Cisco ONS 15454 DWDM Control Card and Node Configuration Guide, Release 10.x.x

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Preface

This section explains the objectives, intended audience, and organization of this publication and describes the conventions that convey instructions and other information.

This section provides the following information:

- Revision History, on page ix
- Document Objectives, on page x
- Audience, on page x
- Document Organization, on page x
- Document Conventions, on page xi
- Related Documentation, on page xvii
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Revision History

Date	Notes
May 2020	Updated for Release 11.1.1.2
October 2019	Updated for Release 11.1
March 2019	Updated for Release 11.0
August 2018	Updated for Release 10.9
December 2017	Updated for Release 10.8
October 2017	Updated for Release 10.7
April 2017	Updated for Release 10.6.2
November 2016	Updated for Release 10.6.1
June 2016	Updated for Release 10.6
January 2016	Updated for Release 10.5.2

Date	Notes
July 2015	Updated for Release 10.5
December 2014	Added content for Duplicate Node Controller in the chapter "Managing the Shelf".
March 2014	Revised the part number and included Release 10.0.1 enhancements.
November 2013	This is the first release of this publication.

Document Objectives

The Cisco ONS 15454 DWDM Configuration Guide is split into the following three guides:

- Cisco ONS 15454 DWDM Control Card and Node Configuration Guide
- Cisco ONS 15454 DWDM Line Card Configuration Guide
- Cisco ONS 15454 DWDM Network Configuration Guide

The *Cisco ONS 15454 DWDM Control Card and Node Configuration Guide* provides background and reference material and procedures for installation and configuration of control cards and node configuration on Cisco ONS 15454 dense wavelength division multiplexing (DWDM) systems.

The *Cisco ONS 15454 DWDM Line Card Configuration Guide* provides background and reference material and procedures for installation and configuration of line cards on Cisco ONS 15454 dense wavelength division multiplexing (DWDM) systems.

The *Cisco ONS 15454 DWDM Network Configuration Guide* provides background and reference material, procedures for turn up, provisioning, and maintenance of Cisco ONS 15454 dense wavelength division multiplexing (DWDM) systems.

Audience

To use this publication, you should be familiar with Cisco or equivalent optical transmission hardware and cabling, telecommunications hardware and cabling, electronic circuitry and wiring practices, and preferably have experience as a telecommunications technician.

Document Organization

This document is organized into the following chapters:

Chapter	Description
Installing the Cisco ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelf	Explains how to install the Cisco ONS 15454 DWDM shelf assemblies.
Installing the Control Cards	Explains how to install the control cards needed for the Cisco ONS 15454 DWDM shelf assemblies.

Chapter	Description
Connecting the PC and Logging into the GUI	Explains how to connect Windows PCs and Solaris workstations to the shelf assembly and how to log into Cisco Transport Controller (CTC) software.
Managing the Shelf	Explains how to provision a single Cisco ONS 15454 node.
Synchronizing Node Timing	Provides information about Cisco ONS 15454 users and node timing.
Provisioning Security	Provides information about Cisco ONS 15454 users and security.
Card Specifications	Contains hardware specifications for the shelf assemblies and cards.
SNMP	Explains Simple Network Management Protocol (SNMP) as implemented by the Cisco ONS 15454.
CTC Enhancements, Operations, and Shortcuts	Describes the Cisco Transport Controller (CTC) views, menus options, tool options, shortcuts, and table display options.
Network Element Defaults	Describes the defaults for the network element settings for Cisco ONS 15454 DWDM shelf assemblies.

Document Conventions

This document uses the following conventions:

Convention	Description
^ or Ctrl	Both the ^ symbol and Ctrl represent the Control (Ctrl) key on a keyboard. For example, the key combination **^D** or **Ctrl-D** means that you hold down the Control key while you press the D key. (Keys are indicated in capital letters but are not case sensitive.)
bold font	Commands and keywords and user-entered text appear in **bold** font.
Italic font	Document titles, new or emphasized terms, and arguments for which you supply values are in *italic* font.
`Courier font`	Terminal sessions and information the system displays appear in `courier` font.
`Bold Courier font`	Bold Courier font indicates text that the user must enter.
[x]	Elements in square brackets are optional.
...	An ellipsis (three consecutive nonbolded periods without spaces) after a syntax element indicates that the element can be repeated.

Convention	Description
|	A vertical line, called a pipe, indicates a choice within a set of keywords or arguments.
[x | y]	Optional alternative keywords are grouped in brackets and separated by vertical bars.
{x | y}	Required alternative keywords are grouped in braces and separated by vertical bars.
[x {y | z}]	Nested set of square brackets or braces indicate optional or required choices within optional or required elements. Braces and a vertical bar within square brackets indicate a required choice within an optional element.
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.
< >	Nonprinting characters such as passwords are in angle brackets.
[ ]	Default responses to system prompts are in square brackets.
!, #	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.

Reader Alert Conventions

This document uses the following conventions for reader alerts:

Note Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the manual.

Tip Means *the following information will help you solve a problem.*

Caution Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

Timesaver Means *the described action saves time.* You can save time by performing the action described in the paragraph.

Warning **Means *reader be warned.* In this situation, you might perform an action that could result in bodily injury.**

IMPORTANT SAFETY INSTRUCTIONS

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071

SAVE THESE INSTRUCTIONS

Waarschuwing

BELANGRIJKE VEILIGHEIDSINSTRUCTIES

Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van de standaard praktijken om ongelukken te voorkomen. Gebruik het nummer van de verklaring onderaan de waarschuwing als u een vertaling van de waarschuwing die bij het apparaat wordt geleverd, wilt raadplegen.

BEWAAR DEZE INSTRUCTIES

Varoitus

TÄRKEITÄ TURVALLISUUSOHJEITA

Tämä varoitusmerkki merkitsee vaaraa. Tilanne voi aiheuttaa ruumiillisia vammoja. Ennen kuin käsittelet laitteistoa, huomioi sähköpiirien käsittelemiseen liittyvät riskit ja tutustu onnettomuuksien yleisiin ehkäisytapoihin. Turvallisuusvaroitusten käännökset löytyvät laitteen mukana toimitettujen käännettyjen turvallisuusvaroitusten joukosta varoitusten lopussa näkyvien lausuntonumeroiden avulla.

SÄILYTÄ NÄMÄ OHJEET

Attention

IMPORTANTES INFORMATIONS DE SÉCURITÉ

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant entraîner des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers liés aux circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions des avertissements figurant dans les consignes de sécurité traduites qui accompagnent cet appareil, référez-vous au numéro de l'instruction situé à la fin de chaque avertissement.

CONSERVEZ CES INFORMATIONS

Warnung **WICHTIGE SICHERHEITSHINWEISE**

Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu Verletzungen führen kann. Machen Sie sich vor der Arbeit mit Geräten mit den Gefahren elektrischer Schaltungen und den üblichen Verfahren zur Vorbeugung vor Unfällen vertraut. Suchen Sie mit der am Ende jeder Warnung angegebenen Anweisungsnummer nach der jeweiligen Übersetzung in den übersetzten Sicherheitshinweisen, die zusammen mit diesem Gerät ausgeliefert wurden.

BEWAHREN SIE DIESE HINWEISE GUT AUF.

Avvertenza **IMPORTANTI ISTRUZIONI SULLA SICUREZZA**

Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di intervenire su qualsiasi apparecchiatura, occorre essere al corrente dei pericoli relativi ai circuiti elettrici e conoscere le procedure standard per la prevenzione di incidenti. Utilizzare il numero di istruzione presente alla fine di ciascuna avvertenza per individuare le traduzioni delle avvertenze riportate in questo documento.

CONSERVARE QUESTE ISTRUZIONI

Advarsel **VIKTIGE SIKKERHETSINSTRUKSJONER**

Dette advarselssymbolet betyr fare. Du er i en situasjon som kan føre til skade på person. Før du begynner å arbeide med noe av utstyret, må du være oppmerksom på farene forbundet med elektriske kretser, og kjenne til standardprosedyrer for å forhindre ulykker. Bruk nummeret i slutten av hver advarsel for å finne oversettelsen i de oversatte sikkerhetsadvarslene som fulgte med denne enheten.

TA VARE PÅ DISSE INSTRUKSJONENE

Aviso **INSTRUÇÕES IMPORTANTES DE SEGURANÇA**

Este símbolo de aviso significa perigo. Você está em uma situação que poderá ser causadora de lesões corporais. Antes de iniciar a utilização de qualquer equipamento, tenha conhecimento dos perigos envolvidos no manuseio de circuitos elétricos e familiarize-se com as práticas habituais de prevenção de acidentes. Utilize o número da instrução fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham este dispositivo.

GUARDE ESTAS INSTRUÇÕES

¡Advertencia! **INSTRUCCIONES IMPORTANTES DE SEGURIDAD**

Este símbolo de aviso indica peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considere los riesgos de la corriente eléctrica y familiarícese con los procedimientos estándar de prevención de accidentes. Al final de cada advertencia encontrará el número que le ayudará a encontrar el texto traducido en el apartado de traducciones que acompaña a este dispositivo.

GUARDE ESTAS INSTRUCCIONES

Varning!

VIKTIGA SÄKERHETSANVISNINGAR

Denna varningssignal signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanliga förfaranden för att förebygga olyckor. Använd det nummer som finns i slutet av varje varning för att hitta dess översättning i de översatta säkerhetsvarningar som medföljer denna anordning.

SPARA DESSA ANVISNINGAR

Figyelem

FONTOS BIZTONSÁGI ELOÍRÁSOK

Ez a figyelmezeto jel veszélyre utal. Sérülésveszélyt rejto helyzetben van. Mielott bármely berendezésen munkát végezte, legyen figyelemmel az elektromos áramkörök okozta kockázatokra, és ismerkedjen meg a szokásos balesetvédelmi eljárásokkal. A kiadványban szereplo figyelmeztetések fordítása a készülékhez mellékelt biztonsági figyelmeztetések között található; a fordítás az egyes figyelmeztetések végén látható szám alapján keresheto meg.

ORIZZE MEG EZEKET AZ UTASÍTÁSOKAT!

Предупреждение

ВАЖНЫЕ ИНСТРУКЦИИ ПО СОБЛЮДЕНИЮ ТЕХНИКИ БЕЗОПАСНОСТИ

Этот символ предупреждения обозначает опасность. То есть имеет место ситуация, в которой следует опасаться телесных повреждений. Перед эксплуатацией оборудования выясните, каким опасностям может подвергаться пользователь при использовании электрических цепей, и ознакомьтесь с правилами техники безопасности для предотвращения возможных несчастных случаев. Воспользуйтесь номером заявления, приведенным в конце каждого предупреждения, чтобы найти его переведенный вариант в переводе предупреждений по безопасности, прилагаемом к данному устройству.

СОХРАНИТЕ ЭТИ ИНСТРУКЦИИ

警告

重要的安全性说明

此警告符号代表危险。您正处于可能受到严重伤害的工作环境中。在您使用设备开始工作之前，必须充分意识到触电的危险，并熟练掌握防止事故发生的标准工作程序。请根据每项警告结尾提供的声明号码来找到此设备的安全性警告说明的翻译文本。

请保存这些安全性说明

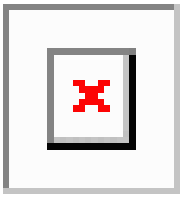
警告

安全上の重要な注意事項

「危険」の意味です。人身事故を予防するための注意事項が記述されています。装置の取り扱い作業を行うときは、電気回路の危険性に注意し、一般的な事故防止策に留意してください。警告の各国語版は、各注意事項の番号を基に、装置に付属の「Translated Safety Warnings」を参照してください。

これらの注意事項を保管しておいてください。

주의



Aviso **INSTRUÇÕES IMPORTANTES DE SEGURANÇA**

Este símbolo de aviso significa perigo. Você se encontra em uma situação em que há risco de lesões corporais. Antes de trabalhar com qualquer equipamento, esteja ciente dos riscos que envolvem os circuitos elétricos e familiarize-se com as práticas padrão de prevenção de acidentes. Use o número da declaração fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham o dispositivo.

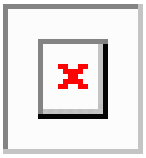
GUARDE ESTAS INSTRUÇÕES

Advarsel **VIGTIGE SIKKERHEDSANVISNINGER**

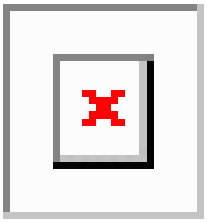
Dette advarselssymbol betyder fare. Du befinder dig i en situation med risiko for legemesbeskadigelse. Før du begynder arbejde på udstyr, skal du være opmærksom på de involverede risici, der er ved elektriske kredsløb, og du skal sætte dig ind i standardprocedurer til undgåelse af ulykker. Brug erklæringsnummeret efter hver advarsel for at finde oversættelsen i de oversatte advarsler, der fulgte med denne enhed.

GEM DISSE ANVISNINGER

تحذير



Upozorenje



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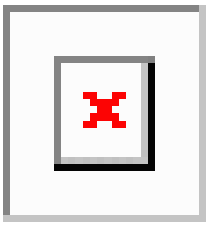

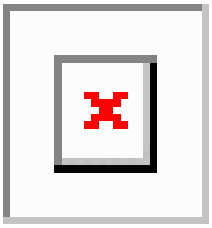

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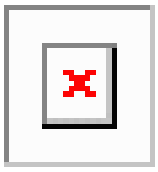

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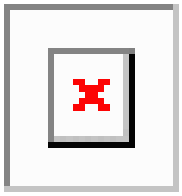

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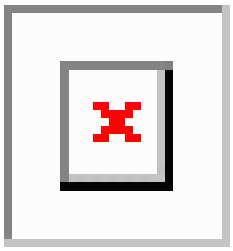

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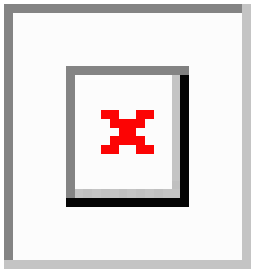


Related Documentation

Use this guide in conjunction with the following referenced Release 10.x.x publications:

- Release Notes for Cisco ONS 15454 DWDM
- Cisco ONS 15454 DWDM Line Card Configuration Guide
- Cisco ONS 15454 DWDM Network Configuration Guide
- Cisco ONS 15454 DWDM Licensing Configuration Guide
- Cisco ONS 15454 Hardware Installation Guide
- Cisco ONS 15454 DWDM Troubleshooting Guide
- Cisco ONS SDH TL1 Command Guide
- Cisco ONS SONET TL1 Command Guide
- Cisco Transport Planner - DWDM Operations Guide
- Regulatory Compliance and Safety Information for Cisco ONS Platforms
- Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms
- Installing the GBIC, SFP, SFP+, XFP, CXP, and CFP Optical Modules in Cisco ONS
- Installing the Cisco ONS 15454 DWDM Passive Optical Modules

For an update on End-of-Life and End-of-Sale notices, refer to

http://www.cisco.com/en/US/products/hw/optical/ps2006/prod_eol_notices_list.html

Obtaining Optical Networking Information

This section contains information that is specific to optical networking products. For information that pertains to all of Cisco, refer to the Obtaining Documentation and Submitting a Service Request section.

Where to Find Safety and Warning Information

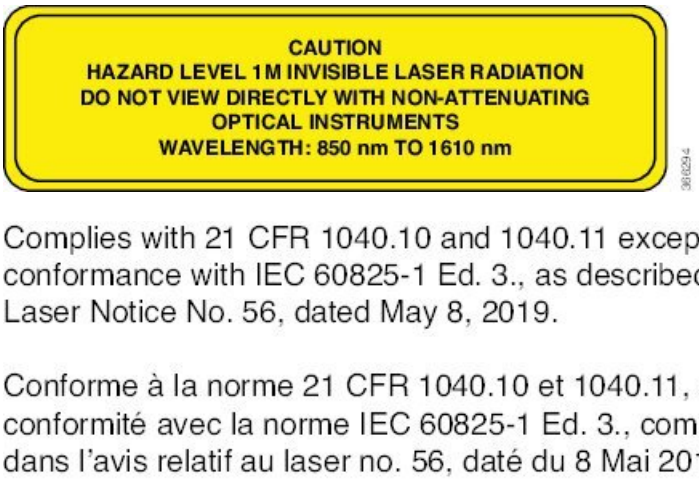
For safety and warning information, refer to the Regulatory Compliance and Safety Information document that accompanied the product. This publication describes the international agency compliance and safety information. It also includes translations of the safety warnings.

Safety Labels

Cisco NCS 2000 Series cards are classified as Laser Class 1 or 1M as per IEC 60825-1 and Hazard Level 1M as per IEC 60825-2.

Figure 1: Class 1M Laser Product Label

Figure 2: Class 1M Laser Product Label



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Communications, Services, and Additional Information

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Cisco Bug Search Tool

Cisco Bug Search Tool (BST) is a web-based tool that acts as a gateway to the Cisco bug tracking system that maintains a comprehensive list of defects and vulnerabilities in Cisco products and software. BST provides you with detailed defect information about your products and software.

Cisco ONS Documentation Roadmap

To quickly access publications of Cisco ONS Release 10.x.x, see the Documentation Roadmap.

Cisco ONS Documentation Roadmap

New and Changed Information

This table summarizes the new and changed information for Release 11.0, and tells you where the features are documented.

Table 1: New and Changed Features - R11.0

Feature	Description	Where Documented
OTNXC encryption	The OTNXC operating mode on the 400G-XP-LC card supports encryption.	*Cisco ONS 15454 DWDM Line Card Configuration Guide* NTP-G367 Provisioning Encryption on 400G-XP-LC Card
Third party certificates for encryption	The 400G-XP-LC card supports the generation of a Certificate Signing Request (CSR) and the installation of Locally Significant Certificates (LSCs) that can be used to authenticate the peer card connection. Third party certificates also referred to as Locally Significant Certificates (LSCs) are certificates that are signed by a Certification Authority (CA) other than Cisco Certificate Authority. LSCs allow customers to have their own Public Key Infrastructure (PKI) to provide better security, to have control of their own CA, and to define policies, restrictions, and usages on the generated certificates.	*Cisco ONS 15454 DWDM Line Card Configuration Guide* NTP-G363 Provisioning LSC on Cards
ANS APC Skipping	The upgraded NE update XML file imported on the CTC for the respective node will import the new ANS parameters and settings for the new degree or modules. The existing ANS parameters or module settings are not affected. This prevents unintended changes to the APC corrections to the existing degree and its associations.	*Cisco ONS 15454 DWDM Network Configuration Guide* Automatic Node Setup

Feature	Description	Where Documented
OTDR Support for TNCS-2O Cards	A TNCS-2O card has an optical module that provides Optical Time Domain Reflectometer (OTDR) measurement, ORL measurement, and standard Optical Service Channel (OSC) capability on two ports. These capabilities are available for upto four ports for each shelf; one shelf can have two TNCS-2O cards.	*Cisco ONS 15454 DWDM Network Configuration Guide* • Provisioning OTDR *Manage the Node* • NTP-G357 Perform OTDR Scan and OTDR Event Scan
Regenerator Constraints Support	For using a regenerator, the optical path needs to be validated. If the optical validation fails, then, the regenerator cannot be used, and the circuit creation fails. If validation is not supported, pre-validated paths are calculated offline and provided as a constraint to the control plane, while setting up the main and restored paths.	*Cisco ONS 15454 DWDM Network Configuration Guide*
TNCS-2 and TNCS-2O Control Cards	The TNCS-2 and TNCS-2O are new control cards compatible with all chassis types such as, Cisco ONS 15454 M2, Cisco ONS 15454 M6, and NCS 2015.	*Cisco ONS 15454 Control Card and Node Configuartion Guide* TNCS-2 and TNCS-2O Cards
TNCS-O Card Support	The TNCS-O card is supported on the Cisco 15454 M2.	*Cisco ONS 15454 Control Card and Node Configuartion Guide* TNCS-O Card
400G-XP-LC enhancements	• The new payloads supported for the MXP operating mode are FC-10G, FC-8G, and 40G. • The OPM_2x40G_2x10G slice mode can be configured in the MXP operating mode for 40GE payloads. • LLDP support—The source MAC address of 10 or 100GE ports can be retrieved after an LLDP packet is received on the client port. LLDP filtering is enabled or disabled on the 10GE or 100GE ports using the Provisioning > Line > Ethernet tab in CTC.	*Cisco ONS 15454 DWDM Line Card Configuration Guide* 400G-XP-LC Card
NCS 1004 Alien	Two variants of 300G, such as 300G_3bps and 300G_3.4375bps are added in the wavelength drop-down list.	*Cisco ONS 15454 DWDM Network Configuration Guide* DLP-G800 Create an LMP Link Using CTC

Feature	Description	Where Documented
8QAM Support on non-SSON	In non-SSON, the user can force the wavelength by checking the wavelength configuration check box and choosing the wavelength from the drop-down list.	*Cisco ONS 15454 DWDM Network Configuration Guide* Provision GMPLS Optical Channel Network Connections Using Non-SSON

This table summarizes the new and changed information for Release 10.9, and tells you where the features are documented.

Table 2: New and Changed Features - R10.9

Feature	Description	Where Documented
Encryption on 400G-XP-LC card	The 400G-XP-LC card provides encryption capability on the OTU4 ports. This card provides confidentiality of the data, which is sent over a fiber optic communication channel, using Next Generation Cryptography. The MXP operating mode supports the encryption feature.	*Cisco ONS 15454 DWDM Line Card Configuration Guide*
400G-XP-LC Enhancements	• The cross-connect circuit bandwidth supported are ODU2, ODU2e, and ODU4. • The OPM_10x10G slice mode is supported for OTN cross-connect circuits. • The new payloads supported for the OTNXC operating mode are OC192/STM64, OTU2, OTU2e, and 100G. • The new payloads supported for the MXP operating mode are OC192/STM64 and OTU2e. • The ODU4 internal ports on the 400G-XP-LC card support configuration of Pseudo Random Binary Sequence (PRBS) with all operating modes. • The Trunk GCC0 configuration is supported on the 400G-XP-LC card. • The 2x150G 8QAM modulation format is configurable on the 400G-XP MXP trunk ports.	*Cisco ONS 15454 DWDM Line Card Configuration Guide*

Feature	Description	Where Documented
Remote TXP	• The transponder node containing a set of transponders is physically connected to the ROADM-A node using the external PPC. • The PPC represent the physical connection between transponder and ROADM node add/drop port. The Staic LMP or UNI need to be created on remote transponder and ROADM accordingly. • This feature supports the following transponder cards: 100G-LC-C 100G-CK-C 100GS-CK-C 200G-CK-C 400G-XP-LC with both MXP/OTNXC operating modes	*Cisco NCS 2000 Series Network Configuration Guide*
MCG Restoration	In case of a fiber cut in a path, the media channels in a media channel group (MCHG) are restored using another available path. This helps reduce the network outage time. After restoration, there is also an option to shrink the media channel group to the minimum size to maintain all the media channnels in the same group.	*Cisco ONS 15454 DWDM Network Configuration Guide*

This table summarizes the new and changed information for Release 10.8, and tells you where the features are documented.

