MOD2_M2_E100	“E100”
MOD2_M2_E1000	“E1000”
MOD2_M2_ESCON	“ESCON”
MOD2_M2_ETRCLO	“ETRCLO”
MOD2_M2_FSTE	“FSTE”
MOD2_M2_GFPOS	“GFPOS”
MOD2_M2_HDTV	“HDTV”
MOD2_M2_ISC1	“ISC1”
MOD2_M2_ISC3	“ISC3”
MOD2_M2_PASSTHRU	“PASSTHRU”
MOD2_M2_POS	“POS”
MOD2_M2_STS18C	“STS18C”
MOD2_M2_STS36C	“STS36C”

MOD2 is used in the following commands:

- INIT-REG-<MOD2>
- OPR-LPBK-<MOD2>
- REPT-PM-<MOD2>
- RLS-LPBK-<MOD2>
- RMV-<MOD2>
- RST-<MOD2>
- RTRV-ALMTH-<MOD2>
- RTRV-LNK-MOD2LNK
- RTRV-NE-WDMANS
- RTRV-PM-<MOD2>
- RTRV-PMSCHED-ALL
- RTRV-PMSCHED-<MOD2>
- RTRV-TH-<MOD2>
- RTRV-TRC-OCH
- SCHED-PMREPT-<MOD2>
- SET-ALMTH-<MOD2>
- SET-TH-<MOD2>

**Table 33** *MOD2ALM enum items no longer supported in Release 5.0*

Enum Name	Enum Value
MOD2ALM_M2_CLNT	“CLNT”
MOD2ALM_M2_OSC	“OSC”

MOD2ALM is used in the following commands:

- REPT-ALM-MOD2ALM
- REPT-EVT-MOD2ALM
- RTRV-ALM-MOD2ALM
- RTRV-COND-MOD2ALM

**Table 34** *MOD2ALM enum items added to Release 5.0*

Enum Name	Enum Value
MOD2ALM_M2_10GFC	“10GFC”
MOD2ALM_M2_10GIGE	“10GIGE”
MOD2ALM_M2_1GFC	“1GFC”
MOD2ALM_M2_1GFICON	“1GFICON”
MOD2ALM_M2_2GFC	“2GFC”
MOD2ALM_M2_2GFICON	“2GFICON”
MOD2ALM_M2_D1VIDEO	“D1VIDEO”
MOD2ALM_M2_DV6000	“DV6000”
MOD2ALM_M2_ESCON	“ESCON”
MOD2ALM_M2_ETRCLO	“ETRCLO”
MOD2ALM_M2_GFPOS	“GFPOS”
MOD2ALM_M2_HDTV	“HDTV”
MOD2ALM_M2_ISC1	“ISC1”
MOD2ALM_M2_ISC3	“ISC3”
MOD2ALM_M2_PASSTHRU	“PASSTHRU”
MOD2ALM_M2_STS18C	“STS18C”
MOD2ALM_M2_STS36C	“STS36C”

MOD2ALM is used in the following commands:

- RTRV-ALM-MOD2ALM
- RTRV-ALM-WLEN
- RTRV-COND-MOD2ALM
- RTRV-COND-VT2

**Table 35** *MOD2B enum items no longer supported in Release 5.0*

Enum Name	Enum Value
MOD2B_M2_CLNT	“CLNT”
MOD2B_M2_FC	“FC”

MOD2B is used in the following commands:

- 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 36** *MOD2B enum items added to Release 5.0*

Enum Name	Enum Value
MOD2B_M2_10GFC	“10GFC”
MOD2B_M2_10GIGE	“10GIGE”
MOD2B_M2_1GFC	“1GFC”
MOD2B_M2_1GFICON	“1GFICON”
MOD2B_M2_2GFC	“2GFC”
MOD2B_M2_2GFICON	“2GFICON”
MOD2B_M2_D1VIDEO	“D1VIDEO”
MOD2B_M2_DV6000	“DV6000”
MOD2B_M2_ESCON	“ESCON”
MOD2B_M2_ETRCLO	“ETRCLO”
MOD2B_M2_GFPOS	“GFPOS”
MOD2B_M2_HDTV	“HDTV”
MOD2B_M2_ISC1	“ISC1”
MOD2B_M2_ISC3	“ISC3”
MOD2B_M2_PASSTHRU	“PASSTHRU”
MOD2B_M2_STS18C	“STS18C”
MOD2B_M2_STS36C	“STS36C”

