



Release Notes for Cisco ONS 15600 Release 7.0

August 2007



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.

Release notes address closed (maintenance) issues, caveats, and new features for the Cisco ONS 15600. For detailed information regarding features, capabilities, hardware, and software introduced with this release, refer to Release 7.0 of the *Cisco ONS 15600 Procedure Guide*, *Cisco ONS 15600 Reference Manual*, *Cisco ONS SONET TLI Command Guide*, and *Cisco ONS 15600 Troubleshooting Guide*. For the most current version of the Release Notes for Cisco ONS 15600 Release 7.0, visit the following URL:

http://www.cisco.com/en/US/products/hw/optical/ps4533/prod_release_notes_list.html

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

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

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Changes to the Release Notes

This section documents supplemental changes that have been added to the *Release Notes for Cisco ONS 15600 Release 7.0* since the production of the Cisco ONS 15600 System Software CD for Release 7.0.

The following changes have been added to the release notes for Release 7.0.

Changes to Caveats

The following caveat has been added.

[ONS-SE-2G-xx.x, page 2](#)

Caveats

Review the notes listed below before deploying the ONS 15600. Caveats with tracking numbers are known system limitations that are scheduled to be addressed in a subsequent release. Caveats without tracking numbers are provided to point out procedural or situational considerations when deploying the product.

Hardware

ONS-SE-2G-xx.x

The ONS-SE-2G-xx.x complies with performance criteria for all intra-facility fiber cables and connectors per Telcordia GR-326-CORE, Issue 3 Sept. 1999. Cisco recommends the following approved suppliers for intrafacility fiber cables to use with this product:

- Volex
- Fitel
- Sumitomo
- Fujikura
- Tyco

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.

CSCsb82218

When a PPM or PIM is physically removed from a node yet remains provisioned, the CTC display shows as blue, as though it was only preprovisioned. Because the PPM or PIM is physically removed, and thus raises an improper removal alarm, CTC should display the alarmed entity as yellow. This issue will be resolved in a future release.

CSCsb96697

When you perform a Manual Switch To Protect and then an SD-L condition is raised on the Protect port that preempts the Manual Switch To Protect, the CTC Maintenance > Protection tab shows “APS_CLEAR.” When you click Clear in that tab while the SD-L is still present on the protect port, the K bytes will change to “No Request” for about 400-1000 frames before redeclaring the SD-L condition. This issue can occur on ONS 15600 ASAP cards with 1+1 protection. It does not affect other cards or protection schemes. This issue does not affect traffic. This issue can only occur when using the CTC Maintenance > Protection tab under the aforementioned conditions. To avoid this issue, do not click Clear when the CTC Maintenance > Protection tab shows “APS_CLEAR” and SD-L is present on the protect port. This issue will be resolved in a future release.

CSCeh84908

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

CSCeg57163

ONS platforms support only a single OSPF virtual link. This issue will be resolved in a future release.

CSCdy58342

Network connectivity could be lost if a backbone area becomes segmented into multiple GNEs. This occurs only if multiple ONS 15600 nodes and routers are connected to the same LAN in OSPF area 0. If a link between two routers breaks, the CTC session connected to Router 1 will not be able to communicate with the ONS 15600 connected to Router 2. To resolve, you must repair the link between the routers or provide another form of redundancy in the network. This is as designed.

CSCdz07098

If OSPF on LAN is enabled with an area ID that is the same as the area ID of any of the DCC Links, CTC will not be able to discover any of the DCC Connected Nodes. To avoid this issue, set the OSPF on LAN area ID to an area other than any of those already occupied by a DCC link. This is as designed.

CSCdy25142

Equipment alarms are always reported based on the activity of the particular card, without taking card redundancy into consideration. Thus, an equipment alarm such as CTNEQPT-PB-0 may be raised against a line card as CR(SA) even though the traffic is protected. This issue will not be resolved.

CSCeb49407

Choosing certain qualities of RES settings in the CTC Provisioning tab, Timing subtab, may trigger a reference failure. Specifically, this can occur if you select the quality of RES level such that any of the following are true.

- $ST3 < RES < ST3E$
- $ST4 < RES < SMC$
- $RES < ST4$

When you then input an actual reference signal lower than ST3E quality, the failure is triggered. This issue will not be resolved.

Optical IO Cards

CSCsc51518

In ASAP card view, the PIM graphic might not update with the correct color after an alarm is cleared. This can occur anytime there is an alarm raised against the PIM or any of its subcomponents (PPM or port). To recover from this state, you must either click the Synchronize button, or change to node view and then back to card view. This issue will be resolved in a future release.

CSCef20813

No graphical representations of LEDs for ASAP ports are displayed in the CTC card view. SD and SF LED representations are also absent from the CTC node view for some legacy OCn cards. There are no plans to resolve this issue.