Table 3: New and Changed Features - R10.8

Feature	Description	Where Documented
OTN Cross-connect support on 400G-XP-LC Cards	The 400G-XP-LC card supports a new OTN cross-connect (OTNXC) operating mode. This mode allows ODU2e switching between client to trunk ports or trunk to trunk ports within a single 400G-XP-LC card for 100G and 200G trunk rates. Only the 10GE client payloads are supported. Each 10GE is mapped to an ODU2e channel. Each 10G client port of the 400G-XP-LC card consists of only one ODU2e and each OTU4C2 (200G) trunk port of the 400G-XP-LC card consists of 20 ODU2es. Client-to-trunk cross-connections can be protected or unprotected. Single card cross-connects or end-to-end cross-connects can be created in an OTN ring.	*Cisco ONS 15454 DWDM Line Card Configuration Guide* • OTN Cross-connect Capability on 400G-XP-LC Cards *Cisco ONS 15454 DWDM Network Configuration Guide* • NTP-G365 Creating,Managing, and Deleting ODU Circuits for the 400G-XP-LC Card

Feature	Description	Where Documented
OTDR Enhancements	• Scan performances are improved using specific scan parameters targeted on the characteristics of the fiber plant such as span length, reflection contributions, and major events. • OTDR identifies the Fiber End as a fiber termination event along with reflection or loss event. • Automode scan is enhanced with the composite trace. • Fast Span Trace is displayed to the user for quick reference before the composite trace. • OTDR module can perform Optical Return Loss (ORL) measurement. • Any ongoing scan operation can be cancelled. • A progress bar is provided to the user for each scan in the sector that displays the percentage of execution of the entire scan operation. • It is possible to activate automatic scan on ORL value exceeding the provisioned threshold. • The insertion loss due to amplifier cards and patchcords is displayed in the OTDR provisioning panel. • New OTDR alarms and conditions are introduced to provide more information about the OTDR functionality. • Prevention of WSON circuit creation is extended for new OTDR alarms and conditions. • CTC panes for OTDR provisioning are redesigned for better user experience.	*Cisco ONS 15454 DWDM Network Configuration Guide* • NTP-G355 Provisioning OTDR for TNCS-O Cards *Manage the Node* • NTP-G357 Perform OTDR Scan and OTDR Event Scan
Support for Regeneration Mode on 400G-XP-LC	400G- XP LC card can be configured as a regenerator. The regeneration functionality is available only on the trunk ports. The two trunk ports must have the same rate to achieve regeneration. Regen mode is not supported on the client ports.	*Cisco ONS 15454 DWDM Line Card Configuration Guide* • Regeneration Mode for 400G-XP LC

Feature	Description	Where Documented
PSM support on 400G-XP-LC	400G-XP LC card supports the Protection Switching Module (PSM). The switch time for all 10G payloads is less than 50 ms. The switch time for 100G trunk rate is higher than the 200G.	*Cisco ONS 15454 DWDM Line Card Configuration Guide* • 400G-XP-LC Card
OPT-EDFA-35	The OPT-EDFA-35 card is a C-band, DWDM EDFA amplifiers/preamplifiers with +23dBm output power. The card includes two identical amplification sections to serve two fiber directions simultaneously. The OPT-EDFA-35 card is bidirectional and has an operative optical gain range up to 24 dB and 35 dB.	*Cisco ONS 15454 DWDM Line Card Configuration Guide* • OPT-EDFA-35 *Manage the Node* • NTP-G76 Verify Optical Span Loss Using CTC • NTP-G77 Manage Automatic Power Control *Monitor Performance* • NTP-G74 Monitor DWDM Card Performance • DLP-G140 View Power Statistics for Optical Amplifier, 40-SMR1-C, and 40-SMR2-C Cards
Card Support in Cisco NCS 2015	The GE_XP, 10GE_XP, GE_XPE,10GE_XPE, MXP_MR_10DME_C, and OPT-RAMP-CE cards are supported on the Cisco NCS 2015 chassis.	*Cisco ONS 15454 DWDM Series Line Card Configuration Guide, Release 10.x.x* • GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Cards • MXP_MR_10DMEX_C Card • OPT-RAMP-C and OPT-RAMP-CE Cards
Software Enhancements	The OpenSSH has been upgraded to CiscoSSH 1.4.	*Cisco ONS 15454 DWDM Network Configuration Guide, Release 10.x.x* • OpenSSH Version

This table summarizes the new and changed information for Release 10.7, and tells you where the features are documented.

Table 4: New and Changed Features - R10.7

Feature	Description	Where Documented
Y-cable support for 200G-CK-LC and 10x10G-LC cards	Y-cable protection is supported when the 200G-CK-LC card is configured in TXP-100G operating mode and the 100G client CPAK ports are provisioned with 100GE payload. This configuration uses the CPAK-100G-LR4 pluggable. Y-cable protection is supported when the 10x10G-LC card is configured in MXP-10x10G operating mode with 200G-CK-LC card and the 10x10G-LC card is provisioned with 10GE, OC-192/STM-64 payloads. This configuration uses the ONS-SC+-10G-LR and ONS-SC+-10G-SR pluggables.	*Cisco ONS 15454 DWDM Line Card Configuration Guide* • Key Features of 100G-LC-C, 100G-ME-C, 100G-CK-C, 100ME-CKC, 10x10G-LC, 100GS-CK-LC, 200G-CK-LC, CFP-LC, and MR-MXP Cards
SSON	SSON allows the user to provide more than 96 channels in a span. The SSON package is enabled using a specific package. The supported SSON circuits are: • Media Channel • Media Channel Group • Carrier	*Cisco ONS 15454 DWDM Network Configuration Guide*
MR-MXP Configuration for 100G and 200G OTU4	2X10GE+2X40GE payload is supported in MXP-100G operating mode which comprises of 200G-CK-LC and MR-MXP cards. This payload is supported only when the sub OpMode in MR-MXP card is OPM_2x40G_2x10G. OTU4 payload is supported in MXP-CK-100G operating mode which comprises of 200G-CK-LC and MR-MXP cards. This payload is supported only when the sub OpMode in MR-MXP card is OPM_100G.	*Cisco ONS 15454 DWDM Line Card Configuration Guide* • MR-MXP Card

Feature	Description	Where Documented
Third Party Certificates for MR-XP Card	The MR-MXP card supports the generation of a Certificate Signing Request (CSR) and installation of Locally Significant Certificates (LSCs) that can be used to authenticate the peer card connection.	*Cisco ONS 15454 DWDM Line Card Configuration Guide*
Support of 400G-XP-LC cards on Cisco ONS 15454 M2	One 400G-XP-LC card can be installed in the Cisco ONS 15454 M2 DC chassis that is powered by 15454-M2-DC or 15454-M2-DC-E.	*Cisco ONS 15454 DWDM Line Card Configuration Guide*
Support for OTU4 traffic on 400G-XP-LC Cards	This payload is supported only on the ONS-QSFP28-LR4 pluggable. The payload can be provisioned for the OPM_100G slice mode for any trunk configuration.	*Cisco ONS 15454 DWDM Line Card Configuration Guide*
Interoperability with 400G-XP-LC card	This line card is interoperable with the NCS55-6X200-DWDM-S card supported on NCS 5500 and the NCS4K-4H-OPW-QC2 Card supported on NCS 4000.	*Cisco ONS 15454 DWDM Line Card Configuration Guide*

This table summarizes the new and changed information for Release 10.6.2, and tells you where the features are documented.

Table 5: New and Changed Features - R10.6.2

Feature	Description	Where Documented
400G-XP-LC card enhancements	• Support for 16G-Fiber Channel and OTU2 payloads • Support for trunk PM parameters-Second Order PMD (SOPMD) and Polarization Depended Loss (PDL).	*Cisco ONS 15454 DWDM Line Card Configuration Guide*

Feature	Description	Where Documented
Node recovery enhancements	Two enhancements have been introduced to recover the node without traffic loss. • When provisioning database loss occurs, the BAD-DB-DETECTED and NODE-FACTORY-MODE critical alarms are raised at the node level. • When system database loss occurs on the active or standby control card, an INVALID SYSDB alarm is raised on the control card. Steps to clear the alarms have been documented.	*Cisco ONS 15454 Network Configuration Guide*
MSM supported configurations	The following configurations are supported: • 40 400G-XP-LC cards provisioned with 10GE payloads • 20 400G-XP-LC, 36 200G-CK-LC, and 72 MR-MXP cards provisioned with 10GE payloads • 80 400G-XP-LC cards provisioned with 100GE payloads • 20 400G-XP-LC cards provisioned with 100GE payloads along with 36 200G-CK-LC and 72 MR-MXP cards provisioned with 10GE payloads.	*Cisco ONS 15454 DWDM Line Card Configuration Guide*

Feature	Description	Where Documented
Duplicate Node Controller	(Only on ONS 15454 M6 and NCS 2015) When a TNC/TNC-E/TSC/TSC-E/TNCS/TNCS-O node controller connects to the same switch where an NCS 2006 or NCS 2015 node controller exists, both the node controllers raise the critical Duplicate Node Controller (DUP-NC) alarm. The subtending shelves of both the node controllers raise the Shelf Communication Failure (SHELF-COMM-FAIL) alarm. Both the node controllers and their subtending shelves shut down their ports on ASIC towards the MSM ports in ECU. However, the traffic is not affected.	*Cisco ONS 15454 DWDM Control Card and Node Configuration Guide* • Duplicate Node Controller
MR-MXP Enhancements	OC192/STM64 and OTU2 client payloads are supported on the MR-MXP card in MXP-200G, MXP-10x10G-100G, MXP-CK-100G, and MXP-100G operating modes. OC192/STM64 and OTU2 client payloads are supported only when the sub OpMode is OPM_10x10G on the MR-MXP card.	*Cisco ONS 15454 DWDM Line Card Configuration Guide* • MR-MXP Card
TCC2 and TCC2P Card Support	The nodes with the TCC2/TCC2P cards in releases prior to R10.6.2 cannot be upgraded to R10.6.2 as the size of the software package exceeds the size of the TCC2/TCC2P flash drive. Hence, R10.6.2 does not have the TCC2/TCC2P software package. If the user wants to continue with the ONS 15454 chassis, it is recommended to use the TCC3 control card. If the user wants to upgrade to a ONS 15454 M6 or NCS 2015 chassis, it is recommended to use the TNCS or TNCS-O control cards.	*Cisco ONS 15454 DWDM Control Card and Node Configuration Guide* • TCC2 and TCC2P Cards

Feature	Description	Where Documented
Multivendor Interoperability	The 200G-CK LC can be configured to interoperate with other vendor devices. The Interop Mode option is available on the full PID, NCS2K-200G-CK, and on the licenced PID, NCS2K-200G-CK-LIC, when licence L-NCS2K-DQPSK-LH= is active.	*Cisco ONS 15454 DWDM Line Card Configuration Guide* • Multivendor Interoperability
Operating Mode to support 16G FC payload	To support the 16G FC payload, a new operating mode, OPM_6x16G_FC is introduced. This operating mode can be provisioned on any MXP card configuration slice, with M_100G and M_200G trunk ports.	*Cisco ONS 15454 DWDM Line Card Configuration Guide* • Operating Mode
ROADM Configurations	A new colorless, directional A/D stage is available using the passive A/D module, MF-6AD-CFS. This A/D stage provides modular A/D capability up to 96 channels that can be used to insert or extract colorless channels to or from a specific ROADM direction.	*Cisco ONS 15454 DWDM Network Configuration Guide* • Node Reference
Third Party Certificates for WSE Card	The WSE card supports the generation of a Certificate Signing Request (CSR) and installation of Locally Significant Certificates (LSCs) that can be used to authenticate the peer card connection.	*Cisco ONS 15454 DWDM Line Card Configuration Guide* • WSE Card • NTP-G340 Provisioning Encryption on the WSE and MR-MXP Cards
OTDR Enhancements	• The OTDR scan starts automatically after the LOS alarm is raised and cleared. • The default value for the automatic OTDR scan to begin is 3 minutes. • Location [km] in the Reflection table or the Insertion Loss table is enhanced with the Accuracy (km) details.	*Cisco NCS 2000 Series Network Configuration Guide* • DLP-G793 Configuring Common OTDR Parameters for OTDR Scan on TNCS-O Cards *Manage the Node* • DLP-G787 Perform OTDR Event Scan on TNCS-O Cards

This table summarizes the new and changed information for Release 10.6.1, and tells you where the features are documented.

Table 6: New and Changed Features - R10.6.1

Feature	Description	Where Documented
400G-XP-LC card	The 400G-XP-LC card is a tunable DWDM trunk card that simplifies the integration and transport of 10 Gigabit and 100 Gigabit Ethernet interfaces and services into enterprises and service provider optical networks. The card is a double- slot unit that provides 400 Gbps of client and 400 Gbps of trunk capacity. The card supports six QSFP+ based client ports that can be equipped with 4x 10 Gbps optics and four QSFP28 or QSFP+ based client ports that can be equipped with 100 Gbps QSFP28 and 4x 10 Gbps QSFP+ optics. The card is capable of aggregating client traffic to either of the two 200 Gbps coherent CFP2 trunk ports. The 400G-XP-LC card is supported only on Cisco ONS 15454 M6 and Cisco NCS 2015 platforms.	*Cisco ONS 15454 DWDM Line Card Configuration Guide* 400G-XP-LC Card
Passive Optical Modules	The following types of modules are supported: • MPO-24 to 20-LC Fan-out Module (NCS2K-MF-MPO-20LC=) • 6 Port Add/Drop Module (NCS2K-MF-6AD-CFS=)	*Installing the Cisco ONS 15454 M2 and ONS 15454 M6 Passive Optical Modules*
ONS 15454 M6 ECU60-S	ONS 15454 M6 ECU60-S is a new type of ECU-S introduced for the ONS 15454 M6 when the shelf is powered at –60 VDC nominal input voltage. This module has eight USB 2.0 ports and two USB 3.0 ports.	*Cisco ONS 15454 Hardware Installation Guide*

Feature	Description	Where Documented
New MPO Cables		*Installing the Cisco ONS 15454 DWDM Passive Optical Modules*

Feature	Description	Where Documented
	The following table lists the MPO cables that can be used with the passive modules from Release 10.6.1: • ONS-MPO-16LC-2—Fan-out cable with one MPO-24 connector on one side and 16 LC connectors on the other side. The cable is two meters long and can be used in ROADM configurations with the NCS2K-MF-6AD-CFS module. This cable can also be used as a fan-out cable to connect the LC interface directly to the SMR20 FS MPO ports. • ONS-12MPO-MPO-x—Multi-fiber patch cord with MPO-12 connectors. The 12 fibers have straight connections. There are four variants: two, four, six, and eight meters. The cables can interconnect the QSFP+ client ports of NCS2K-400G-2C2 and NCS4K-4H-OPW-QC2 with the NCS2K-MF-8X10G-FO passive module. • ONS-12MPO-XMPO-x—Multi-fiber patch cord with MPO-12 connectors. The 12 fibers have crossed fiber interconnections. The cable is used to interconnect the NCS2K-MF-DEG-5-CV and the NCS2K-MF-UPG-4-CV passive modules with the NCS2K-MF-MPO-8LC adapter. • ONS-16MPO-MPO-x—Multi-fiber patch cord with MPO-24 connectors that has only 16 fibers connected. Fibers 1, 2, 11, 12, 13, 14, 23, and 24 are not connected. The cable is used for interconnections	

Feature	Description	Where Documented
	inside the ROADM with MPO-24 standard. The patch cord can be used for interconnections between SMR20 FS and NCS2K-MF-M16LC-CV, or NCS2K-MF-2MPO-ADP or NCS2K-PPMESH8-5AD. The patch cord can also be used for interconnections between NCS2K-16-AD-CCOFS and NCS2K-MF-M16LC-CV.	
Synchronous Ethernet	Synchronous Ethernet (SyncE) provides synchronized timing to multiple remote network elements (NEs) without using an external circuit for timing. SyncE provides the required synchronization at the physical level and uses the Ethernet Synchronization Message Channel (ESMC) to enable traceability of the best clock source. SyncE clocks are compatible with the clocks used in the SONET or SDH synchronization network. SyncE is supported on TNCS and TNCS-O controller cards. You must enable ESMC on an OSC port to configure it as a clock source.	*Synchronizing Node Timing* chapter of the *Cisco ONS 15454 DWDM Control Card and Node Configuration Guide*

Feature	Description	Where Documented
OTDR Enhancements	• Two types of OTDR scans are available for TNCS-O cards: hybrid scan and fast scan. When you start a fast scan on a TX or an RX port, an OTDR_FAST_SCAN_IN PROGRESS_TX or an OTDR_FAST_SCAN_IN PROGRESS_RX alarm is raised. Fast scan shuts down the OSC channel. When you start a hybrid scan on a TX or an RX port, an OTDR_HYBRID_SCAN_IN_PROGRESS_TX or an OTDR_HYBRID_SCAN_IN_PROGRESS_RX alarm is raised. Hybrid scan does not shut down the OSC channel and takes more time to complete. • New OTDR alarms are introduced to provide more information about the OTDR events. Select an event to view its details as a graph or in a tabular format. • CTC logs the data of a maximum of 32 historical OTDR scans. The history is maintained for OTDR scans in the same zone and direction. The values of the back reflection and insertion loss are listed for each scan along with the date and timestamp.	*Cisco ONS 15454 Network Configuration Guide* • NTP-G355 Provisioning OTDR for TNCS-O Cards *Manage the Node* • NTP-G357 Perform OTDR Scan and OTDR Event Scan

Feature	Description	Where Documented
Connection Verification Enhancements	• View and troubleshoot patch cords that have an excess insertion loss higher than the threshold value. • View the originating and destination slots for the connection verification along with the patch cords in the cable view and front panel view of the card. • If there is at least one patch cord highlighted in yellow and no patch cords highlighted in orange on a node, an IPC-VERIFICATION-DEGRADE alarm is raised on the node. • If there is at least one patch cord highlighted in orange on the node, an IPC-VERIFICATION-FAIL alarm is raised on the node. • When the insertion loss is greater than the insertion loss degrade threshold and less than the insertion loss fail threshold, the value of the insertion loss verification of the patch cord is degrade. The corresponding row of the patch cord in the Connection Verification pane is highlighted in yellow. • When the insertion loss is greater than the insertion loss fail threshold, the value of the insertion loss verification of the patch cord is fail. The corresponding row of the patch cord in the Connection Verification pane is highlighted in orange. • Connectivity verification is displayed only for an MPO cable and not for each of the patch cords in it.	*Cisco ONS 15454 DWDM Line Card Configuration Guide* • Supported Cards • Running the Connection Verification *Cisco ONS 15454 DWDM Network Configuration Guide* • Node Reference • NTP-G356 Verify the Connections in Optical Cables

Feature	Description	Where Documented
MR-MXP Enhancements	The MR-MXP card supports the following enhancements: • Payload authentication can be enabled on the MR-MXP card to validate the integrity of the received payloads. • Payload authentication error thresholds can be set on the MR-MXP card. • MR-MXP-K9 and MR-MXP-K9= PIDs of MR-MXP card are introduced and are referred as Encryption as an appliance PIDs. The card authentication and payload encryption are enabled by default and cannot be disabled for these PIDs.	*Cisco ONS 15454 DWDM Line Card Configuration Guide* • MR-MXP Card • NTP-G340 Provisioning Encryption on the WSE and MR-MXP Cards *Cisco ONS 15454 DWDM Licensing Configuration Guide*
LMP Wizard Enhancements	Link Management Protocol (LMP) link can be created between the DWDM node and non DWDM node using a wizard in CTC.	*Cisco ONS 15454 DWDM Network Configuration Guide* • DLP-G800 Create an LMP Link Using CTC • DLP-G801 Configure Local UNI Using CTC
TCC2P support	The TCC2P card can be used as a control card in a subtended shelf where the node controller is TCC3 card on ONS 15454 chassis or TNC/TNCE/TNCS/TNCS-O cards on ONS 15454 M6 or NCS 20015 chassis. The TCC2P card can also be used as a node controller in a stand-alone configuration.	TCC2 and TCC2P Cards

Feature	Description	Where Documented
Software Enhancements	Several software enhancements are introduced in Release 10.6.1. • Reroute enhancements • Retuning wavelengths of existing circuits • Changing the channel frequency measurement units to THz or GHz • Fast restoration of circuits • CTC displays the historical ethernet statistics that are retrieved from the ethernet controllers on the router. • Support of 40-SMR1-C cards in a split ROADM configuration • When a fault occurs on the working path of a FAPs ring, all the SVLANs, whose protection is set, are moved to the protection path of the FAPS ring. Up to 1024 SVLANs can be protected or a range of SVLANs can be protected. • 200G-CK-LC card supports additional configurations in the MXP_200G and MXP_CK_100G operating modes.	• NTP-G353 Creating GMPLS Circuits Using the Fast Circuit Mode • DLP-G732 Editing a GMPLS Circuit • NTP-G359 Changing the Channel Frequency Measurement Unit • NTP-G135 Editing Network Element Defaults • NTP-G345 Viewing Ethernet Statistical PM Counts • Split ROADM Nodes • DLP-G381 Provisioning Layer 2 Protection Settings • 200G-CK-LC

Feature	Description	Where Documented
Security Enhancements	• RADIUS authentication is supported for security super user, security user, and root user. • Security policy can be changed for the security level that you want to provision: Retrieve, Maintenance, Provisioning, Superuser, Security user, Security super user, or ROOT15 user. • RSA-based authentication is supported for dynamic challenge response security feature. • Node reauthentication is supported in CTC for Cisco NCS 2000 and Cisco CRS nodes. • Text string in the Shared Secret field is masked and the shared secret serves as a password between a RADIUS client and RADIUS server.	• *Manage the Node* • *Connect the PC and Log into the GUI*
System Mode Change	The System Mode can be changed by: • Using CTC • Using LCD	• *Manage the Node* • *Cisco ONS 15454 Hardware Installation Guide*
LMP Protocol Extension for Trunk Ports	With LMP extension for trunk ports, traffic is directed to the NCS 4000 series router from the trunk ports of the NCS 2000 series router.	*Cisco ONS 15454 DWDM Network Configuration Guide* • DLP-G790 Create a Static LMP Connection
ROADM Configurations	New layer-2 A/D extensions for ROADM	*Cisco ONS 15454 DWDM Network Configuration Guide* • Node Reference

Feature	Description	Where Documented
GMPLS enhancements	The enhancements include the following: • Explicit Route Object (ERO) - defines the route(s) to be used through a list of specified nodes for a LSP. • Record Route Object (RRO) - enables the user to obtain a list of used resources. • SRLG diversity - enables the user to create a new circuit, with resources which are not used in the reference circuit.	*Cisco ONS 15454 DWDM Network Configuration Guide* • Configuring an Explicit Route Object • Recording a Route Object • Configuring SRLG Diversity
Repair Circuits	When some nodes change their network IP, WSON is not able to restore the correct state of the involved circuits. The Repair Circuits feature enables the user to fix circuits that WSON is not able to automatically repair.	*Cisco ONS 15454 DWDM Network Configuration Guide* • Repairing a Circuit
CTC Cell Highlight	Highlights the recent changes made by the user.	*CTC Enhancements, Operations and Shortcuts*

This table summarizes the new and changed information for Release 10.5.2, and tells you where the features are documented.