MOD2B is used in the following commands:

- RTRV-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 37** MOD2O enum items no longer supported in Release 5.0

Enum Name	Enum Value
MOD2O_M2_CLNT	“CLNT”

**Table 38** MOD2O enum items added to Release 5.0

Enum Name	Enum Value
MOD2O_M2_10GFC	“10GFC”
MOD2O_M2_10GIGE	“10GIGE”
MOD2O_M2_D1VIDEO	“D1VIDEO”
MOD2O_M2_DV6000	“DV6000”
MOD2O_M2_ETRCLO	“ETRCLO”
MOD2O_M2_GIGE	“GIGE”
MOD2O_M2_HDTV	“HDTV”
MOD2O_M2_ISC1	“ISC1”
MOD2O_M2_ISC3	“ISC3”
MOD2O_M2_OC12	“OC12”
MOD2O_M2_OC192	“OC192”
MOD2O_M2_OC3	“OC3”
MOD2O_M2_OC48	“OC48”
MOD2O_M2_PASSTHRU	“PASSTHRU”

MOD2O is used in the following commands:

- RTRV-ALMTH-EQPT
- RTRV-ALMTH-MOD2O

**Table 39** *MOD2\_DATA enum items added to Release 5.0*

Enum Name	Enum Value
MOD2_DATA_M2_10GFC	“10GFC”
MOD2_DATA_M2_10GIGE	“10GIGE”
MOD2_DATA_M2_1GFC	“1GFC”
MOD2_DATA_M2_1GFICON	“1GFICON”
MOD2_DATA_M2_2GFC	“2GFC”
MOD2_DATA_M2_2GFICON	“2GFICON”
MOD2_DATA_M2_FSFE	“FSFE”
MOD2_DATA_M2_G1000	“G1000”
MOD2_DATA_M2_GFPOS	“GFPOS”
MOD2_DATA_M2_GIGE	“GIGE”
MOD2_DATA_M2_OCH	“OCH”
MOD2_DATA_M2_POS	“POS”

MOD2\_DATA is used in the following commands:

- ENT-RMONTH-<MOD2-DATA>
- DLT-RMONTH-<MOD2-DATA>
- RTRV-RMONTH-<MOD2-DATA>

**Table 40** *MOD\_PATH enum items added to Release 5.0*

Enum Name	Enum Value
MOD_PATH_M2_STS18C	“STS18C”
MOD_PATH_M2_STS36C	“STS36C”

MOD\_PATH is used in the following commands:

- ENT-CKT-ORIG
- ENT-CKT-TERM
- ENT-VCG
- RTRV-CKT-ORIG
- RTRV-CKT-TERM
- RTRV-CRS
- RTRV-PATH
- RTRV-STS9C
- RTRV-TRC-OC48
- RTRV-VCG

**Table 41** *NE\_SECU\_MODE enum items added to Release 5.0*

Enum Name	Enum Value
NE_SECU_MODE_REPEATER	“REPEATER”
NE_SECU_MODE_SECURE	“SECURE”

NE\_SECU\_MODE is used in the following commands:

- RTRV-NE-GEN

**Table 42** *ONE\_PLUS\_ONE enum items added to Release 5.0*

Enum Name	Enum Value
OPTIMIZED_ONEPLUSONE	“OPTIMIZED”
STANDARD_ONEPLUSONE	“STANDARD”

ONE\_PLUS\_ONE is used in the following commands:

- ENT-FFP-MOD2
- RTRV-FFP-MOD2

**Table 43** *OPTICAL\_NODE\_TYPE enum items added to Release 5.0*

Enum Name	Enum Value
OPTICAL_NODE_HUB	“HUB”
OPTICAL_NODE_LINE_AMPLIFIED	“LINE-AMPLIFIED”
OPTICAL_NODE_OADM	“OADM”
OPTICAL_NODE_OSC_REG	“OSC-REG”
OPTICAL_NODE_ROADM	“ROADM”
OPTICAL_NODE_TDM_HYBRID	“TDM-HYBRID”
OPTICAL_NODE_UNKNOWN	“UNKNOWN”

OPTICAL\_NODE\_TYPE is used in the following commands:

- RTRV-WDMANS

**Table 44** *OPTICAL\_PORT\_TYPE enum items added to Release 5.0*

Enum Name	Enum Value
OPTICAL_PORT_TYPE_OPT_PORT_IN_PT	“IN-PT”
OPTICAL_PORT_TYPE_OPT_PORT_OUT_PT	“OUT-PT”