BLSR Functionality

CSCeh49665

Connections might still exist after circuit deletions on BLSR DRI rings for which the primary node is isolated. For BLSR DRI rings with several types of DRI circuits, if you isolate the primary node by deleting the database, reseating the I/O cards, then delete all BLSR DRI circuits, the SSXCs still show connections. To avoid this issue, do not delete or create BLSR DRI circuits when a node on the BLSR DRI ring is isolated. This issue will not be resolved.

Interoperability

CSCdx61916 and CSCeg20536

If, using CTC, you attempt to create a protected VT1.5 circuit that originates on one ONS 15327/454 that is connected to the ONS 15600 via path protection to another ONS 15327/454 that is connected to the ONS 15600 via 1+1 or BLSR, the circuit creation request will be denied because of mixed protection

domains. CTC is currently incapable of routing VT circuits across the ONS 15600 when mixed protection schemes are involved. VT traffic can be routed across the ONS 15600 when mixed protection schemes are involved by performing the following:

-
- Step 1** On the ONS 15600, create an STS level cross connect with the requisite path selectors.
 - Step 2** Use CTC to create a VT circuit from the source node to the trunk ports that interface to the 15600.
 - Step 3** Use CTC to create a VT circuit between the destination node and the trunk ports that interface with the 15600.
-

**Note**

While this workaround provides the ability to route VT traffic across the ONS 15600 when mixed protection domains exist, the traffic must be managed as three separate circuits instead of one single end-to-end circuit.

This issue will be resolved in a future release.

CSCdy68110

When you attempt to configure VT circuits on a test configuration consisting of two ONS 15454 nodes and one ONS 15600 node, when both ONS 15454s are connected to the ONS 15600 node using a dual path protection connection configuration, and when the ONS 15600 node serves as an intermediate node between the two ONS 15454 nodes, you may be unable to create a VT circuit from one ONS 15454 to the ONS 15600 and then to the other ONS 15454. VT Tunnels are created, but the VT circuit is not created. A mixed protection domain error message is raised when this occurs. To avoid this issue, create the VT tunnels manually, so that the two tunnels do not create a topology where the working and protect tunnels share the same I/O card. After the tunnels have been created, the VT circuit can be successfully added. This issue will be resolved in future release.

CSCdx94969

Physical PM parameters can not be retrieved through the SNMP interface. MIBs released with the ONS 15600 do not have entries for the following physical PM parameters.

- LBC
- OPR
- OPT

The standard SONET Generic MIB does not have entries for these. To work around this issue, use CTC to retrieve the values. SNMP support for these parameters may be considered for a future release.

CSCdy54737

The following PM parameters can not be retrieved through SNMP.

- **Line:**
 - FC-L
- **Path:**

- FC-P
- PPJC-Pdet
- NPJC-Pdet
- PPJC-Pgen
- NPJC-Pgen
- **Protection groups:**
 - PSC
 - PSD
- **Far End counts for line and path**
- **1-Day PM counts**

To retrieve these counts, use CTC. SNMP support for these parameters may be considered for a future release.

Bridge and Roll

CSCdy14265

The manual bridge and roll feature allows you to perform the END command once the roll operation transitions from a ROLL PENDING to ROLL condition, even if the roll to port has an invalid signal. To avoid traffic impact, ensure that the roll-to line is alarm-free. If an alarm exists, you can choose to do nothing and wait for the alarm to clear, to delete the roll, or to proceed in spite of the alarm. This issue will not be resolved.

TL1

CSCsb72582

You cannot perform an ENT-EQPT for a valid card type when the current equipment state is OOS-AUMA,MEA&UAS. When the fault PPM comes up as OOS-AUMA,MEA&UAS and then the ENT-EQPT command is entered using TL1, the command is rejected. This issue will be resolved in a future release.

CSCeb46234

A TL1 user cannot preprovision IO cards when a filler card is in the slot. Removal of the filler card will clear the slot and allow the TL1 user to preprovision the IO card. This is by design.

Resolved Caveats for Release 7.0

The following caveats were resolved in Release 7.0.x.

Maintenance and Administration

CSCei44592

You can have no more than 113 DCC links in one area ID. For example, with 128 DCC Links provisioned within one area ID, 14 DCC links gray out in CTC. To avoid this issue divide the 128 DCCs into multiple area IDs (at least two). This issue is resolved in Release 7.0.

CSCei14295

After restoring a previously backed up database, the restoral of the PM history database is not time-based, but rather, position-based. The PM history database is stored or retrieved to or from position-dependent time slots from the present PM period. Thus, PM history backed up 24 hours prior to the restore will show the PM history without acknowledging the missing day. This issue is resolved in Release 7.0.