Table 7: New and Changed Features - R10.5.2

Feature	Description	Where Documented
Cisco NCS 2015 AC Shelf Assembly	The Cisco NCS 2015 AC shelf assembly has 18 vertical slots numbered 1 to 18. While slot 2 to slot 16 is for line cards that provide 10 to 100 Gbps interconnections, slot 1 and slot 17 is for the TNCS or TNCS-O cards (timing and control cards). Slot 18 is for the external connection unit (ECU). The NCS 2015 AC shelf is powered by AC power modules with 1+0, 1+1, 2+0, and 2+2 redundancy. The NCS 2015 AC shelf contains backup flash memory that supports the database (DB) and image backup in the single mode operation. The LCD unit is integrated with the fan tray assembly. The fiber or cable guide used in the NCS 2015 AC shelf provides improved fiber management. The air in the NCS 2015 AC shelf is drawn in through a two-inch air inlet at the bottom of the shelf, and expelled at the top-rear. A single NCS 2015 AC shelf supports both ANSI and ETSI standards.	*Cisco NCS 2000 Series Hardware Installation Guide*
ONS 15454 M6 ECU-S	The ONS 15454 M6 ECU-S is a new type of ECU introduced for the ONS 15454 M6. It has 2 USB 3.0 connections and 8 USB 2.0 connections. The Fiber Shuffle or the MPO-fan-out unit can be connected to the ONS 15454 M6 ECU-S using the USB 3.0 port.	*Cisco ONS 15454 Hardware Installation Guide*
Node Alias	A node alias (up to 128 characters) can be configured for a node. It shows as a tool tip in the Network Map and Explorer Tree of the CTC.	*Cisco ONS 15454 DWDM Control Card and Node Configuration Guide* • NTP-G24 Setting Up Name, Date, Time, and Contact Information

Feature	Description	Where Documented
PSM Cards	PSM cards support automatic bi-directional traffic reversion. SNMP support is added for PSM Cards to retrieve the port status. PSM cards support automatic Optical Multiplex Section (OMS) protection when provisioned with Transponder (TXP) and Muxponder (MXP) cards.	*Cisco ONS 15454 DWDM Line Card Configuration Guide* • Provisioning Protection Switching Module

Feature	Description	Where Documented
SMR20 FS CV Cards	The SMR20 FS CV cards are tunable over 96 channels in the C-band, at 50-GHz spacing on the ITU-T grid. The cards provide flex spectrum capability, which allows the flexibility to allocate the channel bandwidth and to increase the network scalability. The cards support up to 20 directions for each ROADM node and can be installed in any service slots in the chassis. The SMR20 FS CV cards provide the connection verification capability using a connectivity check signal. The correctness and the quality of the interconnections (determined by measuring the insertion loss of the external passive path) can be validated with the connection verification feature in the cards.	

Feature	Description	Where Documented
		Cisco ONS 15454 DWDM Line Card Configuration Guide • 17 SMR9 FS, 24 SMR9 FS, 34 SMR9 FS and SMR20 FS Cards • Connection Verification • Supported Cards • Running the Connection Verification *Cisco ONS 15454 DWDM Network Configuration Guide* • Node Reference • NTP-G356 Verify the Connections in Optical Cables *Cisco ONS 15454 DWDM Network Configuration Guide* • DLP-G325 Changing Optical Amplifier Line Settings • DLP-G326 Changing Optical Amplifier Threshold Settings • DLP-G406 Changing Card Optical Channel Parameters for 40-WXC-C, 80-WXC-C, 16-WXC-FS, 17 SMR9 FS, 24 SMR9 FS, 34 SMR9 FS, or SMR20 FS Cards • DLP-G407 Changing the Optical Channel Thresholds for 40-WXC-C, 80-WXC-C, 16-WXC-FS, 17 SMR9 FS, 24 SMR9 FS, 34 SMR9 FS, or SMR20 FS Cards • DLP-G408 Changing Optical Line Parameters for 40-WXC-C, 80-WXC-C, 16-WXC-FS, 17 SMR9 FS, 24 SMR9 FS, 34 SMR9 FS, or SMR20 FS Cards • DLP-G409 Changing the Optical Line Thresholds for 40-WXC-C, 80-WXC-C, 16-WXC-FS, 17 SMR9 FS, 24 SMR9 FS, 34 SMR9 FS, or SMR20 FS Cards • DLP-G772 Viewing Wavelength Power for

Feature	Description	Where Documented
		16-WXC-FS, 17 SMR9 FS, 24 SMR9 FS, 34 SMR9 FS, or SMR20 FS Card • DLP-G773 Creating a Flex Spectrum or ITU Circuit for 16-WXC-FS, 17 SMR9 FS, 24 SMR9 FS, 34 SMR9 FS, or SMR20 FS Card • DLP-G140 View Power Statistics for Optical Amplifier, 40-SMR1-C, 40-SMR2-C,17 SMR9 FS, 24 SMR9 FS, 34 SMR9 FS, and SMR20 FS Cards • DLP-G141 View Optical Power Statistics for 32MUX-O, 32WSS, 32WSS-L, 32DMX-O,32DMX, 32DMX-L, 40-WSS-C, 40-WSS-CE, 40-WXC-C, 80-WXC-C, 16-WXC-FS, 17 SMR9 FS, 24 SMR9 FS, 34 SMR9 FS, SMR20 FS, SMR20 FS CV, 40-MUX-C, 40-DMX-C, and 40-DMX-CE Cards

Feature	Description	Where Documented
TNCS-O Cards	The TNCS-O cards are provisioned as active and standby cards in the Cisco ONS 15454 M6 or NCS 2015 shelves. On the NCS 2015 shelf, the TNCS-O cards can be installed in slots 1 and 17. On the ONS 15454 M6 shelf, the cards can be installed in slot 1 and 8. If the active TNCS-O card fails, system traffic switches to the redundant TNCS-O card. The TNCS-O cards support only Fast Ethernet (FE) and wavelength of 1518 nm in OSC transmissions. A TNCS-O card has an optical module that provides Optical Time Domain Reflectometer (OTDR) measurement capability and standard Optical Service Channel (OSC) transmission on two ports. OTDR capability lets you monitor variations in scan values and thresholds and measure the distance and magnitude of defects like insertion loss and reflection loss on a fiber span across different measurement ranges.	*Cisco ONS 15454 DWDM Control Card and Node Configuration Guide* • TNCS-O Cards • NTP-G313 Installing and Configuring the TNC, TNCE, TSC, TSCE, or TNCS Card *Cisco NCS 2000 Series Network Configuration Guide* • NTP-G355 Provisioning OTDR for TNCS-O Cards *Manage the Node* • NTP-G357 Perform OTDR Scan and OTDR Event Scan
MR-MXP Enhancements	The MR-MXP card supports the following enhancements: • Supports 100G operating modes - MXP-100G, TXP-100G, and 100G_B2B. • Provides encryption capability at the optical layer. • Supports feature-based licensing to support high speed and low speed encryption.	*Cisco ONS 15454 DWDM Line Card Configuration Guide* • MR-MXP Card • Operating Modes for MR-MXP Card • NTP-G340 Provisioning Encryption on the WSE and MR-MXP Cards *Cisco ONS 15454 DWDM Licensing Configuration Guide*

Feature	Description	Where Documented
Squelch Hold Off Timer	The Squelch hold off timer can be configured for TXP_MR_10E, 40E-MXP-C, OTU2_XP, 100G-LC-C, 100G-CK-C, 100ME-CK-C, CFP-LC, 10x10G-LC, and MR-MXP cards for 10GE and 100GE client payloads in TXP and MXP operating modes.	*Cisco ONS 15454 DWDM Line Card Configuration Guide* • DLP-G714 Changing the Card Line Settings • DLP-G217 Changing the 10G Multirate Transponder Line Settings • DLP-G218 Changing the 10G or 40G Multirate Transponder Line Section Trace Settings • DLP-G666 Changing the 40G Muxponder Line Settings
Split ROADM Nodes	The Split ROADM feature is enhanced to support chassis replacement in post-split nodes.	*Cisco ONS 15454 DWDM Network Configuration Guide* • Node Reference
MSM support	The following MSM configurations are supported: • Cisco NCS 2015 as the node controller with up to 10 NCS 2015 as subtended shelves. • Cisco NCS 2015 as the node controller with a mix of up to 15 NCS 2015, NCS 2006, and ONS 15454 as subtended shelves. • Cisco NCS 2006 as the node controller with a mix of up to 15 NCS 2015, NCS 2006, and ONS 15454 shelves as subtended shelves. • Cisco ONS 15454 as the node controller with a mix NCS 2015, NCS 2006, and ONS 15454 shelves as subtended shelves. **Note** The ONS 15454 shelves must have TCC3 cards installed for the configurations.	*Cisco NCS 2000 Series Hardware Installation Guide*

Feature	Description	Where Documented
Unnumbered Interface (UNI) Support	The UNI is the service control interface between the transport network and client equipment. It is used to utilize the supported network services. It eliminates the need of managing IP addresses to identify the interfaces.	*Cisco ONS 15454 DWDM Network Configuration Guide, Release 10.x.x.* • Unnumbered Interface (UNI) Support • DLP-G789 Enable RSVP on an Interface • DLP-G790 Create a Static LMP Connection • DLP-G791 Creating the WSON UNI-C Circuit
Zoom In/Out of Graphs	The ROADM flex spectrum cards support zoom in or zoom out functionality on the graphs displayed in CTC.	*Manage the Node* • DLP-G785 Zoom In/Out with Graphs
Power Redundancy	The power redundancy mode of an NCS 2015 chassis can be configured using CTC or TL1 commands. The AC power modules support 1+0, 1+1, 2+0, and 2+2 redundancy. The DC power modules support 1+0, 1+1, 2+0, 2+1, 2+2, 3+0, and 3+1 redundancy.	*Cisco ONS 15454 DWDM Network Configuration Guide, Release 10.x.x* • Power Redundancy • Power Redundancy Mode While Upgrading from Release 10.5 • NTP-G358 Configuring a Power Redundancy Mode

This table summarizes the new and changed information for Release 10.5, and tells you where the features are documented.

Table 8: New and Changed Features - R10.5

Feature	Description	Where Documented
Cisco NCS 2015 Shelf Assembly	The Cisco NCS 2015 shelf assembly has 18 vertical slots numbered 1 to 18. While slot 2 to slot 16 is for line cards that provide 10 to 100 Gbps interconnections, slot 1 and slot 17 is for the TNCS cards (timing and control cards). Slot 18 is for the external connection unit (ECU). The NCS 2015 system can be powered by redundant DC power modules. The NCS 2015 system contains backup flash memory that supports the database (DB) and image backup in the single mode operation. The LCD unit is integrated with the fan tray assembly. The fiber or cable guide used in the NCS 2015 shelf provides improved fiber management. The air in the NCS 2015 chassis is drawn in through a two-inch air inlet at the bottom of the chassis, and expelled at the top-rear. A single NCS 2015 shelf assembly supports both ANSI and ETSI standards.	*Cisco NCS 2000 Series Hardware Installation Guide*
TNCS Card	The TNCS cards can be provisioned as active and standby cards in the NCS 2015 shelf. The TNCS cards serve as the processor card for the node. The TNCS cards can be installed in slots 1 and 17 on the NCS 2015 shelf. If the active TNCS card fails, system traffic switches to the redundant TNCS card.	*Cisco ONS 15454 DWDM Control Card and Node Configuration Guide* • TNCS Card • NTP-G313 Installing and Configuring the TNC, TNCE, TSC, TSCE, or TNCS Card

Feature	Description	Where Documented
17 SMR9 FS, 24 SMR9 FS, 34 SMR9 FS and SMR20 FS Cards	The 17 SMR9 FS, 24 SMR9 FS, 34 SMR9 FS, and SMR20 FS cards are tunable over 96 channels in the C-band, at 50-GHz spacing on the ITU-T grid. The card provides the flex spectrum capability, which allows the user the flexibility to allocate the channel bandwidth, to increase the network scalability. The 17 SMR9 FS, 24 SMR9 FS, and 34 SMR9 FS cards support up to 9 directions for each ROADM node. The SMR20 FS card supports up to 20 directions for each ROADM node. The cards support count based licensing and can be installed in any service slots in the chassis.	

Feature	Description	Where Documented
		Cisco ONS 15454 DWDM Line Card Configuration Guide • 17 SMR9 FS, 24 SMR9 FS, 34 SMR9 FS and SMR20 FS Cards *Cisco ONS 15454 DWDM Network Configuration Guide* • Node Reference *Cisco ONS 15454 DWDM Network Configuration Guide* • DLP-G325 Changing Optical Amplifier Line Settings • DLP-G326 Changing Optical Amplifier Threshold Settings • DLP-G406 Changing Card Optical Channel Parameters for 40-WXC-C, 80-WXC-C, 16-WXC-FS, 17 SMR9 FS, 24 SMR9 FS, 34 SMR9 FS, or SMR20 FS Cards • DLP-G407 Changing the Optical Channel Thresholds for 40-WXC-C, 80-WXC-C, 16-WXC-FS, 17 SMR9 FS, 24 SMR9 FS, 34 SMR9 FS, or SMR20 FS Cards • DLP-G408 Changing Optical Line Parameters for 40-WXC-C, 80-WXC-C, 16-WXC-FS, 17 SMR9 FS, 24 SMR9 FS, 34 SMR9 FS, or SMR20 FS Cards • DLP-G409 Changing the Optical Line Thresholds for 40-WXC-C, 80-WXC-C, 16-WXC-FS, 17 SMR9 FS, 24 SMR9 FS, 34 SMR9 FS, or SMR20 FS Cards • DLP-G772 Viewing Wavelength Power for 16-WXC-FS, 17 SMR9 FS, 24 SMR9 FS, 34 SMR9 FS, or SMR20 FS Card • DLP-G773 Creating a Flex Spectrum or ITU Circuit for 16-WXC-FS, 17 SMR9 FS,

Feature	Description	Where Documented
		24 SMR9 FS, 34 SMR9 FS, or SMR20 FS Card • DLP-G140 View Power Statistics for Optical Amplifier, 40-SMR1-C, 40-SMR2-C,17 SMR9 FS, 24 SMR9 FS, 34 SMR9 FS, and SMR20 FS Cards *Cisco ONS 15454 DWDM Licensing Configuration Guide* • 17 SMR9 FS, 24 SMR9 FS, 34 SMR9 FS, and SMR20 FS Cards
12-AD-FS and 16-AD-FS Cards	The 12-AD-FS card is an add/drop card that provides contentionless, colorless, omnidirectional, and flex spectrum capability on 4 channels over 4 directions. The 16-AD-FS card provides contentionless, colorless, omnidirectional, and flex spectrum capability on 16 channels over more than 4 directions using upgrade ports. The cards can be installed in any service slots in the Cisco ONS 15454 M6 and NCS 2015 chassis.	*Cisco ONS 15454 DWDM Line Card Configuration Guide* • 12-AD-FS Card • 16-AD-FS Card *Cisco ONS 15454 DWDM Network Configuration Guide* • DLP-G414 Changing Optical Line Settings for Multiplexer and Demultiplexer Cards • DLP-G415 Changing Optical Line Threshold Settings for Multiplexer and Demultiplexer Cards • DLP-G781 Switching the Channels for 12-AD-FS and 16-AD-FS Cards • DLP-G479 View Optical Power Statistics for the PSM, 12-AD-FS, and 16-AD-FS Cards

Feature	Description	Where Documented
Passive Optical Modules	A new generation of passive optical modules can be used to accommodate the ROADM nodes built with the SMR FS and AD-FS cards. Two types of modules are available: interconnection modules, and add/drop modules. The modules are MF-MPO-16LC, MF-2MPO-ADP, MF-16AE-CFS, MF-10AD-CFS, and PPMESH8-5AD. The SMR FS and AD-FS cards can be interconnected by the MF-MPO-16LC, MF-2MPO-ADP, and the PPMESH8-5AD modules. The MF-16AE-CFS and MF-10AD-CFS are only used as passive add/drop modules in TDM networks.	*Installing the Cisco ONS 15454 DWDM Passive Optical Modules* • Components of Cisco ONS 15454 DWDM Passive Optical Modules
Splitter protection on 10x10G-LC card	Splitter protection can be implemented on the 10x10G-LC card in the TXPP-10G mode. The 10x10G-LC card supports up to two splitter protection groups with one client and two trunk ports.	*Cisco ONS 15454 DWDM Line Card Configuration Guide* • Operating Modes for 10x10G-LC Card • NTP-G235 Provisioning an Operating Mode
WSON Full LOGO support	The linear impairments in full coherent networks follow the full Local Optimization Global Optimization (LOGO) model that is applicable to 100G full coherent networks. This enables circuit selection and path validation during routing process. The linear impairment is calculated directly form the source node.	*Cisco ONS 15454 DWDM Network Configuration Guide* • WSON Full Coherent Networks Control Plane • GMPLS Control Plane
OCHCC circuit creation using WSON	All the transponder and muxponder cards support OCHCC circuit creation using WSON except AR-MXP and AR-XPE cards. OCHCC circuits can be configured on the AR-XP card only in the TXP-MR, TXPP-MR, MXP-MR-S, and MXPP-MR-S operating modes.	*Cisco ONS 15454 DWDM Network Configuration Guide* • Card Support • DLP-G705 Provisioning GMPLS Optical Channel Client Connections

Feature	Description	Where Documented
7% HD-FEC support on 100GS-CK-LC and 200G-CK-LC	The 100GS-CK-LC and 200G-CK-LC cards support Hard Decision FEC (HD-FEC) encoding with 7% overhead.	*Cisco ONS 15454 DWDM Line Card Configuration Guide* • 100GS-CK-LC and 200G-CK-LC Cards • FEC Modes for 100G-LC-C, CFP-LC, 100G-CK-C, 100GS-CK-LC, and 200G-CK-LC Cards
Interoperability with NCS 4000	The 100GS-CK-LC and 200G-CK-LC cards in MXP-10X10G operating mode allows 10GE and OC-192 clients (multiplexed on 100G trunk) to interoperate with Cisco NCS 4000 platform.	*Cisco ONS 15454 DWDM Line Card Configuration Guide* • 100GS-CK-LC and 200G-CK-LC Cards • Key Features
User Login Credentials	The user name can be up to 40 characters (up to 39 characters for TACACS and RADIUS authentication).	*Cisco ONS 15454 DWDM Network Configuration Guide* • DLP-G54 Create a Local User on a Single Node Using CTC • DLP-G55 Creating a New User on Multiple Nodes • TACACS Access Server • RADIUS Access Server

This table summarizes the new and changed information for Release 10.3, and tells you where the features are documented.

Table 9: New and Changed Features - R10.3

Feature	Description	Where Documented
MR-MXP Cards	The MXP-MR card is a mixed rate 10G and 40G client muxponder that is supported on the Cisco ONS 15454 M2 and Cisco ONS 15454 M6 platforms. The card is equipped with one CPAK port, two SFP ports, and two QSFP+ ports. The card can interoperate with 100GS-CK-LC, 200G-CK-LC, and 10x10G-LC cards through an ONS 15454 M6, ONS 15454 M2 backplane. The MR-MXP card provides the following features: • Supports 200G operating modes such as MXP_10x10G_100G, MXP_CK_100G, and MXP_200G. • Supports sub OpModes such as OPM_10x10G and OPM_100G on the card client ports. • Aggregation of 10x10G clients payloads. The aggregated payloads are then forwarded to a 200G companion trunk card. • Termination point for a 100G client payload on the CPAK port.	*Cisco ONS 15454 DWDM Line Card Configuration Guide* • MR-MXP Card • NTP-G236 Modifying the 100G-LC-C, 100G-CK-C, 100G-ME-C, 100ME-CKC, 10x10G-LC, 100GS-CK-LC, , 200G-CK-LC, CFP-LC, WSE, or MR-MXP Card Line Settings and PM Parameter Thresholds

Feature	Description	Where Documented
200G-CK-LC and 200G-CK-LIC Cards	The 200G-CK-LC and 200G-CK-LIC cards transport 100 or 200 gigabits per second across metro, regional, long-haul, and ultra-long-haul DWDM optical networks. The 200G-CK-LIC is the licensed card version of the 200G-CK-LC card. The 200G-CK-LC card provides the following benefits: • Supports 200G operating modes such as MXP_10x10G_100G, MXP_CK_100G, and MXP_200G. • Allows choosing 16 QAM and QPSK as the modulation formats at the line side. • Provides Standard G-FEC (Reed-Solomon), Soft Decision FEC (SD-FEC) encoding with 20% overhead. • Provides Nyquist filtering for best performance and optimal band usage. • Supports feature-based licensing.	*Cisco ONS 15454 DWDM Line Card Configuration Guide* • 100G-LC-C, 100G-ME-C, 100G-CK-C, 100GS-CK-LC, 100ME-CKC, and 200G-CK-LC Cards • NTP-G236 Modifying the 100G-LC-C, 100G-CK-C, 100G-ME-C, 100ME-CKC, 10x10G-LC, 100GS-CK-LC, , 200G-CK-LC, CFP-LC, WSE, or MR-MXP Card Line Settings and PM Parameter Thresholds
100GS-CK-LC Card Enhancements	The 100GS-CK-LC card supports 200G operating modes such as MXP_10x10G_100G, MXP_CK_100G, and MXP_200G.	*Cisco ONS 15454 DWDM Line Card Configuration Guide* • Operating Modes for 100G-LC-C, 100G-ME-C, 100G-CK-C, 100GS-CK-LC, 200G-CK-LC, and 100ME-CKC Cards
Licensing	The 200G-CK-LIC card supports feature-based licensing. The 200G-CK-LIC is the licensed card version of the 200G-CK-LC card. The base functionality is enabled in the licensed card version. Additional features are provided through specific feature licenses.	*Cisco ONS 15454 DWDM Licensing Configuration Guide* • 200G-CK-LC Card

Feature	Description	Where Documented
Optical SMU	An Optical software maintenance upgrade (SMU) is a patch that is provided to the customer to fix an emergency situation, such as network failure or traffic loss. The user can download and activate a patch on the node(s) through CTC.	*Cisco ONS 15454 DWDM Network Configuration Guide* • Optical SMU • NTP-G347 Managing SMUs Using CTC
VTXP Enhancements	• Pseudo Random Binary Sequence (PRBS) generation is supported on VTXP. • PM statistics for the CRS PLIM interface can be viewed in a tabular format in CTC. • Trail trace identifier (TTI) is supported on VTXP. It is possible to individually manage the Source Access Point Identifier (SAPI), Destination Access Point Identifier (DAPI), and User Operator Data fields.	*Cisco ONS 15454 DWDM Network Configuration Guide* • NTP-G352 Enabling PRBS Settings for an Interface on the Cisco CRS Router • NTP-G350 Viewing PRBS Statistics for an Interface on the Cisco CRS Router • NTP-G337 Configuring Provisioning Parameters for an Interface on the Cisco CRS-1 Router *Monitor Performance* • NTP-G349 Viewing PM Parameters for an Interface on the Cisco CRS Router
NFV Enhancements	• In the Network Functional View (NFV), all the panes with the exception of the Overview pane are iconised or hidden. The panes are visible on request. • Fast circuit creation of protected and unprotected circuits is supported. • The pre-route option allows the WSON to detect the probable path of the circuit.	*Cisco ONS 15454 DWDM Network Configuration Guide* • DWDM Network Functional View • NTP-G353 Creating GMPLS Circuits Using the Fast Circuit Mode

Feature	Description	Where Documented
Software Enhancements	Several software enhancements are introduced in Release 10.3 : • The TNC/TSC/TNCE/TSCE control cards on the ONS 15454 M6 chassis automatically detects and adjusts the cooling profile according to the cards present on the chassis. • The privilege for Provisioning user has been extended at Node View and Network View. • The Trail Trace Identifier (TTI) in the path monitoring overhead is supported in OTU, and ODU OTN frames. It is possible to individually manage the Source Access Point Identifer (SAPI), Destination Access Point Identifier (DAPI), and User Operator Data fields. • A new squelch option named LF is supported for 10GE, 40GE, and 100GE payloads. This option is supported on 10x10G-LC, CFP-LC, 100G-LC-C, 100G-CK-LC, 100GS-CK-LC, and 200G-CK-LC cards. • A side description can be created or edited for all the optical and virtual sides of the node using CTC or TL1. • PSM is supported on 100GS-CK-LC or 200G-CK-LC cards on their trunk ports where the protection switch time of 50 ms is achieved in the TXP-100G configuration with 20%SD FEC.	*Cisco ONS 15454 DWDM Network Configuration Guide* • NTP-G354 Enabling Cooling Profile Using CTC *Security Reference* • User Privileges and Policies *Cisco ONS 15454 DWDM Line Card Configuration Guide* • DLP-G722 Changing the Card OTN Settings • Key Features of 100G-LC-C, 100G-ME-C, 100G-CK-C, 100ME-CKC, 10x10G-LC, 100GS-CK-LC, 200G-CK-LC, CFP-LC, and MR-MXP Cards *Cisco ONS 15454 DWDM Control Card and Node Configuration Guide* • DLP-G492 Editing an Optical Side

This table summarizes the new and changed information for Release 10.1.0.1, and tells you where the features are documented.