OPTICAL\_PORT\_TYPE is used in the following commands:

- RTRV-OCH
- RTRV-OMS
- RTRV-OTS

**Table 45** *OPTICAL\_WLEN enum items no longer supported in Release 5.0*

Enum Name	Enum Value
OPTICAL_WLEN_WL_UNKNOWN	“USE-TWL1”

OPTICAL\_WLEN is used in the following commands:

- ED-DWDMED-OCH
- RTRV-DWDM
- RTRV-LNK-MOD2LNK
- RTRV-OCH

**Table 46** *OPTICAL\_WLEN enum items added to Release 5.0*

Enum Name	Enum Value
OPTICAL_WLEN_WL_USETWL1	“USE-TWL1”

OPTICAL\_WLEN is used in the following commands:

- ED-DWDMED-EQPT
- ED-OCH
- ENT-EQPT
- RTRV-DWDM
- RTRV-EQPT
- RTRV-LNK-MOD2LNK
- RTRV-LNK-OTS
- RTRV-OCH

**Table 47** *PAYLOAD enum items no longer supported in Release 5.0*

Enum Name	Enum Value
PAYLOAD_PT_10GE	“10GE”
PAYLOAD_PT_1GE	“1GE”
PAYLOAD_PT_SDI_D1_VIDEO	“SDI-D1-VIDEO”

PAYLOAD is used in the following commands:

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

**Table 48** PAYLOAD enum items added to Release 5.0

Enum Name	Enum Value
PAYLOAD_PT_10GE	"10GIGE"
PAYLOAD_PT_10GFC	"10GFC"
PAYLOAD_PT_1GE	"GIGE"
PAYLOAD_PT_1GFICON	"1GFICON"
PAYLOAD_PT_2GFICON	"2GFICON"
PAYLOAD_PT_DS1VTMAPPED	"DS1"
PAYLOAD_PT_DS3	"DS3"
PAYLOAD_PT_DS3I	"DS3I"
PAYLOAD_PT_DS3XM	"DS3XM"
PAYLOAD_PT_E1	"E1"
PAYLOAD_PT_E3	"E3"
PAYLOAD_PT_EC1	"EC1"
PAYLOAD_PT_ETHER	"ETHERNET"
PAYLOAD_PT_ETRCLO	"ETRCLO"
PAYLOAD_PT_FSTE	"FSTE"
PAYLOAD_PT_GFP	"GFP"
PAYLOAD_PT_ISC1	"ISC1"
PAYLOAD_PT_ISC3	"ISC3"
PAYLOAD_PT_PASS_THRU	"PASSTHRU"
PAYLOAD_PT_POS	"POS"
PAYLOAD_PT_SDI_D1_VIDEO	"D1VIDEO"
PAYLOAD_PT_UNKNOWN	"UNKNOWN"
PAYLOAD_PT_UNPROVISIONED	"UNPROVISIONED"
PAYLOAD_PT_UNSUPPORTED	"UNPROVISIONED"
PAYLOAD_PT_UNSUPPORTED	"UNSUPPORTED"

PAYLOAD is used in the following commands:

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

**Table 49** *PAYLOAD\_MAPPING* enum items added to Release 5.0

Enum Name	Enum Value
PAYLOAD_MAPPING_ASYNCH	“ASYNCH”
PAYLOAD_MAPPING_ODU	“ODU”
PAYLOAD_MAPPING_SYNCH	“SYNCH”

PAYLOAD\_MAPPING is used in the following commands:

- ED-OCH
- RTRV-OCH

**Table 50** *PORT\_TYPE* enum items added to Release 5.0

Enum Name	Enum Value
PORT_TYPE_TRANSMUX	“TRANSMUX”

PORT\_TYPE is used in the following commands:

- ENT-MOD1PAYLOAD

**Table 51** *PRODUCT\_TYPE* enum items added to Release 5.0

Enum Name	Enum Value
PRODUCT_TYPE_NE_15310_CL	“ONS15310-CL”

PRODUCT\_TYPE is used in the following commands:

- RTRV-CRS-PATH

**Table 52** *PST* enum items added to Release 5.0

Enum Name	Enum Value
PST_SS_IS_SDH	“unlocked”
PST_SS_OOS_SDH	“locked”
PST_SS_UNKNOWN	“UNKNOWN”