CSCei37179

Rarely, when an ASAP card is participating in a DCC tunnel, and working and protect spans both fail, the ASAP card might stop responding, sometimes followed by a reset. When this occurs there is no resulting traffic loss, and protection switching continues to function. To recover ASAP card responsiveness a soft reset of the card might be necessary. This issue is resolved in Release 7.0.

CSCsb46157

When the first and second ports of a PIM are provisioned as GIGE and, at a minimum, the second port is in a circuit, or, when the third and fourth ports of a PIM are provisioned as GIGE and, at a minimum, the fourth port is in a circuit, packets might be dropped on a soft reset of the associated ASAP card. To prevent this, avoid provisioning a GIGE port next to another GIGE port. This issue is resolved in Releases 6.1 and 7.0.

Bridge and Roll

CSCei37364

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

TL1 Functionality

CSCeh88565

When the Cisco ONS 15600 is supporting 500 TL1 sessions and there is a sustained high level of management traffic the active TSC might reset. This issue is visible when the Cisco ONS 15600 is supporting 500 TL1 ENE logins to DCC-linked network nodes such as the Cisco ONS 15454. In a laboratory test it was observed that an alarm flood (approximately 70000 alarm messages) in the network would overload the active TSC and cause it to reset. The standby TSC transitions to active and the node recovers. To avoid this issue configure TL1 sessions to throttle the amount of alarm data that is sent across the management network. For example, when a TL1 session starts, the REPT^ALM and REPT^EVT messages are allowed by default. The TL1 command “INH-MSG-ALL” will inhibit all REPT-ALM and REPT^EVT autonomous messages from being transmitted. This issue is resolved in Release 7.0.

New Features and Functionality

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

New Software Features

Server Trails

Release 7.0 adds support for server trails. A server trail is a non-DCC link across a third-party network that connects two CTC network domains. A server trail allows circuit provisioning when no DCC is available. You can create server trails between any two optical or DS-3 ports. The end ports of a server trail can be different types. Server trails are not allowed on DCC-enabled ports.

The server trail link is bidirectional and can be VT1.5, VT2, STS1, STS-3c, or STS-12c; you cannot upgrade an existing server trail to another size. A server trail link can be one of the following protection types: Preemptible, Unprotected, and Fully Protected. The server trail protection type determines the protection type for any circuits that traverse it. PCA circuits will use server trails with the Preemptible attribute.

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

Link Consolidation

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

Link consolidation is only available on non-detailed maps. Non-detailed maps display nodes in icon form instead of detailed form, meaning the nodes appear as rectangles with ports on the sides. Refer to the *Cisco ONS 15600 Procedure Guide* for more information about consolidated links.

Data Communications Network Tool

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

Advanced Circuit Filtering and Export

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

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

Superuser Privileges for Provisioning Users

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

CTC Download Highest Level NET JAR File

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

Local Domain Creation and Viewing

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

BLSR STS and VT Squelching

Release 7.0 supports BLSR STS squelching for the ONS 15454, ONS 15327, and ONS 15600, and VT squelching for the ONS 15454, and ONS 15327, with limited VT squelching support (see below) provided by the ONS 15600. STS-level squelching is supported in previous releases. With VT-level squelching added in Release 7.0 the STS squelch table now displays VT-access status for each STS (every entry) in the table. There is a check box in both the east and west sides for each entry of STS squelch table, and a check mark in this box indicates that the STS is VT-access.

Release 7.0 nodes display STS and VT squelch tables depending on the type of circuits created. For example, if a fiber cut occurs, the BLSR squelch tables show STSs or VTs that will be squelched for every isolated node. Squelching replaces traffic by inserting the appropriate alarm indication signal path (AIS-P) and prevents traffic misconnections. For an STS with a VT-access check mark, the AIS-P will be removed after 100 ms.

BLSR STS Squelch Tables in CTC

BLSR STS squelch tables show STSs that will be squelched for every isolated node. BLSR STS numbers, East and West source and destination information, and East and West incoming, or outgoing VT access indications are displayed in the BLSR Squelch Table window. BLSR squelching is performed on STSs that carry STS circuits only. Squelch table entries will not appear for STSs carrying VT circuits or Ethernet circuits to, or from E-Series Ethernet cards provisioned in a multicard Ethergroup. These squelch tables contain entries with adjacent node IDs displayed, instead of source or destination node IDs.

BLSR VT Squelch Tables in CTC

BLSR VT squelch tables only appear on the node dropping VTs from a BLSR and are used to perform VT-level squelching when a node is isolated. VT squelching is supported on the ONS 15454 and the ONS 15327 platforms. The ONS 15600 platform does not support VT squelching; however, when an ONS 15454 and an ONS 15600 are in the same network, the ONS 15600 node allows the ONS 15454 node to carry VT circuits in a VT tunnel. The ONS 15600 performs 100-ms STS-level squelching for each VT-access STS at the switching node in case of a node failure.