Table 10: New and Changed Features - R10.1.0.1

Feature	Description	Where Documented
100GS-CK-LC Card	The 100GS-CK-LC card is a tunable DWDM trunk card that simplifies the integration and transport of the 100 Gigabit Ethernet interfaces and services on the enterprise or service provider optical networks. The 100GS-CK-LC card provides the following benefits: • Allows choosing 100G QPSK as the modulation format at the line side. • Provides 20% SD (Soft Decision) FEC encoding and Nyquist filtering for best performance and optimal band usage. • Supports gridless tunability. • Allows client access either through the local 100G CPAK interface or through backplane lines that allow interconnection with an adjacent 10x10G-LC card.	*Cisco ONS 15454 DWDM Line Card Configuration Guide* • 100G-LC-C, 100G-ME-C, 100G-CK-C, 100GS-CK-LC, and 100ME-CKC Cards • NTP-G236 Modifying the 100G-LC-C, 100G-CK-C, 100G-ME-C, 100ME-CKC, 10x10G-LC, 100GS-CK-LC, CFP-LC, or WSE Card Line Settings and PM Parameter Thresholds
Split ROADM Nodes	The split ROADM node feature allows the ROADM node to have separate Network Elements (NEs) for each line side leading to the separation of different ROADM degrees. When a node split is configured, each line side is treated as a separate NE. The whole NE manageability is not lost in case of failure. The legacy ROADM configurations can be migrated to split ROADM configurations using CTC and CTP.	*Cisco ONS 15454 DWDM Network Configuration Guide, Release 10.x.x* • Node Reference

Feature	Description	Where Documented
Software Enhancements	Several software enhancements are introduced in Release 10.1.	• NTP-G346 Resetting the Network Element to Factory Defaults • DLP-G775 Displaying the Bandwidth Usage of the STS Timeslots • TACACS+ Security • DLP-G776 Configure the Node for TACACS+ Authentication
FLD-OSC	The FLD-OSC is a passive unit used to combine the optical service channel (OSC) wavelengths to form the DWDM aggregated signal, or split the OSC wavelengths from the DWDM aggregated signal. The passive unit occupies a single slot in the rack mounting bracket. The passive unit is introduced due to the end-of-sale of the OSC-CSM card in the MSTP platform.	OSC Combiner/Splitter Module

This table summarizes the new and changed information for Release 10.0.2, and tells you where the features are documented.

Table 11: New and Changed Features - R10.0.2

Feature	Description	Where Documented
VTXP Enhancements	The user can provision an OCH CC circuit using the Network Functional View (NFV between the MSTP transponder or muxponder client interface and the router PLIM interface (10G and 100G ethernet controller). The OCHTrail circuit type is no longer directly supported between the router interfaces and the MSTP ones; it is indirectly created by the creation of the OCH CC circuit.	*Cisco ONS 15454 DWDM Network Configuration Guide* • DLP-G705 Provisioning GMPLS Optical Channel Client Connections • Source and Destination Port Configuration

Feature	Description	Where Documented
CTC Enhancements	• CTC displays the circuit constraints of the circuit in the graphical view of the Circuit Maintenance perspective of the NFV. The user can also modify the circuit constraints of the circuit being edited in the NFV. These modified circuit constraints are applied after resignalling of the circuit (automatic circuit restoration or manual reroute). • CTC displays the link direction in the circuit map for Link Management Protocol (LMP) links between the router PLIM interface and the OCH ports on the MSTP node. This is also applicable to the internal patchcords between the trunk interface and the OCH ports of the MSTP node. • CTC allows tuning of the router PLIM interface by specifying the channel ID, frequency or the wavelength. • CTC displays the ethernet statistics that are retrieved from the ethernet controllers on the router. The information is displayed in a tabular format.	*Cisco ONS 15454 DWDM Network Configuration Guide* • GMPLS Path Constraints • DLP-G732 Editing a GMPLS Circuit • DLP-G337 Configuring Provisioning Parameters for an Interface on the Cisco CRS-1 Router
WSON Enhancements	The user can configure optical validation threshold values for the protected GMPLS circuits.	*Cisco ONS 15454 DWDM Network Configuration Guide* DLP-G705 Provisioning GMPLS Optical Channel Client Connections

Feature	Description	Where Documented
Non-continuous Loopback Support on 100G Cards	The loopback and drop facility is supported on the 100G-LC-C, 10x10G-LC, CFP-LC, and 100G-CK-C cards as follows: 1. Trunk facility loopback (drop) and client facility loopback (drop) is supported on: • 100G-LC-C cards configured in the TXP mode (with CXP client pluggable) for OTU4 and 100GE client payloads. • 100G-CK-LC configured in the TXP mode (with CPAK client pluggable) for OTU4 and 100GE client payloads. 2. Backplane facility loopback (drop) is supported on: • 100G-LC-C and CFP-LC configured in the TXP mode (with CFP client pluggable) for OTU4 and 100GE client payloads. • 100G-CK-C and CFP-LC configured in the TXP mode (with CFP client pluggable) for OTU4 and 100GE client payloads.	*Cisco ONS 15454 DWDM Line Card Configuration Guide* Key Features of 100G-LC-C, 100G-ME-C, 100G-CK-C, 100ME-CKC, 10x10G-LC, 100GS-CK-LC, and CFP-LC Cards
New ROADM Configurations	Four new A/D ROADM configurations are supported for 48 channel 100 GHz systems.	*Cisco ONS 15454 DWDM Network Configuration Guide* ROADM Node

This table summarizes the new and changed information for Release 10.0.1, and tells you where the features are documented.

Table 12: New and Changed Features - R10.0.1

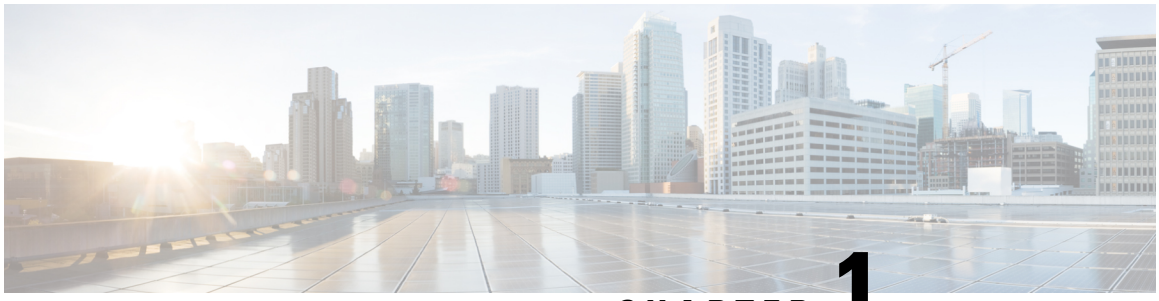
Feature	Description	Where Documented
VTXP and GMPLS Enhancements	• The user can regenerate a circuit that is created from UNI interface or VTXP. • The user can configure the expected circuit wavelength for VTXP using CTC. • The user can create a GMPLS UNI circuit when VTXP UNI is enabled in CTC. • The user can either specify a mandatory or preferred wavelength for routing while creating the GMPLS circuit using CTC. • The user can upgrade an existing GMPLS circuit from the legacy signaling to the new signaling that supports the LOGO (Local Optimization Global Optimization) and regeneration features on the GMPLS circuit.	*Cisco ONS 15454 DWDM Network Configuration Guide* • WSON Full Coherent Networks Control Plane • DLP-G346 Provisioning Optical Channel Client Connections • DLP-G395 Creating an Optical Channel Trail • DLP-G707 Upgrading a Non-GMPLS Circuit to a GMPLS Circuit • DLP-G708 Creating a GMPLS Optical Channel Trail • DLP-G733 Configuring GMPLS UNI

This table summarizes the new and changed information for Release 10.0, and tells you where the features are documented.

Table 13: New and Changed Features - R10.0

Feature	Description	Where Documented
EDRA-1-xx and EDRA-2-xx Cards	The double-slot EDRA-1-xx and EDRA-2-xx cards are erbium-doped Raman amplifiers (EDRAs) that support Raman amplification on very long unregenerated spans. Each EDRA card can manage up to 96 channels, 50-GHz-spaced from 196.1 GHz (1528.77nm) to 191.35 GHz (1566.72 nm).	*Cisco ONS 15454 DWDM Line Card Configuration Guide* • EDRA-1-xx and EDRA-2-xx Cards • EDRA Workflow Diagram • EDRA-1-xx and EDRA-2-xx Cards Power Monitoring *Cisco ONS 15454 DWDM Network Configuration Guide* • Automatic Raman Pump Calculation • ARPC Workflow • EDRA Card Start Up and Fiber Link Turn Up • NTP-G184 Creating a Provisionable Patchcord • NTP-G160 Modifying Card Line Settings and PM Thresholds • EDRA optical safety • DLP-G140 View Power Statistics for Optical Amplifier, 40-SMR1-C, and 40-SMR2-C Cards
16WXC-FS Card	The double-slot cross connect 16-port Flex Spectrum ROADM line card (16-WXC-FS) can be used in the core of the network. The card is used to build ROADM nodes with 96 channels spaced at 50-GHz, flex spectrum channels, or a combination of the two. The card provides the flex spectrum capability, which allows the user the flexibility to allocate the channel bandwidth, to increase the network scalability.	*Cisco ONS 15454 DWDM Line Card Configuration Guide* • 16-WXC-FS Card *Cisco ONS 15454 DWDM Network Configuration Guide* • NTP-G174 Modifying the Line Settings and PM Thresholds for 40-WXC-C, 80-WXC-C, or 16-WXC-FS Cards • Node Reference

Feature	Description	Where Documented
Passive Optical Modules	A new generation of passive optical modules can be used to accommodate ROADM nodes built with the 16-WXC-FS and EDRA cards. Three types of modules are available: patch panel modules, add/drop modules, and adapter modules.	*Installing the Cisco ONS 15454 M2 and ONS 15454 M6 Passive Optical Modules*
100G-CK-C and 100ME-CK-C Cards	The 100G-CK-C and 100ME-CKC cards are tuneable over the entire C-band. The 100G-CK-C card works similar to the 100G-LC-C card. The 100G-CK-C card has the new CPAK client interface replacing the CXP client interface of the 100G-LC-C card.	*Cisco ONS 15454 DWDM Line Card Configuration Guide* • 100G-LC-C, 100G-ME-C, 100G-CK-C, 100GS-CK-LC, and 100ME-CKC Cards • NTP-G236 Modifying the 100G-LC-C, 100G-CK-C, 100G-ME-C, 100ME-CKC, 10x10G-LC, 100GS-CK-LC, CFP-LC, or WSE Card Line Settings and PM Parameter Thresholds
Software Enhancements	Several software enhancements are introduced in Release 10.0	*Cisco ONS 15454 DWDM Network Configuration Guide* • LSP Priority • LSP Setup with Regenerators • Restoration Based on LSP Priority • WSON Full Coherent Networks Control Plane • DLP-G705 Provisioning GMPLS Optical Channel Client Connections • DLP-G708 Creating a GMPLS Optical Channel Trail • DLP-G733 Configuring GMPLS UNI • DLP-G774 Changing the Frame Type on the OSC



CHAPTER 1

Installing the Cisco ONS 15454, ONS 15454 M2, and ONS 15454 M6

This chapter has information on installing Cisco ONS 15454.

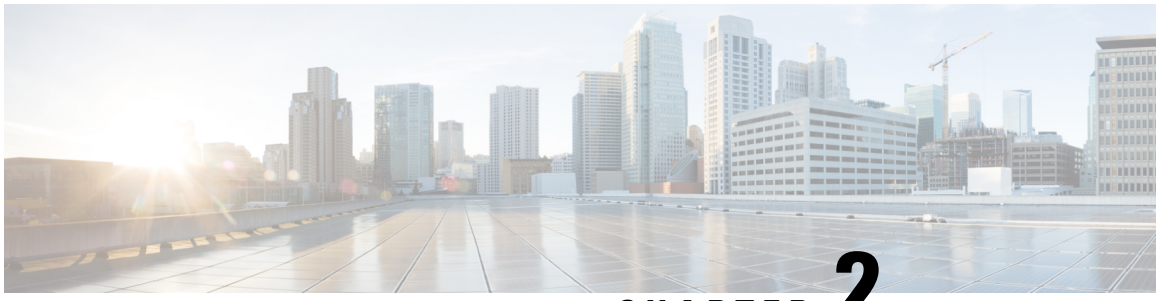
- Installing the Cisco ONS 15454, ONS 15454 M2, and ONS 15454 M6, on page 1

Installing the Cisco ONS 15454, ONS 15454 M2, and ONS 15454 M6

For information on installing the Cisco ONS 15454, ONS 15454 M2, and ONS 15454 M6, see:

Cisco ONS 15454 Hardware Installation Guide

Installing the Cisco ONS 15454, ONS 15454 M2, and ONS 15454 M6



CHAPTER 2

Installing the Control Cards

This chapter describes the common control cards needed for the Cisco ONS 15454, Cisco ONS 15454 M2, and Cisco ONS 15454 M6 platforms and provides installation and card turn up procedures.

- Card Compatibility, on page 4
- Safety Labels, on page 5
- TCC2 and TCC2P Cards, on page 5
- TCC3 Card, on page 7
- TNC and TNCE Card, on page 7
- TSCE Card, on page 10
- TNCS Card, on page 11
- TNCS-O Card, on page 11
- TNCS-2 and TNCS-2O Cards, on page 12
- Support for OTDR, on page 14
- Control Card Workflow Diagram, on page 16
- Related Procedures for TNCS and TNCS-O Cards, on page 20
- Digital Image Signing, on page 20
- DIS Identification, on page 20
- AIC-I Card, on page 21
- MS-ISC-100T Card, on page 24
- Front Mount Electrical Connections, on page 25
- Control Card Reset, on page 29
- Control Card Database, on page 29
- NTP-G15 Installing the Common Control Cards on ONS 15454 Shelf, on page 30
- NTP-G249 Upgrade the TCC2/TCC2P Card to the TCC3 Card, on page 33
- NTP-G313 Installing and Configuring the TNC, TNCE, TSC, TSCE, TNCS, TNCS-O, TNCS-2, and TNCS-2O Card, on page 35
- NTP-G278 Upgrade an Older Controller Card to a Newer Controller Card, on page 44
- LCD or ECU Hot Plug-In , on page 47

Card Compatibility

Note The DB-9 console port of the node controller works only on the active control card of the GNE or ENE and not on the standby control card. The DB-9 console port also does not work in control cards installed in the sub-tending shelves. The console port is available on all control cards except the TNCS-2 and TNCS-2O cards.

Table 14: Platform and Software Release Compatibility for Control Cards

Card Name	R4.5 - R4.6	R4.7 - R6.0	R7.0, R7.2	R8.0 - R8.5
TCC3 [1]	No	No	No	No
TNC/TSC [2]	No	No	No	No
TNCE/TSCE [2]	No	No	No	No
TNCS	No	No	No	No
TNCS-2	No	No	No	No
TNCS-2O	No	No	No	No

1 The TCC3 card is backward compatible with software Release 9.1 and earlier releases. In the Release 9.1 and earlier releases, the TCC3 card boots up as the TCC2P card in the Cisco ONS 15454 DWDM systems.

2 From releases 9.2.3 and later, the TNC and TNCE cards can be interchanged on an ONS 15454 M6 shelf without any alarms. However, if you combine both the cards in a single chassis and configure the OC3 OSC, it raises an EOC alarm.

Table 15: Platform and Software Release Compatibility for Control Cards

Card Name	R9.2	R9.2.x	R9.3, R9.4, R9.6.x, R9.8.x	R10.0, R10.1.x	R10.3	R1
TCC2/TCC2P/ AIC-I/MS-ISC-100T	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM t d m 2	D e	15 .
TCC3 [3]	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	D	15

Card Name	R9.2	R9.2.x	R9.3, R9.4, R9.6.x, R9.8.x	R10.0, R10.1.x	R10.3
TNCE/TSCE [2]	No	ONS-15454-M2 and ONS-15454-M6 TNCE/TSCE cards are supported from R9.2.3	ONS-15454-M2 and ONS-15454-M6	ONS-15454-M2 and ONS-15454-M6	M M
TNCS	No	No	No	No , , S 5	2 6
TNCS-O	No	No	No	No , , S 5	2 6
TNCS-2	No	No	No	No , , S 5	2 6
TNCS-2O	No	No	No	No , , S 5	2 6

[3] The TCC3 card is backward compatible with software Release 9.1 and earlier releases. In the Release 9.1 and earlier releases, the TCC3 card boots up as the TCC2P card in the Cisco ONS 15454 DWDM systems.

Safety Labels

For information about safety labels, see the "Safety Labels" section.

TCC2 and TCC2P Cards

(Cisco ONS 15454 only)

The Advanced Timing, Communications, and Control (TCC2) card performs system initialization, provisioning, alarm reporting, maintenance, diagnostics, IP address detection/resolution, SONET section overhead (SOH) data communications channel/generic communications channel (DCC/GCC) termination, optical service channel (OSC) DWDM data communications network (DCN) termination, and system fault detection for the ONS 15454. It monitors the supply voltage of the system. Install TCC2 cards in Slots 7 and 11 for redundancy. If the active TCC2 fails, traffic switches to the protect TCC2.

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 supports multi-shelf management.

(For Releases up to R10.3) The TCC2P card acts as a shelf controller and node controller for the ONS 15454. The TCC2P card supports up to four subtended shelves through the MS-ISC-100T card or external switch. In a multi-shelf configuration, the TCC2P card allows the ONS 15454 node to be a node controller and does not support subtending of ONS 15454 M6 shelves.

(From R10.5.2.6) The TCC2P card can be used as a control card in a subtended shelf where the node controller is TCC3 card on ONS 15454 chassis or TNC/TNCE/TNCS/TNCS-O cards on ONS 15454 M6 or NCS 2015 chassis. The TCC2P card can also be used as a node controller in a stand-alone configuration.

Limitations of TCC2 and TCC2P Cards

- (From R10.3) Due to memory limitations, TCC2/TCC2P cards are not supported as the node controller in multi-shelf configuration from R10.5.2.6. Hence, it is recommended to use TCC3 card as the node controller in multi-shelf configuration.
- (From R10.3) When ONS 15454 with TCC3 card, ONS 15454 M6 or NCS 2015 chassis is the node controller and ONS 15454 chassis with TCC2P card is the subtended shelf controller, the conversion from subtended shelf controller to node controller or to stand-alone controller is not supported.
- (From R10.6.1) The MS-ISC-100T card is not supported to save flash memory.
- In R10.5.2.6 or later, when a new TCC2P card is inserted into the standby slot of the ONS 15454 SSC shelf that is connected to ONS 15454 M6 or NCS 2015 or ONS 15454 node controller with TCC3 controller, the TCC2P card goes for roll reboot and never comes up. Hence, the user cannot replace the TCC2P card in SSC shelf with a new TCC2P card. The workaround is as follows:
  1. Configure the standalone node to SSC.
  2. Remove the card from the shelf and insert in the actual SSC shelf.

TCC2 and TCC2P Card Support from R10.6.2

The nodes with the TCC2/TCC2P cards in releases prior to R10.6.2 cannot be upgraded to R10.6.2 as the size of the software package exceeds the size of the TCC2/TCC2P flash drive. Hence, R10.6.2 does not have the TCC2/TCC2P software package.

If the user wants to continue with the ONS 15454 chassis, it is recommended to use the TCC3 control card. If the user wants to upgrade to a ONS 15454 M6 or NCS 2015 chassis, it is recommended to use the TNCS or TNCS-O control cards. There is sufficient space in the flash drive of the proposed alternative control cards.

Related Procedures for TCC2 and TCC2P Cards

- NTP-G15 Installing the Common Control Cards on ONS 15454 Shelf, on page 30
- NTP-G22 Verifying Common Card Installation
- NTP-G51 Verify DWDM Node Turn Up
- NTP-G103 Backing Up the Database
- NTP-G104 Restoring the Database

- NTP-G106 Resetting Cards Using CTC
- NTP-G105 Restoring the Node to Factory Configuration

TCC3 Card

(Cisco ONS 15454 only)

The Timing Communications Control Three (TCC3) card is an enhanced version of the TCC2P card. The primary enhancements include the increase in memory size and compact flash space. The TCC3 card boots up as TCC2P card in older releases and as TCC3 card from Release 9.2 onwards.