PST is used in the following commands:

- ED-10GIGE
- ED-APC
- ED-BITS
- ED-CLNT
- ED-CRS-STs-PATH
- ED-CRS-VT-PATH
- ED-DS3I
- ED-DWDM-CLNT

- ED-E1ED-E3
- ED-E4
- ED-EC1
- ED-EQPT
- ED-FAC
- ED-FSTE
- ED-G1000
- ED-GIGE
- ED-LNK-MOD2LNK
- ED-OCH
- ED-OCN-TYPE
- ED-OMS
- ED-OTS
- ED-POS
- ED-STM1E
- ED-STS-PATH
- ED-T1
- ED-T3
- ED-VCM
- ED-VT-PATH
- ED-WLEN
- ENT-CRS-MOD2-PATH
- ENT-CRS-STS-PATH
- ENT-CRS-VT-PATH
- ENT-LNK-MOD2LNK
- ENT-WLEN
- RMV-MOD2
- RST-MOD2
- RST-STS-PATH
- RST-VT-PATH
- RTRV-BITS
- RTRV-CLNT
- RTRV-CRS
- RTRV-DS3I
- RTRV-DWDM
- RTRV-E1
- RTRV-E3
- RTRV-E4

- RTRV-EC1
- RTRV-EQPT
- RTRV-G1000
- RTRV-LNK-OTS
- RTRV-OCH
- RTRV-OCN-TYPE
- RTRV-OMS
- RTRV-OTS
- RTRV-STM1E
- RTRV-STS9C
- RTRV-T1
- RTRV-T3
- RTRV-VCG
- RTRV-VCM
- RTRV-VT2
- RTRV-WLEN

**Table 53** RECOVERY\_GUARD\_TIMER enum items added to Release 5.0

Enum Name	Enum Value
RECOVERY_GUARD_TIMER_0	"0.0"
RECOVERY_GUARD_TIMER_1	"1.0"
RECOVERY_GUARD_TIMER_10	"10.0"
RECOVERY_GUARD_TIMER_100	"0.1"
RECOVERY_GUARD_TIMER_2	"2.0"
RECOVERY_GUARD_TIMER_3	"3.0"
RECOVERY_GUARD_TIMER_4	"4.0"
RECOVERY_GUARD_TIMER_5	"5.0"
RECOVERY_GUARD_TIMER_50	"0.05"
RECOVERY_GUARD_TIMER_500	"0.5"
RECOVERY_GUARD_TIMER_6	"6.0"
RECOVERY_GUARD_TIMER_7	"7.0"
RECOVERY_GUARD_TIMER_8	"8.0"
RECOVERY_GUARD_TIMER_9	"9.0"

RECOVERY\_GUARD\_TIMER is used in the following commands:

- ED-FFP-MOD2
- ENT-FFP-MOD2
- RTRV-FFP-MOD2

**Table 54** *REGULATED\_PARAM\_NAME enum items added to Release 5.0*

Enum Name	Enum Value
REGULATED_PARAM_NAME_AMPLMODE	“AMPLMODE”
REGULATED_PARAM_NAME_CHPOWER	“CHPOWER”
REGULATED_PARAM_NAME_GAIN	“GAIN”
REGULATED_PARAM_NAME_OPWR_LFAIL	“OPWR-LFAIL”
REGULATED_PARAM_NAME_REFTILT	“REFTILT”
REGULATED_PARAM_NAME_VOAREFATT N	“VOAREFATTN”
REGULATED_PARAM_NAME_VOAREFPWR	“VOAREFPWR”

REGULATED\_PARAM\_NAME is used in the following commands:

- RTRV-NE-WDMANS

**Table 55** *REGULATED\_PORT\_TYPE enum items added to Release 5.0*

Enum Name	Enum Value
REGULATED_PORT_FAILED	“FAILED”
REGULATED_PORT_NOT_APPLICABLE	“NOT-APPLICABLE”
REGULATED_PORT_OUT_OF_RANGE	“OUT-OF-RANGE”
REGULATED_PORT_PORT_IN_SERVICE	“PORT-IN-SERVICE”
REGULATED_PORT_REGULATED	“REGULATED”
REGULATED_PORT_UNCHANGED	“UNCHANGED”

REGULATED\_PORT\_TYPE is used in the following commands:

- RTRV-NE-WDMANS

**Table 56** *SAMPLE\_TYPE enum items added to Release 5.0*

Enum Name	Enum Value
SAMPLE_TYPE_ABSOLUTE	“ABSOLUTE”
SAMPLE_TYPE_DELTA	“DELTA”

SAMPLE\_TYPE is used in the following commands:

- DLT-RMONTH-MOD2-DATA

**Table 57** *SNMP\_VERSION enum items added to Release 5.0*

Enum Name	Enum Value
SNMP_VERSION_SNMPV1	“SNMPV1”
SNMP_VERSION_SNMPV2	“SNMPV2”

SNMP\_VERSION is used in the following commands:

- ED-TRAPTABLE
- ENT-TRAPTABLE

**Table 58** SST enum items added to Release 5.0

Enum Name	Enum Value
SST_SS_AINS_SDH	“automaticInservice”
SST_SS_DSBLD	“DSBLD”
SST_SS_DSBLD_SDH	“disabled”
SST_SS_MT_SDH	“maintenance”
SST_SS_OOG	“OOG”
SST_SS_OOG_SDH	“outOfGroup”
SST_SS_UAS_SDH	“unassigned”

SST is used in the following commands:

- ED-10GIGE
- ED-CLNT
- ED-CRS-STP-PATH
- ED-CRS-VT-PATH
- ED-DS3I
- ED-DWDM-CLNT
- ED-E1
- ED-E3
- ED-E4
- ED-EC1
- ED-EQPT
- ED-FAC
- ED-FSTE
- ED-G1000
- ED-GIGE
- ED-LNK-MOD2LNK
- ED-OCH
- ED-OCN-TYPE
- ED-OMS
- ED-OTS
- ED-POS
- ED-STM1E
- ED-STP-PATH

- ED-T1
- ED-T3
- ED-VCM
- ED-VT-PATH
- ED-WLEN
- ENT-CRS-MOD2-PATH
- ENT-CRS-STS-PATH
- ENT-CRS-VT-PATH
- ENT-LNK-MOD2LNK
- ENT-WLEN
- RMV-MOD2
- RST-MOD2
- RST-STS-PATH
- RST-VT-PATH
- RTRV-CLNT
- RTRV-CRS
- RTRV-DS3I
- RTRV-DWDM
- RTRV-E1
- RTRV-E3
- RTRV-E4
- RTRV-EC1
- RTRV-EQPT
- RTRV-G1000
- RTRV-LNK-OTS
- RTRV-OCH
- RTRV-OCN-TYPE
- RTRV-OMS
- RTRV-OTS
- RTRV-POS
- RTRV-STM1E
- RTRV-STS9C
- RTRV-T1
- RTRV-T3
- RTRV-VCM
- RTRV-VT2
- RTRV-WLEN

**Table 59** *STARTUP\_TYPE enum items added to Release 5.0*

Enum Name	Enum Value
STARTUP_TYPE_FALLING	“FALLING”
STARTUP_TYPE_RISING	“RISING”
STARTUP_TYPE_RISING_OR_FALLING	“RISING-OR-FALLING”

STARTUP\_TYPE is used in the following commands:

- ENT-RMONTH-<MOD2-DATA>
- DLT-RMONTH-<MOD2-DATA>
- RTRV-RMONTH-<MOD2-DATA>

**Table 60** *STM1E\_MODE enum items added to Release 5.0*

Enum Name	Enum Value
STM1E_MODE_STM1_MODE	“STM1E”

STM1E\_MODE is used in the following commands:

- ED-FAC

**Table 61** *SYS\_TYPE enum items no longer supported in Release 5.0*

Enum Name	Enum Value
SYS_TYPE_SMF_28_16CH_POWER	“SMF-28-16CH-POWER”
SYS_TYPE_SMF_28_8CH_POWER	“SMF-28-8CH-POWER”
SYS_TYPE_SMF_28_GAIN	“SMF-28-GAIN”
SYS_TYPE_SMF_28_POWER	“SMF-28-POWER”

SYS\_TYPE is used in the following commands:

- ED-WDMANS
- RTRV-WDMANS

**Table 62** *TMPER enum items added to Release 5.0*

Enum Name	Enum Value
TMPER_PER_HR	“1-HR”
TMPER_PER_MIN	“1-MIN”
TMPER_RAW_DATA	“RAW-DATA”

TMPER is used in the following commands:

- INIT-REG-MOD2
- RTRV-PM-G1000
- RTRV-PM-MOD2

- RTRV-PMSCHED-G1000
- RTRV-TH-ALL
- RTRV-TH-G1000
- RTRV-TH-MOD2
- SCHED-PMREPT-MOD2
- SET-TH-MOD2

**Table 63** TRCFORMAT enum items added to Release 5.0

Enum Name	Enum Value
TRCFORMAT_16_BYTE	“16-BYTE”
TRCFORMAT_1_BYTE	“1-BYTE”
TRCFORMAT_64_BYTE	“64-BYTE”

TRCFORMAT is used in the following commands:

- ED-OCN-TYPE
- ED-TRC-CLNT
- ED-TRC-OCH
- RTRV-OCN-TYPE
- RTRV-TRC-CLNT
- RTRV-TRC-OCH

**Table 64** TRCLEVEL enum items no longer supported in Release 5.0

Enum Name	Enum Value
TRCLEVEL_TL_J1_PATH	“J1”
TRCLEVEL_TL_TANDEM_1	“TCM1”
TRCLEVEL_TL_TANDEM_2	“TCM2”

TRCLEVEL is used in the following commands:

- ED-TRC-CLNT
- ED-TRC-OCH
- RTRV-TRC-CLNT
- RTRV-TRC-OCH

**Table 65** TRCMODE enum items no longer supported in Release 5.0

Enum Name	Enum Value
TRCFORMAT_16_BYTE	“16-BYTE”
TRCFORMAT_1_BYTE	“1-BYTE”
TRCFORMAT_64_BYTE	“64-BYTE”

TRCMODE is used in the following commands:

- ED-OCN-TYPE
- ED-STTS-PATH
- ED-TRC-CLNT
- ED-TRC-OCH
- ED-VT-PATH
- RTRV-OCN-TYPE
- RTRV-PATH
- RTRV-STTS9C
- RTRV-TRC-CLNT
- RTRV-TRC-OC48
- RTRV-TRC-OCH
- RTRV-VT2

**Table 66** *VALIDITY enum items added to Release 5.0*

Enum Name	Enum Value
VALIDITY_CV_OFF	“OFF”

VALIDITY is used in the following commands:

- RTRV-PM-G1000
- RTRV-PM-MOD2

**Table 67** *VERIFICATION\_GUARD\_TIMER enum items added to Release 5.0*

Enum Name	Enum Value
VERIFICATION_GUARD_TIMER_1	“1.0”
VERIFICATION_GUARD_TIMER_500	“0.5”

VERIFICATION\_GUARD\_TIMER is used in the following commands:

- ED-FFP-MOD2
- ENT-FFP-MOD2
- RTRV-FFP-MOD2

**Table 68** *WCT enum items added to Release 5.0*

Enum Name	Enum Value
WCT_ONEWAY	“1WAY”
WCT_TWOWAY	“2WAY”

WCT is used in the following commands:

- ENT-WLEN

- RTRV-WLEN

## Related Documentation

### Release-Specific Documents

- *Release Notes for the Cisco ONS 15454, Release 4.7*
- *Release Notes for the Cisco ONS 15454 SDH, Release 5.0*
- *Release Notes for the Cisco ONS 15327, Release 5.0*
- *Release Notes for the Cisco ONS 15600, Release 5.0*
- *Release Notes for the Cisco ONS 15310-CL, Release 5.0*
- *Cisco ONS 15454 Software Upgrade Guide, Release 5.0*

### Platform-Specific Documents

- *Cisco ONS 15454 Procedure Guide*  
Provides installation, turn up, test, and maintenance procedures
- *Cisco ONS 15454 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 Troubleshooting Guide*  
Provides a list of SONET alarms and troubleshooting procedures, general troubleshooting information, and hardware replacement procedures
- *Cisco ONS SONET TL1 Command Guide*  
Provides a comprehensive list of TL1 commands

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The following sections provide sources for obtaining documentation from Cisco Systems.

### World Wide Web

You can access the most current Cisco documentation on the World Wide Web at the following sites:

- <http://www.cisco.com>
- <http://www-china.cisco.com>
- <http://www-europe.cisco.com>

## Documentation CD-ROM

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- P4—You need information or assistance on Cisco product capabilities, product installation, or basic product configuration.

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<http://www.cisco.com/tac/caseopen>

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If you have a priority level 1 (P1) or priority level 2 (P2) problem, contact TAC by telephone and immediately open a case. To obtain a directory of toll-free numbers for your country, go to the following website:

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