When using a VT circuit on a VT tunnel (VTT), or on a VT aggregation point (VAP), the VTT or VAP allows multiple VT circuits to be passed through on a single STS without consuming VT matrix resources on the cross-connect card.

In case of a source and destination node failure of a VTT, the switching node performs 100-ms STS-level squelching for the VTT STS. The node dropping VT traffic performs VT-level squelching. VT traffic on the VTT that is not coming from the failed node is protected.

An STS grooming node (VAP source) does not carry VT circuits through a VTT. The STS grooming node performs STS-level squelching for each STS timeslot at the switching node in case the VT-grooming (VAP destination) node fails. The node dropping VT traffic performs VT-level squelching for each VT timeslot in case the STS-grooming end node fails. No VT traffic on the VAP is protected during a failure of the STS-grooming node or the VT-grooming node.

The VT squelch table provides BLSR VT group number and channel indications, and East and West source information. To view the VT squelch table, double-click the STS with a check mark in the BLSR STS squelch table window. The check mark appears on every VT-access STS; however, the VT-squelch table appears only by double-clicking the check mark on the node dropping the VT. The intermediate node of the VT does not maintain the VT-squelch table.

“Ring is Squelching STS Traffic” Condition

Release 7.0 supports an informational Ring is Squelching STS Traffic (STS-SQUELCH-L) condition that can be raised on an OC-N facility. The STS-SQUELCH-L condition indicates that traffic is squelched due to node failure (traffic outage). If the node failure scenario includes the source or destination node, then switching the nodes that switched the traffic away from the failure will squelch all the STSs that originate from or are destined to the failure node. The condition resolves when the node is no longer failing.

“Ring is Squelching VT Traffic” Condition

Release 7.0 supports an informational Ring is Squelching VT Traffic (VT-SQUELCH-L) condition that can be raised on an OC-N facility. The VT-SQUELCH-L condition indicates that traffic is squelched due to node failure (traffic outage). If the node failure scenario includes the source node, the node dropping VT will squelch VT traffic. The condition resolves when the node failure is recovered.

Enhanced Fault Management

Release 7.0 adds increased flexibility for fault management. When an entity is put in the OOS,MT administrative state, the node suppresses all standing alarms on that entity. All alarms and events appear on the Conditions tab. You can change this behavior for the LPBKFACILITY and LPBKTERMINAL alarms. To display these alarms on the Alarms tab, you can set the `NODE.general.ReportLoopbackConditionsOnOOS-MTPorts` to `TRUE` in the NE Defaults editor.

TL1

TL1 Command Changes

Command Syntax Changes

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

ENT-TADRMAP syntax:

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

Is changed to:

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

OPR-SYNCNSW syntax:

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

Is changed to:

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

RTRV-NE-SYNCN syntax:

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

Is changed to:

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

RTRV-SYNCN syntax:

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

Is changed to:

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

RTRV-TADRMAP syntax:

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

Is changed to:

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

ED-NE-GEN syntax:

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

Is changed to:

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

Command Response Changes

The following TL1 response has changed in Release 7.0.

RTRV-INV response:

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

Is changed to:

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

TL1 ENUM Items Added

Table 1 and Table 2 highlight ENUM items added for Release 7.0, by ENUM type.

Table 1 *EQUIPMENT_TYPE enum items added to Release 7.0*

Enum Name	Enum Value
EQUIPMENT_TYPE_ET_UNKNOWN	"UNKNOWN"
EQUIPMENT_TYPE_ET_UNPROVISIONED	"UNPROVISIONED"

EQUIPMENT_TYPE is used in the following commands:

- CHG-EQPT
- ENT-EQPT

Table 2 MTU_TYPE enum items added to Release 7.0

Enum Name	Enum Value
MTU_1548	"1548"
MTU_9600	"9600"

MTU_TYPE is used in the following commands:

- ED-GIGE
- ED-POS

Related Documentation

Release-Specific Documents

- *Release Notes for the Cisco ONS 15600, Release 6.0*
- *Release Notes for the Cisco ONS 15454 SDH, Release 7.0*
- *Release Notes for the Cisco ONS 15327, Release 7.0*
- *Release Notes for the Cisco ONS 15454, Release 7.0*
- *Release Notes for the Cisco ONS 15310-CL, Release 7.0*
- *Cisco ONS 15600 Software Upgrade Guide, Release 7.0*

Platform-Specific Documents

- *Cisco ONS 15600 Procedure Guide*
Provides installation, turn up, test, and maintenance procedures
- *Cisco ONS 15600 Reference Manual*
Provides technical reference information for SONET/SDH cards, nodes, and networks
- *Cisco ONS 15600 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

Obtaining Documentation and Submitting a Service Request

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

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

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