The TCC3 card supports multi-shelf management. The TCC3 card acts as a shelf controller and node controller for the ONS 15454. The TCC3 card supports up to 50 subtended shelves through the MSM-ISC card or external switch. In a multi-shelf configuration, the TCC3 card allows the ONS 15454 node to be a node controller if an M6 shelf is subtended to it. From R10.0, we strongly recommend the use of TCC3 card as a node controller on an ONS 15454 multi-shelf node.

For more information on TCC3 Card, see http://www.cisco.com/en/US/prod/collateral/optical/ps5724/ps2006/datasheet_c78-598518.html.

Related Procedures for TCC3 Card

- NTP-G15 Installing the Common Control Cards on ONS 15454 Shelf, on page 30
- NTP-G22 Verifying Common Card Installation
- NTP-G51 Verify DWDM Node Turn Up
- NTP-G103 Backing Up the Database
- NTP-G104 Restoring the Database
- NTP-G106 Resetting Cards Using CTC
- NTP-G105 Restoring the Node to Factory Configuration

TNC and TNCE Card

Cisco ONS 15454 M2 and ONS 15454 M6

On the ONS-15454-M6 shelf, install redundant TNC or TNCE cards in slots 1 and 8. If the active TNC or TNCE card fails, the system traffic switches to the redundant TNC or TNCE card.

The ONS-15454-M6 shelf has dual power supply. The TNC or the TNCE card monitors both supply voltage inputs on the ONS-15454-M6 shelf. The TNC or TNCE card raises an alarm if one of the supply voltage inputs has a voltage out of the specified range.

You can insert and remove the TNC or TNCE card without impacting the system traffic, even when the system is online.

Control Card Workflow Diagram

Workflow Diagram

The following figure shows the workflow diagram of the TNC/TSC/TNCE/TSCE card on the ONS 15454 M6 shelf. The diagram provides information on the tasks required to install and configure the TNC/TSC/TNCE/TSCE card.

Figure 3: Control Card Workflow Diagram

Related Procedures for TNC and TNCE Cards

- NTP-G313 Installing and Configuring the TNC, TNCE, TSC, TSCE, TNCS, TNCS-O, TNCS-2, and TNCS-2O Card, on page 35
- NTP-G22 Verifying Common Card Installation
- NTP-G51 Verify DWDM Node Turn Up
- NTP-G103 Backing Up the Database
- NTP-G104 Restoring the Database
- NTP-G106 Resetting Cards Using CTC
- NTP-G280 Modifying Threshold Settings for the TNC and TNCE Cards
- NTP-G277 Provision Alarms and Controls on the TNC, TNCE, TSC, or TSCE Card
- NTP-G279 Monitor TNC and TNCE Card Performance
- NTP-G250 Verifying Digital Image Signing (DIS) Information

TSCE Card

Cisco ONS 15454 M2 and ONS 15454 M6

The TSCE card combines the functions of multiple cards such as TCC2P, ISC, and AIC-I cards. The TSCE card is provisioned as active and standby in the ONS-15454-M6 shelf. The TSCE card serves as the processor card for the shelf.

The ONS-15454-M6 shelf has dual power supply. The TSCE card monitors both supply voltage inputs on the ONS-15454-M6 shelf. The TSCE card raises an alarm if one of the supply voltage inputs has a voltage out of the specified range.

You can insert and remove the TSCE card without impacting the system traffic, even when the system is online.

The TSCE card does not support optical service channel (OSC) and SFP ports.

Note The TNC, TNCE, and TSCE cards cannot be inserted in the same shelf.

Related Procedures for TSC and TSCE Cards

- NTP-G313 Installing and Configuring the TNC, TNCE, TSC, TSCE, TNCS, TNCS-O, TNCS-2, and TNCS-2O Card, on page 35
- NTP-G22 Verifying Common Card Installation
- NTP-G51 Verify DWDM Node Turn Up
- NTP-G103 Backing Up the Database

- NTP-G104 Restoring the Database
- NTP-G106 Resetting Cards Using CTC
- NTP-G280 Modifying Threshold Settings for the TNC and TNCE Cards
- NTP-G277 Provision Alarms and Controls on the TNC, TNCE, TSC, or TSCE Card
- NTP-G279 Monitor TNC and TNCE Card Performance
- NTP-G250 Verifying Digital Image Signing (DIS) Information

TNCS Card

(ONS 15454 M2, ONS 15454 M6, NCS 2015)

The TNCS cards are provisioned as active and standby in the Cisco ONS 15454 M2, ONS 15454 M6, or NCS 2015 shelves. The TNCS cards serve as the processor card for the node.

On the NCS 2015 shelf, the TNCS cards can be installed in slots 1 and 17. On the ONS 15454 M6 shelf, the cards can be installed in slots 1 and 8. On the ONS 15454 M2 shelf, the card can be installed in slot 1. If the active TNCS card fails, system traffic switches to the redundant TNCS card.

The NCS 2015 shelf is powered by DC power modules with 3+1, 2+2, 2+1, or 1+1 redundancy. A minimum of one power module is required to turn up the chassis. The number of power modules to be connected is dependent on the chassis load. The TNCS cards raise an alarm if one of the supply voltage inputs has a voltage out of the specified range.

You can insert and remove the TNCS cards even when the system is online, without impacting the system traffic.

Note When a TNCS card provisioned with OC3/STM-1 or GIGE payloads is replaced with a TNCS-O card, the PROV-MISMATCH, RS-EOC, EOC-E and SIGLOSS alarms are raised due to incompatibility of the payloads provisioned on the TNCS card. FE is the only payload supported on the TNCS-O card.

Perform the following steps on the TNCS card before you replace a TNCS card with a TNCS-O card:

- Delete incompatible payloads (OC3/STM-1 or GIGE) on the TNCS card.
- Delete any synchronization service related to the OSC port.

For more information about the TNCS cards, see http://www.cisco.com/en/US/prod/collateral/optical/ps5724/ps2006/data_sheet_c78-602903.html.

TNCS-O Card

The TNCS-O card is provisioned as active and standby in the Cisco ONS 15454 M6 or NCS 2015 shelves. On the NCS 2015 shelf, the TNCS-O card can be installed in slots 1 and 17. On the ONS 15454 M6 shelf, the card can be installed in slots 1 and 8. If the active TNCS-O card fails, the system switches to the redundant TNCS-O card.

The TNCS-O cards support only Fast Ethernet (FE) and wavelength of 1518 nm in OSC transmissions.

Note OC-3 and ONE-GE payloads are not supported by the TNCS-O card.

The OSC transmission ranges are:

- Standard range: 12 - 43 dB
- Reduced range: 5 - 30 dB

Note The OTDR feature of TNCS-O and TNCS-2O cards is not supported over DWDM network configuration having PSM card at the line side of booster amplifier. In this configuration, the PSM Working (W) and Protect (P) ports are connected to the fiber. The OTDR signal is split into both W and P fibers and back reflected light from both the fibers leads to inconsistent OTDR results.

Operating Modes for TNC, TNCE, TNCS, or TNCS-O cards

The control cards can be configured either in TNC or TNCO operating mode. The TNC mode is the default operating mode for the cards. A card is configured in TNCO mode if the actual card that is to be inserted into a shelf is a TNCS-O card.

Note The creation of OC-3 or ONE-GE payloads is rejected in the TNCO mode.

TNCS-2 and TNCS-2O Cards

(ONS 15454 M2, ONS 15454 M6, NCS 2015)

The TNCS-2 and TNCS-2O cards are provisioned as active and standby ONS 15454 M6 or NCS 2015 chassis.

Note The TNCS-2O control card is not supported on a node that has ONS 15454 as node controller and NCS 2006 or NCS 2015 as subtending shelf controllers.

On the NCS 2015 shelf, the TNCS-2 and TNCS-2O cards can be installed in slots 1 and 17.

On the ONS 15454 M6 shelf, the cards can be installed in slots 1 and 8.

On the ONS 15454 M2 shelf, the cards can be installed in slot 1.

You can insert and remove the TNCS-2 and TNCS-2O cards without affecting the system traffic, even when the system is online.

The card has the following features:

- The TNCS-2 and the TNCS-2O cards work in redundant mode with another TNCS-2, TNCS-2O, TNCS, TNCSO, or TNCE cards.
- Synchronous Ethernet is supported on all GE and FE ports of the TNCS-2 and the TNCS-2O cards.
- The TNCS-2 and TNCS-2O cards address CPU EOL and SDRAM supply issues on the existing controller cards.
- The TNCS-2 and the TNCS-2O cards supports a secure boot.
- The TNCS-2 and TNCS-2O cards exhibit chassis control functions including the control of power supplies, fans, ECU, optical modules, clock synchronization, and line card configuration. It can also configure the field programmable devices present in the TNCS-2 or TNCS-2O card.
- The TNCS-2 and TNCS-2O cards support environment monitoring and alarm reporting features.

Note The TNCS-2 and TNCS-2O cards cannot be installed in the chassis that runs software earlier than R11.0.

- All packages are supported on the TNCS-2 and TNCS-2O cards.

The **Lamp Test** button is not available on the TNCS-2 and TNCS-2O cards.

Note When the EMS port is configured with 10 Mbps speed for TNCS-2 and TNCS-2O cards, it causes unicast storm control over the EMS peer port connected to the switch. However, when the storm controller is enabled on the EMS port for unicast packets on the switch, the EMS link goes down.

Table 16: The TNCS-2 and TNCS-2O cards support the following shelf control options:

Standby Slot	Active Slot	Support
TSC	TNCS-2O	Not Supported
TSC-E	TNCS-2O	Not Supported
TNC	TNCS-2O	Not Supported
TNC-E	TNCS-2O	Yes
TNCS	TNCS-2O	Yes
TNCS-O	TNCS-2O	Yes
TNCS-2	TNCS-2O	Yes
TSC	TNCS-2	Not Supported
TSC-E	TNCS-2	Not Supported
TNC	TNCS-2	Not Supported

Standby Slot	Active Slot	Support
TNC-E	TNCS-2	Yes
TNCS	TNCS-2	Yes
TNCS-O	TNCS-2	Yes
TNCS-2O	TNCS-2	Yes

Power Settings of TNCS-O and TNCS-2O OTDR Ports

OTDR ports of TNCS-O and TNCS-2O operate in two modes:

- High Power
- Low Power

These power changes occur based on the settings of the **Max Expected Span Loss** parameter. If the **Max Expected Span Loss** parameter is set to 28 dB or less, OTDR ports operate in low power and if the **Max Expected Span Loss** parameter is set to more then 28 dB, OTDR ports operate in high power.

After changing the value of **Max Expected Span Loss** parameter, you must perform **Launch ANS** from CTC as it is an ANS parameter.

Support for OTDR

Optical Time Domain Reflectometer (OTDR) is used to detect faults in an optical fiber link of a communication network. OTDR functionality is supported on TNCS-O and TNCS-2O control cards.

From Release 11.0, the OTDR functionality support is extended to NCS 2002.

The OTDR feature on the TNCS-O and TNCS-2O cards lets you do the following:

- Inspect the transmission fiber.
- Identify discontinuities or defect on the fiber.
- Measure the distance and magnitude of defects like insertion loss, reflection loss, and so on.
- Monitor variations in scan values and configured threshold values periodically.

The OTDR measurement ranges are:

- Zone #1
- Zone #2
- Zone #3
- Zone #4
- Expert Mode
- Auto mode

The following table shows the OTDR performance in different operating ranges:

Operating Range	Distance Range [Km]	Distance Accuracy [m]	Loss Accuracy [dB]		Reflection Accuracy [dB]		Measurement Time [s]
			Typ.	W.C.	Typ.	W.C.	
Zone #1	0.001 - 1	+/- 1	+/- 0.2	+/- 2	3	4	180
Zone #2	0.001 - 25	+/- 2	+/- 0.2	+/- 2	2	4	180
Zone #3	0.001 - 80	+/- 10	+/- 0.5	+/- 2	1	4	180
Zone #4	0.001 - 100	+/- 20	+/- 0.5	+/- 2	1	4	180

The following table shows the maximum dynamic range of OTDR in the different zones. The maximum dynamic range of OTDR includes the total insertion loss, including the optical attenuation at the faceplate connector, not shown in the OTDR trace.

Operating Range	Max [dB]
Zone #1	2.5
Zone #2	8
Zone #3	17
Zone #4	21

You can start a scan in auto mode requesting for the new reflection loss report or for both (legacy and new reflection loss reports). You can select, either the new loss reflection scan or normal scan. The TL1 command used for this operation is available here TL1 Command Guide.

Note The OTDR feature of TNCS-O and TNCS-2O cards is not supported over DWDM network configuration having PSM card at the line side of booster amplifier. In this configuration, the PSM Working (W) and Protect (P) ports are connected to the fiber. The OTDR signal is split into both W and P fibers and back reflected light from both the fibers leads to inconsistent OTDR results.

OTDR Training

In R10.8, OTDR scan performances are improved using specific parameters of fiber plant such as span length, span loss, equipment insertion loss, reflection contributions, and major events on the fiber. This calibration operation is called OTDR training.

OTDR training is executed with the following rules.

- OTDR training is executed on both the Tx fiber and Rx fiber.
- OTDR training results are used to execute the composite scan.
- OTDR training is embedded in the scan operation.
- OTDR training takes up to 2 minutes in fast mode and up to 10 minutes in hybrid mode.

- OTDR training results in calibration file, fast span trace, and identification of fiber end.

Note High reflection location is not available if detected during ORL training.

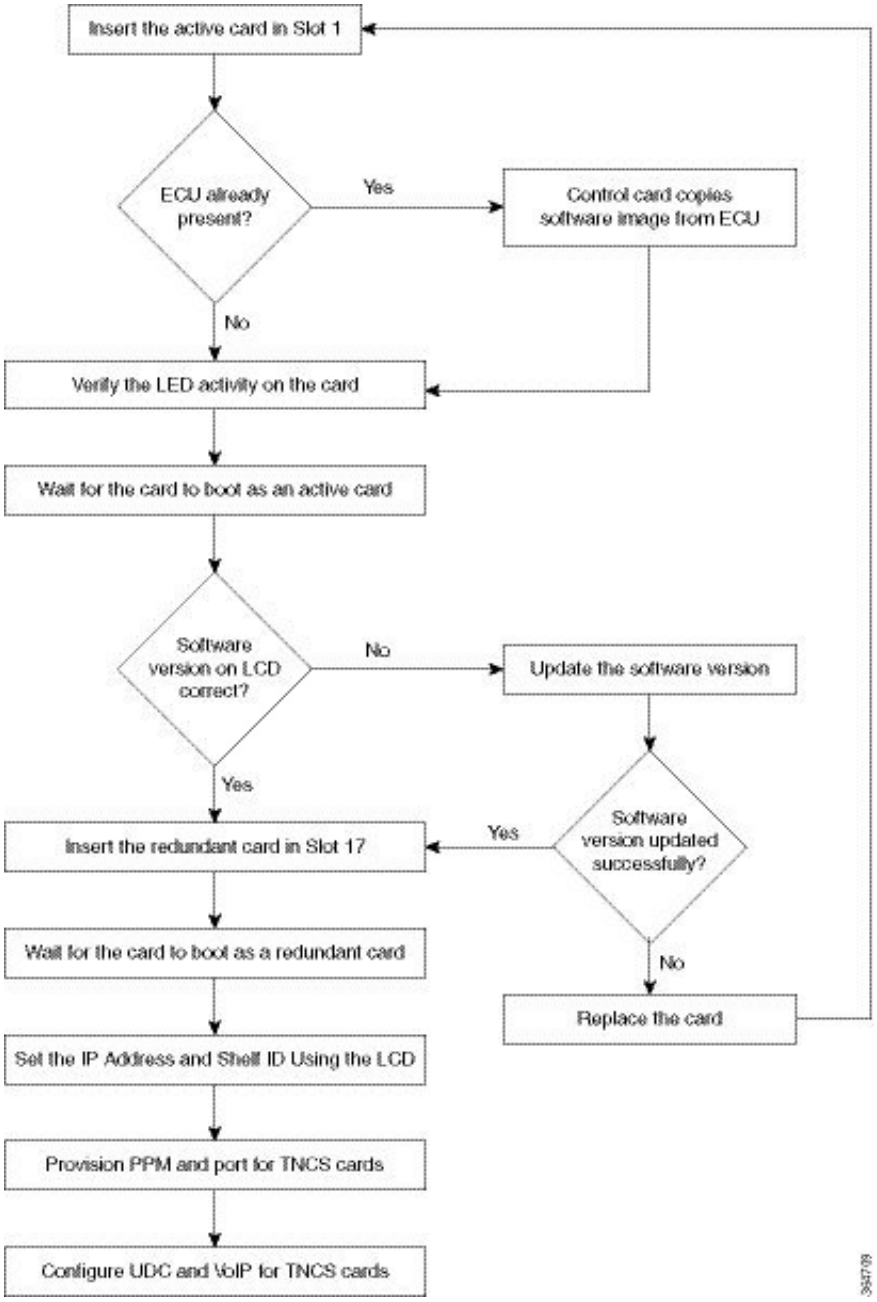
You can configure a periodic ORL training in the Rx direction, even for a single PPM. The TL1 command used for this operation is available here TL1 Command Guide.

Control Card Workflow Diagram

Note From Release 10.62 onwards, the new node must be connected to the laptop before node turn up.

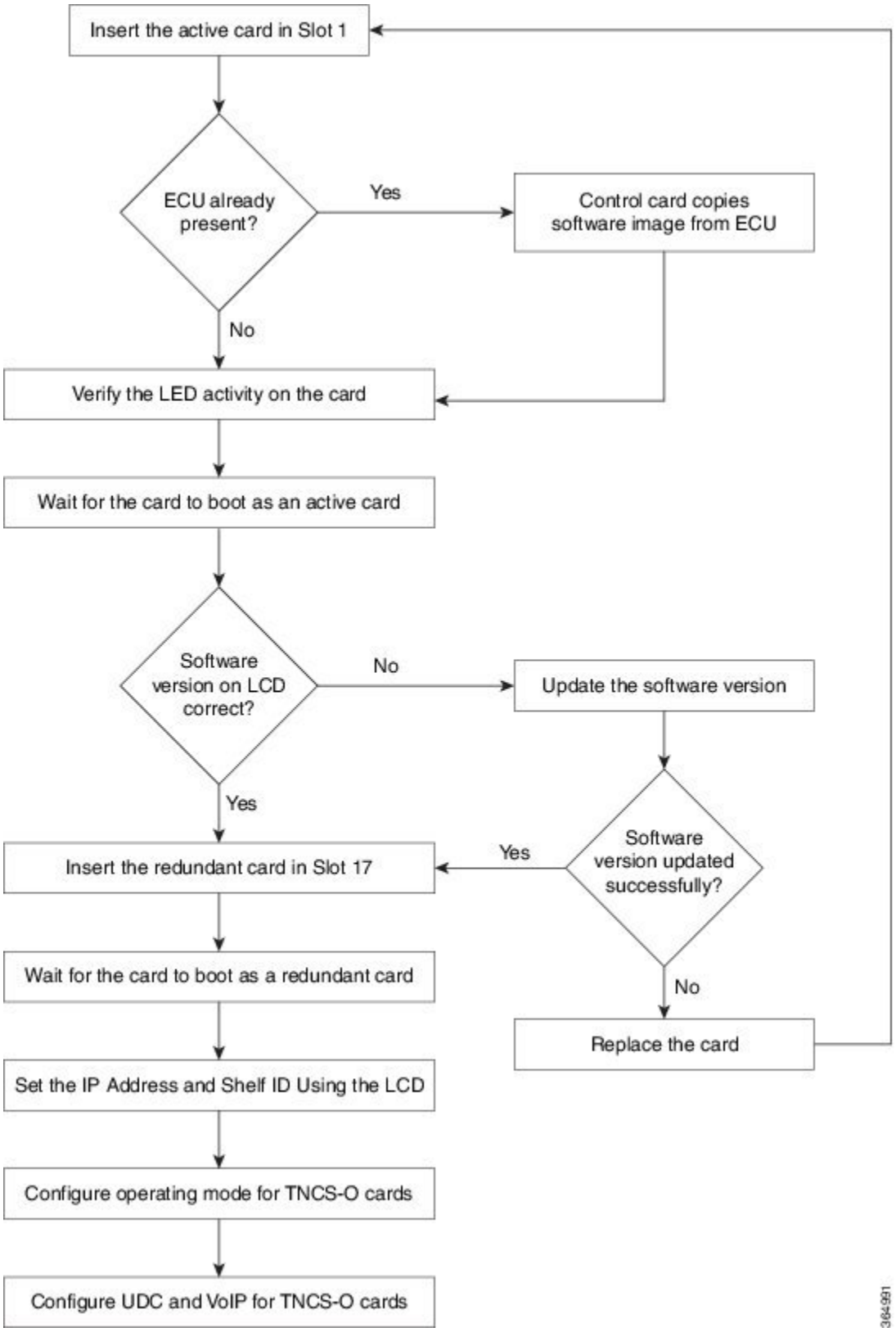
The following figure shows a workflow that describes the tasks required to install and configure the TNCS card.

Figure 4: TNCS Card Workflow



The following figure shows a workflow that describes the tasks required to install and configure the TNCS-O card.

Figure 5: TNCS-O Card Workflow


Insert the active card in Slot 1
ECU already present?
Yes
Control card copies software image from ECU
No
Verify the LED activity on the card
Wait for the card to boot as an active card
Software version on LCD correct?
No
Update the software version
Yes
Software version updated successfully?
Yes
Insert the redundant card in Slot 17
No
Replace the card
Wait for the card to boot as a redundant card
Set the IP Address and Shelf ID Using the LCD
Configure operating mode for TNCS-O cards
Configure UDC and VoIP for TNCS-O cards
384991

Related Procedures for TNCS and TNCS-O Cards

- NTP-G313 Installing and Configuring the TNC, TNCE, TSC, TSCE, TNCS, TNCS-O, TNCS-2, and TNCS-2O Card, on page 35
- NTP-G277 Provision Alarms and Controls on the TNC, TNCE, TNCS, TSC, or TSCE Card

Digital Image Signing

(Cisco ONS 15454 DWDM)

The DIS feature complies with the new U.S. Government Federal Information Processing Standard (FIPS) 140-3 to provide security for all software provided on the Cisco ONS 15454 DWDM platforms. This standard requires software to be digitally signed and verified for authenticity and integrity prior to load and execution.

DIS focuses on software security and provides increased protection from attacks and threats to Cisco ONS 15454 DWDM products. DIS verifies software integrity and provides assurance that the software has not been tampered with or modified. Digitally signed Cisco software provides counterfeit protection.

New controller cards, such as TNC/TNCE/TSC/TSCE/TNCS/TNCS-O, provide services that authenticate the origin of the software running on the Cisco ONS 15454 DWDM platforms.

DIS Identification

Digitally signed software can be identified by the last three characters appended to the working version and protected version field in CTC. The DIS conventions can be viewed under the working version displayed in the **Maintenance** > **Software** tab in CTC. For example, 9.2.0 (09.20-X10C-29.09-SDA) and 9.2.0 (09.20-010C-18.18-SPA).

The significance of the three characters appended to the software version is explained in the following table:

Character	Meaning
S (first character)	Indicates that the package is signed.
P or D (second character)	Production (P) or Development (D) image. • Production image—Software approved for general release. • Development image—development software provided under special conditions for limited use.
A (third character)	This third character indicates the version of the key used for signature generation. The version changes when a key is revoked and a new key is used. The values of the version key varies from A to Z.

Related Procedures for DIS

To verify DIS, see NTP-G250 Verifying Digital Image Signing (DIS) Information

AIC-I Card

(Cisco ONS 15454 only)

- The optional Alarm Interface Controller—International (AIC-I) card provides customer-defined (environmental) alarms and controls and supports local and express orderwire.
- It provides 12 customer-defined input and 4 customer-defined input/output contacts. The physical connections are via the backplane wire-wrap pin terminals. If you use the additional alarm expansion panel (AEP), the AIC-I card can support up to 32 inputs and 16 outputs, which are connected on the AEP connectors. The AEP is compatible with ANSI shelves only. A power monitoring function monitors the supply voltage (–48 VDC).

Note For ANSI shelves, the number of inputs and outputs can be increased using the AEP. The AEP is connected to the shelf backplane and requires an external wire-wrap panel.

AIC-I Card-Level Indicators

For "AIC-I Card-Level Indicators", see Card-Level Indicators on the AIC-I Card.

External Alarms and Controls

The AIC-I card provides input/output alarm contact closures. You can define up to 12 external alarm inputs and 4 external alarm inputs/outputs (user configurable). The physical connections are made using the backplane wire-wrap pins or FMEC connections. For information about increasing the number of input/output contacts, see the “ONS 15454 ANSI Alarm Expansion Panel” section in the Cisco ONS 15454 Hardware Installation Guide.

LEDs on the front panel of the AIC-I indicate the status of the alarm lines, one LED representing all of the inputs and one LED representing all of the outputs. External alarms (input contacts) are typically used for external sensors such as open doors, temperature sensors, flood sensors, and other environmental conditions. External controls (output contacts) are typically used to drive visual or audible devices such as bells and lights, but they can control other devices such as generators, heaters, and fans.

You can program each of the twelve input alarm contacts separately and each of the sixteen input alarm contacts separately. Choices include:

- Alarm on Closure or Alarm on Open
- Alarm severity of any level (Critical, Major, Minor, Not Alarmed, Not Reported)
- Service Affecting or Non-Service Affecting alarm-service level
- 63-character alarm description for CTC display in the alarm log

You cannot assign the fan-tray abbreviation for the alarm; the abbreviation reflects the generic name of the input contacts. The alarm condition remains raised until the external input stops driving the contact or you provision the alarm input.

The output contacts can be provisioned to close on a trigger or to close manually. The trigger can be a local alarm severity threshold, a remote alarm severity, or a virtual wire:

- Local NE alarm severity: A hierarchy of Not Reported, Not Alarmed, Minor, Major, or Critical alarm severities that you set to cause output closure. For example, if the trigger is set to Minor, a Minor alarm or above is the trigger.
- Remote NE alarm severity: Same as the local NE alarm severity but applies to remote alarms only.
- Virtual wire entities: You can provision any environmental alarm input to raise a signal on any virtual wire on external outputs 1 through 4 when the alarm input is an event. You can provision a signal on any virtual wire as a trigger for an external control output.

You can also program the output alarm contacts (external controls) separately. In addition to provisionable triggers, you can manually force each external output contact to open or close. Manual operation takes precedence over any provisioned triggers that might be present.

For information on how to configure and view the external alarms and external controls, refer the Alarm and TCA Monitoring and Management document.

Orderwire

Orderwire allows a crafts person to plug a phone set into an ONS 15454 and communicate with crafts people working at other ONS 15454s or other facility equipment. The orderwire is a pulse code modulation (PCM) encoded voice channel that uses E1 or E2 bytes in section/line overhead.

The AIC-I allows simultaneous use of both local (section overhead signal) and express (line overhead channel) orderwire channels on a SONET/SDH ring or particular optics facility. Express orderwire also allows communication via regeneration sites when the regenerator is not a Cisco device.

You can provision orderwire functions with CTC similar to the current provisioning model for DCC/GCC channels. In CTC, you provision the orderwire communications network during ring turn-up so that all NEs on the ring can reach one another. Orderwire terminations (that is, the optics facilities that receive and process the orderwire channels) are provisionable. Both express and local orderwire can be configured as on or off on a particular SONET/SDH facility. The ONS 15454 supports up to four orderwire channel terminations per shelf. This allows linear, single ring, dual ring, and small hub-and-spoke configurations. Orderwire is not protected in ring topologies such as bidirectional line switched ring (BLSR), multiplex section-shared protection ring (MS-SPRing), path protection, or subnetwork connection protection (SNCP) ring.

Caution Do not configure orderwire loops. Orderwire loops cause feedback that disables the orderwire channel.

The ONS 15454 implementation of both local and express orderwire is broadcast in nature. The line acts as a party line. Anyone who picks up the orderwire channel can communicate with all other participants on the connected orderwire subnetwork. The local orderwire party line is separate from the express orderwire party line. Up to four OC-N/STM-N facilities for each local and express orderwire are provisionable as orderwire paths.

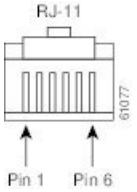
The AIC-I supports selective dual tone multi-frequency (DTMF) dialing for telephony connectivity, which causes one AIC-I card or all ONS 15454 AIC-I cards on the orderwire subnetwork to “ring.” The ringer/buzzer resides on the AIC-I. There is also a “ring” LED that mimics the AIC-I ringer. It flashes when a call is received on the orderwire subnetwork. A party line call is initiated by pressing *0000 on the DTMF pad. Individual dialing is initiated by pressing * and the individual four-digit number on the DTMF pad.

Table 17: Orderwire Pin Assignments

RJ-11 Pin Number	Description
1	Four-wire receive ring
2	Four-wire transmit tip
3	Two-wire ring
4	Two-wire tip
5	Four-wire transmit ring
6	Four-wire receive tip

When provisioning the orderwire subnetwork, make sure that an orderwire loop does not exist. Loops cause oscillation and an unusable orderwire channel.

Figure 6: RJ-11 Connector



User Data Channel

The user data channel (UDC) features a dedicated data channel of 64 kbps (F1 byte) between two nodes in an ONS 15454 network. Each AIC-I card provides two user data channels, UDC-A and UDC-B, through separate RJ-11 connectors on the front of the AIC-I card. Each UDC can be routed to an individual optical interface in the ONS 15454. The UDC ports are standard RJ-11 receptacles.

Table 18: UDC Pin Assignments

RJ-11 Pin Number	Description
1	For future use
2	TXN
3	RXN
4	RXP
5	TXP
6	For future use

Data Communications Channel

The DCC features a dedicated data channel of 576 kbps (D4 to D12 bytes) between two nodes in an ONS 15454 network. Each AIC-I card provides two data communications channels, DCC-A and DCC-B, through separate RJ-45 connectors on the front of the AIC-I card. Each DCC can be routed to an individual optical interface in the ONS 15454.

The DCC ports are synchronous serial interfaces. The DCC ports are standard RJ-45 receptacles.

Table 19: DCC Pin Assignments

RJ-45 Pin Number	Description
1	TCLKP
2	TCLKN
3	TXP
4	TXN
5	RCLKP
6	RCLKN
7	RXP
8	RXN

For more information on AIC-I card, see http://www.cisco.com/en/US/products/hw/optical/ps2006/products_data_sheet09186a00800dd662.html.

Related Procedures for AIC-I Card

- NTP-G15 Installing the Common Control Cards on ONS 15454 Shelf, on page 30
- NTP-G22 Verifying Common Card Installation
- NTP-G60 Creating and Deleting Overhead Circuits
- NTP-G72 Provision External Alarms and Controls on the Alarm Interface Controller-International Card
- NTP-G101 Modifying Alarm Interface Controller-International Settings

MS-ISC-100T Card

(Cisco ONS 15454 only)

Note For hardware specifications, see the "MS-ISC-100T Card Specifications" section in the Hardware Specifications document.

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

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

Caution Shielded twisted-pair cabling should be used for inter-building applications.

Table 20: MS-ISC-100T Card Port Assignments

Port	Description
DCN 1and DCN 2	Connection to the network
SSC1 to SSC7	Connection to subtending shelves
NC	Connection to TCC2/TCC2P using a cross-over cable
PRT	Connection to the PRT port of the redundant MS-ISC-100T

MS-ISC-100T Card-Level Indicators

For "MS-ISC-100T Card-Level Indicators", see Card-Level Indicators on the MS-ISC-100T Card.

Related Procedures for MS-ISC-100T Card

- NTP-G15 Installing the Common Control Cards on ONS 15454 Shelf, on page 30
- NTP-G22 Verifying Common Card Installation
- NTP-G144 Provisioning a Multishelf Node
- NTP-G163 Upgrading Nodes in Single-Shelf Mode to Multishelf Mode

Front Mount Electrical Connections

This section describes the MIC-A/P and MIC-C/T/P FMECs, which provide power, external alarm, and timing connections for the ONS 15454 ETSI shelf. The FMECs are needed to support the functions of the DWDM, transponder, and muxponder cards.

MIC-A/P FMEC

Note For hardware specifications, see the "MIC-A/P FMEC Specifications (ETSI only)" section in the Hardware Specifications document.

The MIC-A/P FMEC has the following features:

- Connection for one of the two possible redundant power supply inputs
- Connection for eight alarm outputs (coming from the TCC2/TCC2P card)
- Connection for four configurable alarm inputs/outputs
- Connection for sixteen alarm inputs
- Storage of manufacturing and inventory data

For proper system operation, both the MIC-A/P and MIC-C/T/P FMECs must be installed in the ONS 15454 ETSI shelf.

Table 21: Alarm Interface Pinouts on the MIC-A/P DB-62 Connector

Pin No.	Signal Name	Signal Description
1	ALMCUTOFF N	Alarm cutoff, normally open ACO pair
2	ALMCUTOFF P	Alarm cutoff, normally open ACO pair
3	ALMINP0 N	Alarm input pair 1, reports closure on connected wires
4	ALMINP0 P	Alarm input pair 1, reports closure on connected wires
5	ALMINP1 N	Alarm input pair 2, reports closure on connected wires
6	ALMINP1 P	Alarm input pair 2, reports closure on connected wires
7	ALMINP2 N	Alarm input pair 3, reports closure on connected wires
8	ALMINP2 P	Alarm input pair 3, reports closure on connected wires
9	ALMINP3 N	Alarm input pair 4, reports closure on connected wires
10	ALMINP3 P	Alarm input pair 4, reports closure on connected wires
11	EXALM0 N	External customer alarm 1
12	EXALM0 P	External customer alarm 1
13	GND	Ground
14	EXALM1 N	External customer alarm 2
15	EXALM1 P	External customer alarm 2

Pin No.	Signal Name	Signal Description
16	EXALM2 N	External customer alarm 3
17	EXALM2 P	External customer alarm 3
18	EXALM3 N	External customer alarm 4
19	EXALM3 P	External customer alarm 4
20	EXALM4 N	External customer alarm 5
21	EXALM4 P	External customer alarm 5
22	EXALM5 N	External customer alarm 6
23	EXALM5 P	External customer alarm 6
24	EXALM6 N	External customer alarm 7
25	EXALM6 P	External customer alarm 7
26	GND	Ground
27	EXALM7 N	External customer alarm 8
28	EXALM7 P	External customer alarm 8
29	EXALM8 N	External customer alarm 9
30	EXALM8 P	External customer alarm 9
31	EXALM9 N	External customer alarm 10
32	EXALM9 P	External customer alarm 10
33	EXALM10 N	External customer alarm 11
34	EXALM10 P	External customer alarm 11
35	EXALM11 N	External customer alarm 12
36	EXALM11 P	External customer alarm 12
37	ALMOUP0 N	Normally open output pair 1
38	ALMOUP0 P	Normally open output pair 1
39	GND	Ground
40	ALMOUP1 N	Normally open output pair 2
41	ALMOUP1 P	Normally open output pair 2
42	ALMOUP2 N	Normally open output pair 3
43	ALMOUP2 P	Normally open output pair 3

Pin No.	Signal Name	Signal Description
44	ALMOUP3 N	Normally open output pair 4
45	ALMOUP3 P	Normally open output pair 4
46	AUDALM0 N	Normally open Minor audible alarm
47	AUDALM0 P	Normally open Minor audible alarm
48	AUDALM1 N	Normally open Major audible alarm
49	AUDALM1 P	Normally open Major audible alarm
50	AUDALM2 N	Normally open Critical audible alarm
51	AUDALM2 P	Normally open Critical audible alarm
52	GND	Ground
53	AUDALM3 N	Normally open Remote audible alarm
54	AUDALM3 P	Normally open Remote audible alarm
55	VISALM0 N	Normally open Minor visual alarm
56	VISALM0 P	Normally open Minor visual alarm
57	VISALM1 N	Normally open Major visual alarm
58	VISALM1 P	Normally open Major visual alarm
59	VISALM2 N	Normally open Critical visual alarm
60	VISALM2 P	Normally open Critical visual alarm
61	VISALM3 N	Normally open Remote visual alarm
62	VISALM3 P	Normally open Remote visual alarm

MIC-C/T/P FMEC

Note For hardware specifications, see the "MIC-C/T/P FMEC Specifications (ETSI only)" section in the Hardware Specifications document.

The MIC-C/T/P FMEC has the following features:

- Connection for one of the two possible redundant power supply inputs
- Connection for two serial ports for local craft/modem (for future use)
- Connection for one LAN port

- Connection for two system timing inputs
- Connection for two system timing outputs
- Storage of manufacturing and inventory data

For proper system operation, both the MIC-A/P and MIC-C/T/P FMECs must be installed in the shelf.

The MIC-C/T/P FMEC has one pair of LEDs located on the RJ45 LAN connector. The green LED is on when a link is present, and the amber LED is on when data is being transferred.

Control Card Reset

You can soft reset the control card by using CTC or by physically resetting the card (a hard reset). A soft reset reboots the control card and reloads the operating system and the application software. Additionally, a hard reset temporarily removes power from the control card and clears all the buffer memory.

You can apply a soft reset from CTC to either an active or standby control card without affecting traffic. If you need to perform a hard reset on an active control card, put the control card into standby mode first by performing a soft reset.

Note Hard reset can also be performed on the TNC/TNCE/TSC/TSCE/TNCS/TNCS-O card through CTC and TL1 interface. Before performing the hard reset, bring the TNC/TNCE/TSC/TSCE/TNCS/TNCS-O card to maintenance mode.

When you reset the standby control card, the system traffic is not affected. When you reset the active control card, traffic switches to the standby card if the standby card is present and in the ready standby state. If the standby card is not in the ready standby state, traffic does not switch, and results in loss of system traffic and management connectivity until the card reboots completely.

Caution When you reset the TNC/TNCE/TSC/TSCE card on the ONS-15454-M2 or ONS-15454-M6 shelf or the TNCS/TNCS-O card on the ONS-15454-M6 or NCS 2015 shelf in simplex control mode (when the standby control card is not present), loss of management connectivity happens until the card reboots. The system traffic loss may occur depending on the line card and traffic type.

Note (Cisco ONS 15454 shelf) When a CTC reset is performed on an active TCC2/TCC2P/TCC3 card, the AIC-I card goes through an initialization process and also resets because it is controlled by the active TCC2/TCC2P/TCC3 card.

Control Card Database

When dual control cards are installed in the ONS 15454 DWDM shelf each control card hosts a separate database; therefore, the protect card database is available if the database on the working control card fails. You can also store a backup version of the database on the workstation running CTC. This operation should

be part of a regular maintenance program at approximately weekly intervals, and should also be completed when preparing ONS 15454 DWDM for a pending natural disaster, such as a flood or fire. The configuration details are stored in the database of the control card. The database restore from a TNC and TNCE cards to a TSC and TSCE cards or vice versa is not supported.

Note The following parameters are not backed up and restored: node name, IP address, mask and gateway, and Internet Inter-ORB Protocol (IIOP) port. If you change the node name and then restore a backed up database with a different node name, the circuits map to the new node name. We recommend keeping a record of the old and new node names.

NTP-G15 Installing the Common Control Cards on ONS 15454 Shelf

Purpose	This procedure describes how to install the control cards needed for the ONS 15454 platform.
Tools/Equipment	Two TCC2/TCC2P/TCC3 cards (required) AIC-I card (optional) MS-ISC-100T (optional; for multishelf node configurations)
Prerequisite Procedures	• • NTP-G7 Install the Power and Ground • NTP-G14 Install DWDM Equipment
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	Provisioning or higher

Warning During this procedure, wear grounding wrist straps to avoid ESD damage to the card. Do not directly touch the backplane with your hand or any metal tool, or you could shock yourself. Statement 94.

Caution Always use the supplied ESD wristband when working with a powered ONS 15454. For detailed instructions on how to wear the ESD wristband, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.

Note If protective clips are installed on the backplane connectors of the cards, remove the clips before installing the cards.

Note If you install a card incorrectly, the FAIL LED flashes continuously.

Procedure

Step 1 Complete the DLP-G33 Installing the TCC2, TCC2P, or TCC3 Card.

Note If you install the wrong card in a slot, see the NTP-G107 Remove Permanently or Remove and Replace DWDM Cards.

Step 2 Complete the DLP-G34 Installing the AIC-I Card, on page 31, if necessary.

Step 3 DLP-G309 Installing the MS-ISC-100T Card, if necessary.

Stop. You have completed this procedure.

DLP-G34 Installing the AIC-I Card

Purpose	This task installs the AIC-I card. The AIC-I card provides connections for external alarms and controls (environmental alarms).
Tools/Equipment	AIC-I card
Prerequisite Procedures	DLP-G33 Installing the TCC2, TCC2P, or TCC3 Card
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Open the latches/ejectors on the card.

Step 2 Use the latches/ejectors to firmly slide the card along the guide rails in Slot 9 until the card plugs into the receptacle at the back of the slot.

Step 3 Verify that the card is inserted correctly and close the latches/ejectors on the card.

Note It is possible to close the latches/ejectors when the card is not completely plugged into the backplane. Ensure that you cannot insert the card any further.

Note When installing cards, allow each card to boot completely before installing the next card.

Step 4 Verify the following:

- The red FAIL LED blinks for up to 10 seconds.

  Note If the red FAIL LED does not turn on, check the power.

- The PWR A and PWR B LEDs become red, the two INPUT/OUTPUT LEDs become amber, and the ACT LED turns green for approximately 5 seconds.
- The PWR A and PWR B LEDs turn green, the INPUT/OUTPUT LEDs turn off, and the green ACT LED remains on.

  Note It might take up to 3 minutes for the PWR A and PWR B LEDs to update.

  Note If you insert a card into a slot provisioned for a different card, no LEDs turn on.

  Note If the red FAIL LED is on continuously or the LEDs act erratically, the card is not installed properly. Remove the card and repeat Steps 1 to 4.

Step 5 Return to your originating procedure (NTP).

DLP-G309 Installing the MS-ISC-100T Card

Purpose	This task installs redundant MS-ISC-100T cards. The MS-ISC-100T card is required for a multishelf node configuration. It provides LAN redundancy on the node controller shelf. An alternative to using the MS-ISC-100T card is the Cisco Catalyst 2950, although Cisco recommends using the MS-ISC-100T. For more information on the Catalyst 2950 installation, refer to the Catalyst 2950 product documentation.
Tools/Equipment	MS-ISC-100T card (2)
Prerequisite Procedures	DLP-G33 Installing the TCC2, TCC2P, or TCC3 Card
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Note The MS-ISC-100T is not supported in a subtended shelf.

Note When installing cards, allow each card to boot completely before installing the next card.

Procedure

Step 1 Open the latches/ejectors on the card.

Step 2 Use the latches/ejectors to firmly slide the card along the guide rails into the appropriate slot in the node controller shelf until the card plugs into the receptacle at the back of the slot. The card can be installed in any slot from Slot 1 to 6 or 12 to 17. Cisco recommends that you install the MS-ISC-100T cards in Slot 6 and Slot 12.

Step 3 Verify that the card is inserted correctly and close the latches/ejectors on the card.

Note It is possible to close the latches/ejectors when the card is not completely plugged into the backplane. Ensure that you cannot insert the card any further.

Step 4 Verify the LED activity:

- The red FAIL LED blinks for 35 to 45 seconds.
- The red FAIL LED turns on for 15 to 20 seconds.
- The red FAIL LED blinks for approximately 3 minutes.
- The red FAIL LED turns on for approximately 6 minutes.
- The green ACT or ACT/STBY LED turns on. The SF LED can persist until all card ports connect to their far end counterparts and a signal is present.

Note If the red FAIL LED does not turn on, check the power.

Note If you insert a card into a slot provisioned for a different card, all LEDs turn off.

Step 5 Repeat Steps 1 through 4 for the redundant MS-ISC-100T card.

Step 6 Return to your originating procedure (NTP).

NTP-G249 Upgrade the TCC2/TCC2P Card to the TCC3 Card

Purpose	This procedure upgrades the TCC2/TCC2P card to the TCC3 card.
Tools/Equipment	Two TCC3 cards
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Maintenance or higher

Note Downgrade procedures from TCC3 cards to TCC2P/TCC2 cards are not supported. Log into the Technical Support Website at http://www.cisco.com/cisco/web/support/index.html for more information or call Cisco TAC (1 800 553-2447).

Procedure

Step 1 Log into CTC.

Step 2 Verify that the LAN wires on the backplane are installed properly. The TCC3 card does not autodetect miswired LAN connections. If a LAN connection is miswired, a LAN Connection Polarity Reversed condition appears.

Step 3 Verify that the node you are upgrading has 10.x.x installed. The software version is displayed in the upper left corner of the window.

Step 4 Back up the database before beginning the upgrade.

Step 5 Physically replace the standby TCC2/TCC2P card with a TCC3 card.

a) Check the LED on the faceplate. The ACT/STBY LED on the faceplate of the TCC2/TCC2P/TCC3 card indicates whether the card is in active or standby mode. A green ACT/STBY LED indicates an active card and an amber light indicates a standby card.
b) Open the standby TCC2/TCC2P card ejectors.
c) Slide the card out of the slot. This raises the IMPROPRMVL alarm, which clears when the upgrade is complete.
d) Open the ejectors on the TCC3 card to be installed.
e) Slide the TCC3 card into the slot along the guide rails.
f) Close the ejectors.
g) In CTC node view, Ldg (loading) appears on the newly installed TCC3.

Note It takes approximately 10 minutes for the active TCC2/TCC2P card to copy the system software and database to the newly installed TCC3 card. During this operation, the LEDs on the TCC3 card flash Fail and then the active/standby LED flashes. When the transfer completes, the TCC3 card reboots and goes into standby mode after approximately three minutes. Do not remove the card from the shelf during a database transfer.

Caution If your active TCC2/TCC2P card resets during the upgrade before the new TCC3 card is in full standby mode, remove the new TCC3 card immediately.

Step 6 When the newly installed TCC3 card is in standby, right-click active TCC2/TCC2P card in CTC.

Step 7 From the pull-down menu, click **Reset Card**.

Wait for the TCC2/TCC2P card to reboot. The software switches the standby TCC3 card to the active mode. The TCC2/TCC2P card verifies that it has the same database as the TCC3 card and then switches to standby.

Step 8 Verify that the remaining TCC2/TCC2P card is now in standby mode (the ACT/STBY LED changes to amber).

Step 9 Physically replace the remaining TCC2/TCC2P card with the second TCC3 card.

a) Open the TCC2/TCC2P card ejectors.
b) Slide the card out of the slot. This raises the IMPROPRMVL alarm, which clears when the upgrade is complete.
c) Open the ejectors on the TCC3 card.

d) Slide the TCC3 card into the slot along the guide rails.
e) Close the ejectors.

Tip When a newly installed TCC3 card has a different version of the software installed from the version running on the active TCC3 card, the newly installed TCC3 card automatically copies the software version running on the active TCC3 card. You do not need to do anything in this situation. However, loading the TCC3 card does not boot up in the normal manner. When the card is first inserted, the red FAIL LED stays on for a short period. The FAIL LED then blinks normally and all LEDs go dark. After loading the new software for approximately 10 minutes, the TCC3 card becomes the standby card and the amber LED is illuminated.

Step 10 If power-related alarms occur after the second TCC3 card is installed, check the voltage on the backplane.

Step 11 When both the active and standby TCC3 cards are operational, download the full version of the same release package. For example, if the node is in the R9.8.1.3 release before upgrading to the TCC3 card, download the R9.8.1.3 DWDM pkg (non-DWDM-LITE pkg) after upgrading to the TCC3 card.

Step 12 Upgrade the node to Cisco ONS 15454 DWDM full package. For example, upgrade the node to R9.8.1.3 DWDM pkg.

Stop. You have completed this procedure.

NTP-G313 Installing and Configuring the TNC, TNCE, TSC, TSCE, TNCS, TNCS-O, TNCS-2, and TNCS-2O Card

Purpose	This procedure describes how to install and configure the TNC, TNCE, TSC, TSCE, or TNCS/TNCS-O/TNCS-2/TNCS-2O card.
Tools/Equipment	Redundant TNC/TNCE/TSC/TSCE/TNCS/TNCS-O/TNCS-2/TNCS-2O cards on ONS-15454-M6 shelf (required) Stand-alone TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O/TNCS-O card on ONS-15454-M2 shelf (required) Redundant TNCS/TNCS-O/TNCS-2/TNCS-2O cards on the NCS 2015 shelf.
Prerequisite Procedures	Install Power and Ground. See the Hardware Installation Guide.
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	Provisioning or higher

Warning During this procedure, wear grounding wrist straps to avoid ESD damage to the card. Do not directly touch the backplane with your hand or any metal tool, or you could shock yourself. Statement 94

Caution Always use the supplied ESD wristband when working with a powered ONS 15454 DWDM shelf assemblies. For detailed instructions on how to wear the ESD wristband, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.

Note If you install a card incorrectly, the FAIL LED flashes continuously.

Procedure

Step 1 Complete the Installing the TNC, TNCE, TSCE, TNCS-2, TNCS-2O, TNCS-O, or TNCS Card, on page 36.

Step 2 Complete theDLP-G788 Configuring Operating Mode for the TNC, TNCE, TNCS, TNCS-O, TNCS-2, and TNCS-2O Cards, on page 42.

Step 3 Complete the DLP-G605 Provisioning PPM and Port for the TNC, TNCE, TNCS-2, TNCS-2O, and TNCS Cards, on page 40.

Step 4 Complete the DLP-G606 Configuring UDC and VoIP for the TNC, TNCE, TNCS-2, TNCS-2O, and TNCS/TNCS-O Cards, on page 41.

Step 5 Complete the DLP-G605 Provisioning PPM and Port for the TNC, TNCE, TNCS-2, TNCS-2O, and TNCS Cards, on page 40.

Note Step 3, on page 36 and Step 5, on page 36 do not apply to TNCS-O cards.

Stop. You have completed this procedure.

Installing the TNC, TNCE, TSCE, TNCS-2, TNCS-2O, TNCS-O, or TNCS Card

This task installs active and standby cards on the Cisco ONS 15454 M6 or Cisco NCS 2015 shelf.

Caution Do not remove the control cards during the software installation process, which is indicated by the alternate flashing of the FAIL and ACT/STBY LEDs. Removing the control cards during the software installation process corrupts the system memory.

Note Allow each control card to boot completely before installing the redundant control card.

Note You cannot insert the control cards in other slots due to mechanical constraints. To identify the card slot, match the symbol placed on the lower side of the card front panel with the symbol on the shelf.

Procedure

Step 1 Open the latches or ejectors of the first control card that you will install.

Step 2 Use the latches or ejectors to firmly slide the card horizontally along the guide rails until the card plugs into the receptacle at the back of the slot (slot 1 or 8 in the ONS-15454-M6 shelf, slot 1 or 17 in the NCS 2015 shelf).

Note The cards slide vertically in the NCS 2015 shelf.

Step 3 Verify that the card is inserted correctly, and close the latches or ejectors on the card.

If you insert a card into a slot assigned for a different card, all LEDs turn off.

Step 4 If needed, verify the LED activity on the control card.

- The red FAIL LED, PWR LED turn on briefly.
- The red FAIL LED turns on for about 10 seconds.
- The red FAIL LED and the amber ACT/STBY LED turn on for about 30 seconds.
- The red FAIL LED blinks for about 10 seconds.
- The red FAIL LED turns on for about 15 seconds.
- All the LEDs including the CRIT, MAJ, MIN, REM, SYNC, and ACO LEDs blink once and turn off for about 10 seconds.
- ACT/STBY LED blinks for about 1 second.
- All the LEDs including the CRIT, MAJ, MIN, REM, SYNC, and ACO LEDs turn off for about 10 seconds.
- The ACT/STBY, ACO, and PWR LEDs turn on.
- The boot process is complete when the PWR LEDs turn green and the amber ACT/STBY LED remains on. The ACT/STBY LED turns green if this is the first control card installed, but turns amber if this is the second control card installed.

  Note It might take up to four minutes for the power alarms to clear.

  Note During the control card initialization, the SFTWDOWN alarm appears twice. The alarm clears after the control card boots completely.

  Note If the FAIL LED is on continuously, see the note in Step 8 about the control card automatic upload.

Figure 7: Installing TNC and TNCE Cards on the ONS-15454-M6 Shelf

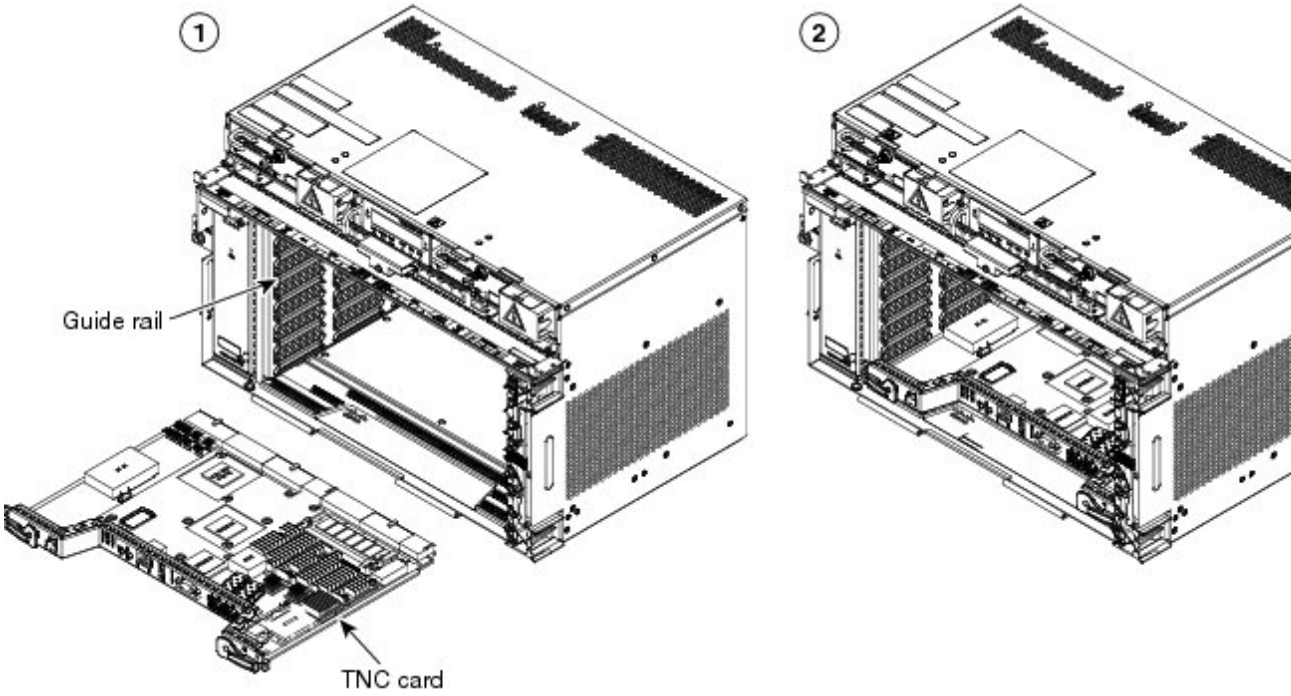
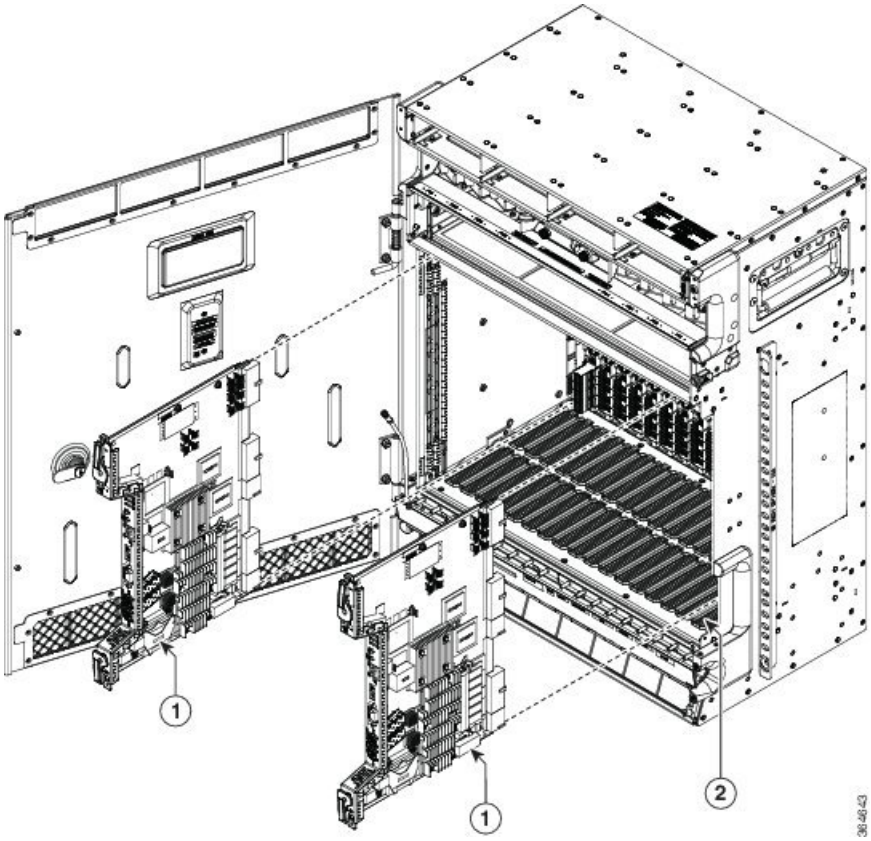


Figure 8: Installing TNCS/TNCS-O Cards on the NCS 2015 Shelf



1	TNCS/TNCS-O Card	2	Guide Rail

Step 5 Verify that the ACT/STBY LED is green if this is the first powered-up control card installed or amber if this is the second powered-up control card. The IP address, temperature of the node, and time of day appear on the LCD. The default time and date is 12:00 AM, January 1, 1970.

Step 6 The LCD cycles through the IP address (the default is 192.1.0.2), node name, and software version. Verify that the correct software version is shown on the LCD. The software text string indicates the node type (SDH or SONET) and software release. (For example: SDH 09.20-05L-20.10 indicates it is an SDH software load, Release 9.2. The numbers following the release number do not have any significance.)

Step 7 If the LCD shows the correct software version, continue with Step 8. If the LCD does not show the correct software version, refer to your next level of technical support, upgrade the software, or remove the control card and install a replacement card. Refer to the release-specific software upgrade document to replace the software.

Step 8 (ONS-15454-M6 or NCS 2015 shelf only) Repeat Steps 1 through 7 for the redundant control card.

Note If you install a standby control card that has a different software version than the active control card, the standby control card copies the software version from the one in the active control card. When the standby card is first inserted, the LEDs follow the normal boot-up sequence. However, after the red FAIL LED turns on for about 5 seconds, the FAIL LED and the ACT/STBY LED begin to flash alternately for up to 30 minutes. After loading the new software, the upgraded control cards LEDs repeat the appropriate bootup sequence, and the amber ACT/STBY LED turns on.

Step 9 Return to your originating procedure.

DLP-G605 Provisioning PPM and Port for the TNC, TNCE, TNCS-2, TNCS-2O, and TNCS Cards

Purpose	(Cisco ONS 15454 M2, ONS 15454 M6, and Cisco NCS 2015)This task provisions a PPM and port on TNC, TNCE, TNCS, TNCS-2, and TNCS-2O cards. PPMs are created to support the OSC function.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	None

Note If the card in the shelf is configured in TNCO operating mode, PPM and port is automatically provisioned on the card.

Procedure

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the TNC, TNCE, TNCS, TNCS-2, TNCS-2O, or TNCS-O cards where you want to provision PPM and port settings.

Step 2 Click the **Provisioning** > **Pluggable Port Modules** tabs.

Step 3 In the Pluggable Port Modules area, click Create. The Create PPM dialog box appears.

Step 4 In the Create PPM dialog box, complete the following:

- PPM—Choose 1 or 2 from the PPM drop-down list.
- PPM Type—Displays the PPM associated with the chosen PPM in the above step.

Step 5 Click **OK**. The newly created PPM appears in the Pluggable Port Modules area. The row in the Pluggable Port Modules area becomes white when the PPM is inserted and the Actual Equipment Type column lists the name of PPM.

Step 6 In the Pluggable Ports area, click**Create** . The Create Port dialog box appears.

Step 7 In the Create Ports dialog box, complete the following:

- Port—Choose the port you want to configure from the Port drop-down list.
- Port Type—Choose the port type, such as OC-3, FE, or ONE-GE from the Port Type drop-down list.

  Note When changing the port type from OC-3 or FE, to ONE-GE is traffic affecting.

Note The OC-3 port type is not supported on the TNCS-2 & TNCS-2O cards.

Note OC-3 can be configured only on PPM port 1. FE and ONE-GE can be configured on both the ports. If the port type is FE, then disable ALS before provisioning OSC on that port.

Step 8 Click **OK**. The newly created port appears in the Pluggable Ports area. The port type you provisioned is listed in the Rate column.

Step 9 Repeat Steps 3 through 8 to provision another PPM and port on the TNC, TNCE, TNCS-2, TNCS-2O, or TNCS cards.

Step 10 Return to your originating procedure (NTP).

DLP-G606 Configuring UDC and VoIP for the TNC, TNCE, TNCS-2, TNCS-2O, and TNCS/TNCS-O Cards

Purpose	(Cisco ONS 15454 M2, Cisco ONS 15454 M6, and Cisco NCS 2015)This task configures UDC and VoIP traffic for the TNC, TNCE, TNCS-2, TNCS-2O, and TNCS/TNCS-O cards.
Tools/Equipment	None
Prerequisite Procedures	• DLP-G46 Log into CTC • NTP-G38 Provisioning OSC Terminations • DLP-G605 Provisioning PPM and Port for the TNC, TNCE, TNCS-2, TNCS-2O, and TNCS Cards, on page 40
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	None

Note LLDP traffic associated with specific MAC addresses is not passed across UDC.

Note Each TNC, TNCE, TNCS-2, TNCS-2O, and TNCS/TNCS-O card supports UDC/VoIP configuration. You can configure UDC or VoIP on the two SFP ports present on the TNC, TNCE, TNCS-2, TNCS-2O, and TNCS cards. The TNC, TNCE, TNCS-2, TNCS-2O, and TNCS cards support the UDC/VoIP configuration only when OSC is provisioned on the SFP ports.

Note If two nodes are connected through the fiber and if the TNC, TNCE, TNCS-2, TNCS-2O, and TNCS/TNCS-O cards in one node have UDC configuration, the TNC, TNCE, TNCS-2, TNCS-2O, and TNCS/TNCS-O cards in the other node must also have UDC configuration. The same rule applies to VoIP configuration.

Procedure

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the TNC, TNCE, TNCS, TNCS-2, TNCS-2O, or TNCS-O cards where you want to configure UDC and VoIP.

Step 2 Click the **Provisioning** > **UDC / VOIP** tabs.

Step 3 From the Service Type drop-down list, choose UDC or VOIP.

Note You can configure UDC or VoIP on only one SFP port at a time per TNC, TNCE, TNCS-2, TNCS-2O, or TNCS card. If you want to configure UDC or VoIP on the second SFP port, choose NONE from the Service Type drop-down list for the first port and then choose UDC or VoIP for the second port.

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G788 Configuring Operating Mode for the TNC, TNCE, TNCS, TNCS-O, TNCS-2, and TNCS-2O Cards

Purpose	(Cisco ONS 15454 DWDM)This task configures the operating mode for the TNC, TNCE, TNCS, and TNCS-O cards.
Tools/Equipment	None
Prerequisite Procedures	• DLP-G46 Log in to CTC
Required/As Needed	As Needed
Onsite/Remote	Onsite or Remote
Security Level	None

The TNC mode supports the TNC, TNC-E and TNCS cards, the TNCS-O mode supports only the TNCS-O card, and no card mode supports the TSC and TSC-E cards.

Procedure

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the control card where you want to configure the card mode.

Step 2 Click **Provisioning** > **Card** tab.

Step 3 From the Mode drop-down list, choose TNC or TNCO.

Note The card is configured to TNC mode by default.

Note If the actual card to be inserted is TNCS-O card, configure the card in TNCO mode.

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G774 Changing the Frame Type on the OSC

Purpose	This task changes the frame type on the OSC.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	None

Note TNCS-O cards support only FE payload. Hence, OSC payload cannot be changed on TNCS-O cards.

Procedure

Step 1 Delete the OC-3, STM1, FE, or ONE_GE OSC communication channel. See DLP-G186 Delete an OSC Termination.

Step 2 Click **Provisioning** > **WDM-ANS** > **Internal Patchcords**.

Step 3 Choose the internal patchcord that is associated with OSC and click **Delete**.

Step 4 Delete the OSC payload on the TNC/TNCE/TNCS-2/TNCS-2O/TNCS card.

a) In node view (single-shelf mode) or shelf view (multishelf view), double-click the TNC/TNCE/TNCS card where you want to delete the OSC payload.

b) Click the **Provisioning** > **Pluggable Port Modules** tabs.

c) In the Pluggable Ports area, choose the OSC payload that you want to delete and click **Delete**.

Step 5 Provision the OSC payload on the TNC/TNCE/TNCS-2/TNCS-2O/TNCS card. See DLP-G605 Provisioning PPM and Port for the TNC, TNCE, and TNCS Cards.

Note OC-3/STM1 can be configured only on port 1. FE and ONE-GE can be configured on both the ports.

Step 6 Provision the internal patchcord from the OSC on the TNC/TNCE/TNCS/TNCS-2/TNCS-2O card to the corresponding line card. See Virtual Patchcords.

Step 7 Provision the OSC communication channel. See NTP-G38 Provisioning OSC Terminations.

Step 8 Repeat the above steps for the other node.

Step 9 Return to your originating procedure (NTP).

NTP-G278 Upgrade an Older Controller Card to a Newer Controller Card

Purpose	This procedure upgrades an older controller card to a newer controller card. See the #unique_65 to upgrade the TNCS Card to TNCS-O Card.
Tools/Equipment	Two TSCE/TNC/TNCE/TNCS/TNCS-O (Two of the new controller cards to be used as active and standby cards.)
Prerequisite Procedures	"DLP-G46 Log into CTC" in the "Connect the PC and Log into the GUI" document.
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Maintenance or higher

The table below lists the matrix of the controller cards that can be upgraded.

Card	New Card
TSC	TSC-E
	TNC
	TNC-E
	TNCS
	TNCS-O

TSC-E	TNC
	TNC-E
	TNCS
	TNCS-O
TNC	TNC-E
	TNCS
	TNCS-O
TNC-E	TNCS
	TNCS-O
TNCS	TNCS-O

Note Downgrade procedures from a newer controller card to older controller card are not supported. Log into the Technical Support Website at http://www.cisco.com/cisco/web/support/index.html for more information or call Cisco TAC (1 800 553-2447).

Note If the old controller is TNC/TNC-E/TNCS and you want to upgrade to TNCS-O, the old controller cards should be provisioned only with an FE payload on both the PPM ports. If the TNC/TNC-E/TNCS controller card has a different payload provisioned such as OC-3/1GIGE, you must delete the OSC, payload, and the PPM.

This procedure also applies to TSC/TNC/TSC-E/TNC-E upgrades to the TNCS/TNCS-O card for an M6 shelf.

Before you begin

- M2 supports only TSC, TSC-E, TNC, TNC-E, TNCS, TNCS-2, TNCS-2O, and TNCS-O controller cards.
- M6 supports only TSC, TSC-E, TNC, TNC-E, TNCS,TNCS-2, TNCS-2O, and TNCS-O controller cards.
- M15 supports only TNCS, TNCS-2, TNCS-2O, and TNCS-O controller cards.

Procedure

Step 1 Verify that the node you are upgrading has R 10.x.x/ R11.0 installed. The software version is displayed in the upper left corner of the window.

Step 2 Back up the database before beginning the upgrade.

Step 3 Physically replace the standby older controller card with the newer controller card. task

a) Check the LED on the faceplate. The ACT/STBY LED on the faceplate of the controller card indicates whether the card is in active or standby mode. A green ACT/STBY LED indicates an active card and an amber light indicates a standby card.
b) Open the ejectors on the standby old controller card.
c) Slide the card out of the slot. This raises the IMPROPRMVL alarm, which clears when the upgrade is complete.
d) Right-click the slot from which the old controller card was ejected out.
e) Click **Delete Card** to delete the old controller card from CTC.

Note If the old controller card is not deleted from the CTC shelf view before inserting the new controller card, the MEA (card mismatch) alarm appears on that slot.

f) Open the ejectors on the new controller card to be installed.
g) Slide the new controller card into the slot along the guide rails.
h) Close the ejectors.
i) In CTC node view, Ldg (loading) appears on the newly installed controller card.

Note It takes approximately 10 minutes for the active old controller card to copy the system software and database to the newly installed controller card. During this operation, the LEDs on the new controller card flash Fail and then the active/standby LED flashes. When the transfer completes, the new controller card reboots and goes into standby mode after approximately three minutes. Do not remove the card from the shelf during a database transfer.

Caution If your active old controller card resets during the upgrade before the new controller card is in full standby mode, remove the new controller card immediately.

Step 4 When the newly installed controller card is in standby, right-click the active old controller card in CTC.

Step 5 From the pull-down menu, click **Reset Card**.

Wait for the old controller card to reboot. The standby new controller card is switched to active mode. The old controller card verifies that it has the same database as the new controller card and then switches to standby.

Step 6 Verify that the remaining old controller card is now in standby mode (the ACT/STBY LED changes to amber).

Step 7 Physically replace the remaining old controller card with the second new controller card.

a) Open the ejectors on the old controller card.
b) Slide the card out of the slot. This raises the IMPROPRMVL alarm, which clears when the upgrade is complete.
c) Right-click the slot from which the old controller card was ejected out.
d) Click **Delete Card** to delete the old controller card from CTC.

If the old controller card is not deleted from the CTC shelf view before inserting the TNC card, the MEA (card mismatch) alarm appears on that slot.

e) Open the ejectors on the new controller card.
f) Slide the new controller card into the slot along the guide rails.
g) Close the ejectors.

The second new controller card boots up. The second new controller card must also copy the database. Do not remove the card from the shelf during a database transfer.

Step 8 If power-related alarms occur after the second new controller card is installed, check the voltage on the RJ-45 LAN port. Refer to the troubleshooting guide for information on clearing the alarms.

Stop. You have completed this procedure.

LCD or ECU Hot Plug-In

Purpose	This procedure upgrades or downgrades the LCD or ECU (in case of NCS 2015) inserted into a node.
Tools/Equipment	One LCD (incase of NCS 2006) or ECU (in case of NCS 2015) having a USB device with Release 11.0 and one LCD (incase of NCS 2006) or ECU (in case of NCS 2015) having a USB device with Release prior to 11.0.
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Maintenance or higher

Before you begin

The following procedure is applicable on the ONS 15454 M6 and NCS 2015 chassis. These scenarios apply to the LCD in case of the ONS 15454 M6 and the ECU in case of the NCS 2015.

Note In the case, the user is unaware of the Release version of the LCD or ECU being plugged-in into the chassis, log into the Technical Support Website at http://www.cisco.com/c/en/us/support/index.html for more information or call TAC (1 800 553-2447).

Insert an LCD/ECU of Release prior to 11.0 in a Release 11.0 Chassis

Procedure

Step 1 Ensure the LCD/ECU present in the chassis is of Release 11.0.

Step 2 Eject the LCD/ECU operating with Release 11.0 from the chassis.

Step 3 Insert the new LCD/ECU with a Release prior to 11.0. The USBSYNC alarm is raised indicating the USB Sync procedure. Wait for USBSYNC alarm to clear.

Stop. You have completed this procedure.

Insert an LCD/ECU of Release 11.0 in a Release prior to 11.0 Chassis

Caution When an LCD or ECU of release 11.0 onwards is inserted into a chasis with a release prior to 11.0, the downgrade of LCD to release prior to 11.0 will not be successful and the node will reboot. The chassis will not be in a usable condition.

Note

- For NCS 2006 platform, this scenario is applicable only for LCD module.
- For NCS 2015 platform, this scenario is applicable only for ECU module. (as for NCS 2015 platform, the USB is on ECU)

In this case, follow the below steps to make the chassis usable:

Procedure

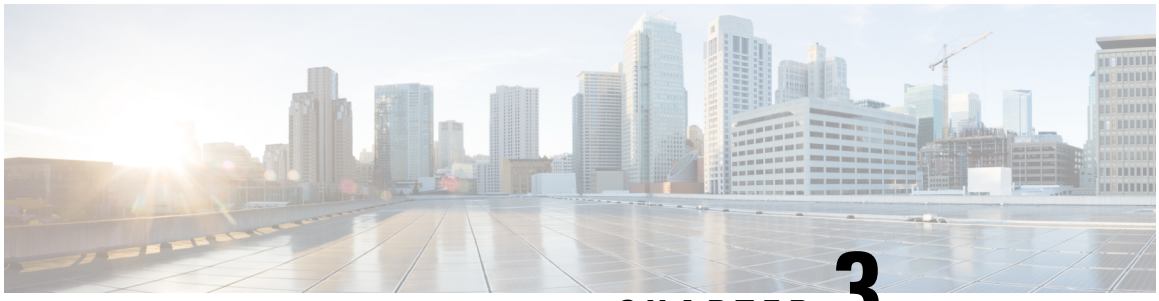
Step 1 Ensure the LCD or ECU present in the chassis is with release 11.0 onwards and the USB sync is complete.

Wait, if the USB sync is not complete.

Step 2 Download any release prior to release 11.0 into the protect partition on the node and follow the NCS 2000 downgrade process steps.

The LCD or ECU gets formatted with the dosFs1.0 file system after you complete the downgrade process. The LCD or ECU is now ready to be inserted in any chassis running prior to release 11.0.

Note In case of any help, log into the Technical Support Website at http://www.cisco.com/c/en/us/support/index.html for more information or call TAC (1 800 553-2447).



CHAPTER 3

Connecting the PC and Logging into the GUI

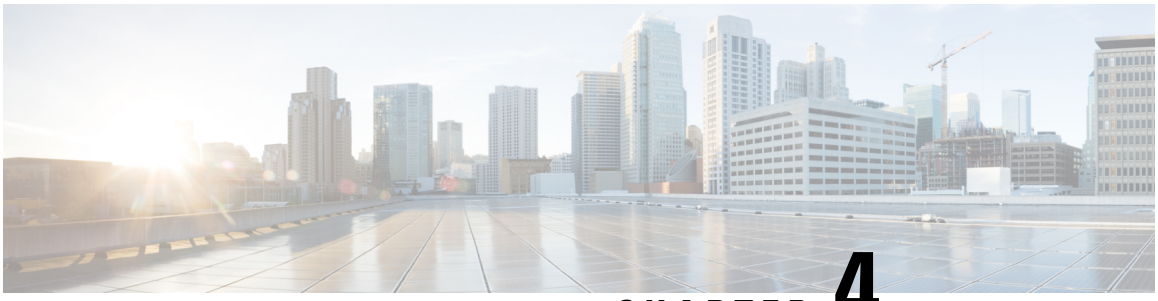
This chapter provides information on how to connect Windows PCs and Solaris workstations to the chassis and how to log into Cisco Transport Controller (CTC) software, the Operation, Administration, Maintenance and Provisioning (OAM&P) user interface.

- Connecting the PC and Logging into the GUI, on page 49

Connecting the PC and Logging into the GUI

The information in this chapter is in a new location. See Connect the PC and Log into the GUI document for information on how to connect Windows PCs and Solaris workstations to the chassis and how to log into Cisco Transport Controller (CTC) software, the Operation, Administration, Maintenance and Provisioning (OAM&P) user interface.

Connecting the PC and Logging into the GUI



CHAPTER 4

Managing the Shelf

This chapter explains how to provision a single Cisco ONS 15454 dense wavelength division multiplexing (DWDM) node and turn it up for service, including assigning the node name, date, and time; provisioning timing references; provisioning network attributes such as IP address and default router; setting up users and user security; and creating DWDM connections.

The procedures and tasks described in this chapter for the Cisco ONS 15454 platform is applicable to the Cisco ONS 15454 M2 and Cisco ONS 15454 M6 platforms, unless noted otherwise.

Procedures in this chapter require that you have a network plan calculated for your DWDM network with Cisco Transport Planner. Cisco Transport Planner is a DWDM planning tool that is available from your Cisco account representative. Cisco Transport Planner 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 Transport Planner, contact your Cisco account representative. For instructions on using Cisco Transport Planner, refer to the *Cisco Transport Planner DWDM Operations Guide*.

Note Unless otherwise specified, in this document "ONS 15454" refers to both ANSI (ONS 15454) and ETSI (ONS 15454 SDH) shelf assemblies.

Note During the conversion of single shelf to multishelf node controller shelf, it is recommended to delete all the existing circuits on the shelf once and then proceed with re-creating them to avoid any unnecessary results. For example, the TL1 retrievals will not return the right values if the circuits are not deleted before converting to multishelf node.

Note Due to memory limitations, TCC2/TCC2P cards are not supported from Release 10.5.2 onwards. As a result, in a multishelf configuration, the TCC2/TCC2P cards cannot be a node controller or a shelf controller. Upgrade the TCC2/TCC2P card to a TCC3 card.

Note Cisco Transport Controller (CTC) views referenced in these procedures depend on the mode. In single-shelf mode, the views are network, node, and card. In multishelf mode, the views are network, multishelf, shelf, and card. For more information about CTC views, refer to CTC Enhancements, Operations, and Shortcuts.

- NTP-G139 Verifying Cisco Transport Planner Reports and Files, on page 52
- NTP-G22 Verifying Common Card Installation, on page 54
- NTP-G250 Verifying Digital Image Signing (DIS) Information, on page 56
- NTP-G144 Provisioning a Multishelf Node, on page 58
- Duplicate Node Controller, on page 61
- NTP-G23 Create Users and Assign Privileges, on page 61
- Setting Maximum Password Length Using CTC, on page 65
- NTP-G24 Setting Up Node Identification Information, on page 65
- NTP-G25 Setting Battery Power Monitor Thresholds, on page 67
- NTP-G26 Setting Up CTC Network Access, on page 69
- NTP-G194 Setting Up EMS Secure Access to the Node, on page 84
- NTP-G27 Setting Up the Node for Firewall Access, on page 84
- NTP-G28 Creating FTP Host, on page 86
- NTP-G132 Provisioning OSI, on page 89
- NTP-G143 Importing the Cisco Transport Planner NE Update Configuration File, on page 99
- NTP-G320 Configuring the Node as a Non-DWDM Network, on page 104
- NTP-G31 Installing the DWDM Dispersion Compensating Units, on page 106
- NTP-G239 Managing Passive Units and Passive Shelves, on page 107
- NTP-G152 Creating and Verifying Internal Patchcords, on page 112
- NTP-G242 Creating an Internal Patchcord Manually, on page 113
- NTP-G354 Creating an Internal Patchcord Manually Using the Trunk to Trunk (L2) Option, on page 114
- NTP-G209 Creating, Editing, and Deleting Optical Sides, on page 123
- NTP-G38 Provisioning OSC Terminations, on page 126
- NTP-G37 Running Automatic Node Setup, on page 128
- NTP-G163 Upgrading Nodes in Single-Shelf Mode to Multishelf Mode, on page 130
- NTP-G332 Upgrading Nodes in Single-Shelf Mode to Multishelf Mode with TCC2P Cards as Subtending Shelf Controller, on page 133
- DLP-G730 Editing the Shelf ID of the Subtending Shelf in a Multishelf Configuration Using the LCD, on page 135

NTP-G139 Verifying Cisco Transport Planner Reports and Files

Purpose	This procedure verifies that you have the Cisco Transport Planner reports and files needed to turn up the node.
Tools/Equipment	None
Prerequisite Procedures	Chapter 1, “Install the Cisco ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelf” in the Cisco ONS 15454 Hardware Installation Guide
Required/As Needed	Required

Onsite/Remote	Onsite
Security Level	Retrieve or higher

Procedure

Step 1 Verify that you have the Cisco Transport Planner reports and files shown in the following table for the node that you will provision. The reports and files can be provided in one of the following ways:

- If you have Cisco Transport Planner, verify that you have the electronic network design plan from which you can generate the reports in Cisco Transport Planner. For information about generating the reports, refer to the *Cisco Transport Planner DWDM Operations Guide*.
- If you do not have Cisco Transport Planner, you must have printouts of all reports listed in the following table except the Assisted Configuration Setup file. Assisted Configuration Setup is an electronic file that will be imported into CTC. You must be able to access it from the CTC computer used to provision the node
- If you not do not have all the reports and files listed in the following table, do not continue. See your site planner or network planner for the required information and files.

Step 2 Print the following table for reference. You will need information from the reports during node turn-up.

Stop. You have completed this procedure.

Cisco Transport Planner Node Setup Information and Files

Table 22: Cisco Transport Planner Node Setup Information and Files

Source	Format	Description
Shelf layout	JPG file	Cisco Transport Planner provides a shelf layout showing the cards that should be installed in each slot. Cisco Transport Planner can export each of these cards as a JPG file with a user-defined name.
Installation Parameters	Table	Provides the target reference values for the variable optical attenuators (VOAs), output power, optical thresholds, and amplifier configuration parameters.
Internal Connections	Table	Identifies the patchcords that must be installed within the shelf.
NE Update Configuration file	XML file	The Cisco Transport Planner NE Update configuration file is an electronic file with an XML extension and a name assigned by the network designer for the network you are provisioning. The file is imported into CTC where it preprovisions internal patchcords, optical sides and card parameters for optical cards, transponders, and passive units (DCUs and patch panels). It configures the ANS parameters based on the network calculated by Cisco Transport Planner.

Source	Format	Description
Traffic Matrix	Table	Shows the traffic flow within the node. During node turn-up, this report is used to identify the location of Y-cable protection groups.
Cable list	Table or list	A list of cables needed to provision the node. The list can be derived from the Internal Connections Report or from the Bill of Materials report prepared by Cisco Transport Planner.

NTP-G22 Verifying Common Card Installation

Purpose	This procedure verifies the following: • Cisco ONS 15454 shelf has two TCC2/ TCC2P/TCC3 cards installed. • Cisco ONS 15454 M6 and the Cisco ONS 15454 M2 shelves have TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O cards installed. • Cisco ONS 15454 M6 and the NCS 2015 shelves have TNCS/TNCO cards installed. It also verifies the installation of the AIC-I and MS-ISC-100T cards, if they are installed.
Tools/Equipment	None
Prerequisite Procedures	Install the Shelf in the *Cisco 15454 Hardware Installation Guide*
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	Retrieve or higher

Procedure

Step 1 Verify the following:

- TCC2/TCC2P/TCC3 cards are installed in Slots 7 and 11 on the ONS 15454 shelf.
- Two TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O/TNCS/TNCS-O cards are installed in Slots 1 and 8 on the ONS 15454 M6 shelf.
- A stand-alone TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O card is installed in Slot 1 on the ONS 15454 M2 shelf.
- Two TNCS/TNCS-O cards are installed in Slots 1and 17 on the NCS 2015 shelf.

Step 2 Verify that the FAIL LED is off on both the control cards.

Step 3 Verify that the green ACT (active) LED is illuminated on one control card and that the amber STBY (standby) LED is illuminated on the other control card.

Note If the control cards are not installed, or if their LEDs are not operating as described, do not continue. Complete the "DLP-G33 Install the TCC2, TCC2P, or TCC3 Card" or " Installing and Configuring the TNC, TNCE, TSC, TSCE, TNCS-2, TNCS-2O or TNCS/TNCS-O Card" task in the Cisco ONS 15454 Hardware Installation Guide.

Step 4 (On 15454-DWDM shelf) If the AIC-I card is installed, verify that it is installed in Slot 9 and that its ACT (active) LED displays a solid green light.

Note If the AIC-I card is not installed and the card is required by the Cisco Transport Planner shelf layout, or if it is installed and its LEDs are not operating as described, do not continue. Complete the "DLP-G34 Install the AIC-I Card" task in the Cisco ONS 15454 Hardware Installation Guide or refer to the *Cisco ONS 15454 DWDM Troubleshooting Guide* to resolve installation problems before proceeding to the next step.

Step 5 Verify that the software release shown on the LCD matches the software release required for your network. On the LCD, the software release is shown under the platform (SONET or SDH) and date/temperature. If the release does not match, perform one of the following procedures:

- Perform a software upgrade using the software CD. Refer to the release-specific software upgrade document.
- On ONS 15454, replace the TCC2/TCC2P/TCC3 cards with cards containing the correct release.
- On ONS 15454 M6, replace the LCD and TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O/TNCS/TNCS-O cards with cards containing the correct release.
- On ONS 15454 M2, replace the power module and TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O cards with cards containing the correct release.
- On NCS 2015, replace the LCD and TNCS/TNCS-O cards with cards containing the correct release.

Step 6 (On ONS 15454 shelf) If the node will be configured as a multishelf node, verify that redundant MS-ISC-100T cards are installed (Slots 6 and 12 are recommended) and that the green ACT (active) LED is illuminated on both cards.

Note If the MS-ISC-100T card is not installed and the card is required by the Cisco Transport Planner shelf layout, or if the card's LEDs are not operating as described, do not continue. Complete the "DLP-G309 Install the MS-ISC-100T Card" task in the Cisco ONS 15454 Hardware Installation Guide or refer to the *Cisco ONS 15454 DWDM Troubleshooting Guide* to resolve installation problems before proceeding to the next procedure.

Stop. You have completed this procedure.

NTP-G250 Verifying Digital Image Signing (DIS) Information

Purpose	This procedure retrieves the following information for the TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O/TNCS/TNCS-O cards: • Software signature information • Version of the digitally signed software • Public keys installed In a hybrid multi-shelf configuration involving ONS 15454 and ONS 15454 M6 shelf assemblies, DIS information is available for the ONS 15454 M6 shelf only.
Tools/Equipment	None
Prerequisite Procedures	• NTP-G22 Verifying Common Card Installation, on page 54 • DLP-G46 Log into CTC
Required/As Needed	As Needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve user

Procedure

Step 1 Do the following as applicable at the node where you want to verify the DIS information:

a) To retrieve the digitally signed software version, go to Step 2.
b) To retrieve the software signature information, go to Step 3.
c) To retrieve the public keys installed on the node, go to Step 4.

Step 2 In node view (single-shelf mode) or multishelf view (multishelf mode), click **Maintenance** > **Software** tab to retrieve the digitally signed software version. The following columns appear in the pane:

- Node—Displays the node name or IP address.
- Type—Displays the node type.
- **Node Status**—Displays the node status, which is based on the highest alarm level at the node.
- **Working Version**—Displays the working node software version (the general software release number [n.n.n] followed by the specific software release identification number). For example, 9.2.0 (09.20-X10E-02.06).
- **Protect Version**—Displays the protect node software version (the general software release number [n.n.n] followed by the specific software release identification number). For example, 9.2.0 (09.20-X10E-02.06).
- **Download Status**—Displays the status of any in-progress network software downloads.

Step 3 In node view (single-shelf mode) or shelf view (multishelf view), click **Maintenance** > **DIS** > **Info** > **Retrieve Signature Information** tabs to retrieve signature information. The following information is displayed in the pane:

- Attribute—The following information is displayed:
  - Organization Name—Displays the owner of the software image.
  - Organization Unit—Displays the business unit within Cisco.
  - Serial Number—Displays the serial number of the certificate with the digital signature.
  - Common Name—Displays the name of the platform.
  - Hash Algorithm—Displays the hashing algorithm used.
  - Image Type—Shows the type of the image-Development or Production.
  - Key Version—Indicates the key version used to digitally sign the image. A key version is identified with an alphabetical character that ranges from A to Z.
  - Sign Algorithm—Refers to the RSA algorithm.
  - Working Software Information—Displays the signature information of the working software.
  - Protect Software Information—Displays the signature information of the protect software.

Note To refresh the signature information, click **Refresh Signature Information.**

Step 4 In node view (single-shelf mode) or shelf view (multishelf mode), click **Maintenance** > **DIS** > **Available Keys** > **Retrieve All Keys** tabs to retrieve public key information. The following information is displayed in the pane:

- **Key Type—**Displays the public key available on the system for verification:
  - **Release Key—**Verifies release images.
  - **Development Key—**Verifies the development images.
- **Public Key Algorithm—**Displays the name of the algorithm used for public key cryptography.
- **Exponent—**Displays the exponent of the public key algorithm—release or development keys.
- **Key Version—**Displays the key version used for verification.
- **Modulus**—Displays the modulus of the public key algorithm with a size of 2048 bits.

Note To refresh the public key information, click **Refresh All Keys.**

Stop. You have completed this procedure.

NTP-G144 Provisioning a Multishelf Node

Purpose	This procedure provisions a multishelf node from CTC. A multishelf node consists of a control node and subtending shelves that are configured to operate as a single node.
Tools/Equipment	None

Prerequisite Procedures	• NTP-G22 Verifying Common Card Installation, on page 54
	• Cisco ONS 15454 Hardware Installation Guide:
	  • "NTP-G301 Connect the ONS 15454 Multishelf Node and Subtending Shelves to an MS-ISC-100T Card"
	  • "NTP-G302 Connect the ONS 15454 Multishelf Node and Subtending Shelves to a Catalyst 2950"
	  • "NTP-G295 Connect the ONS 15454 Multishelf Node and Subtending Shelves to a Catalyst 3560"
	  • "NTP-G296 Upgrade the ONS 15454 Multishelf with MS-ISC Card Configuration Using the Catalyst 3560"
	  • "NTP-G297 Upgrade the ONS 15454 Multishelf with Catalyst 2950 Configuration Using the Catalyst 3560"
	  • "NTP-G308 Connect the ONS 15454 M6 Multishelf Node and the ONS 15454 M6 Subtending Shelves"
	  • "NTP-G309 Connect the ONS 15454 M6 and the ONS 15454 in a Mixed Multishelf Configuration"
	  • NTP-G310 Upgrade the ONS 15454 Multishelf Configuration using the ONS 15454 M6
	• DLP-G46 Log into CTC

Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Superuser only

Caution An optical shelf in a multishelf configuration must be provisioned as the node controller shelf and not as a subtending shelf. Otherwise, traffic will be dropped. If there are no slots available on the optical shelf to install the MS-ISC-100T cards (needed for a node controller shelf), install and configure the Cisco Catalyst 2950 or Cisco Catalyst 3560. See the "NTP-G302 Connect the ONS 15454 Multishelf Node and Subtending Shelves to a Catalyst 2950" procedure or the "NTP-G295 Connect the ONS 15454 Multishelf Node and Subtending Shelves to a Catalyst 3560" procedure in the Cisco ONS 15454 Hardware Installation Guide. If you are using an ONS 15454 M6, then refer to the applicable procedure for connecting the ONS 15454 M6 as the node controller in the Cisco ONS 15454 Hardware Installation Guide.

Note If a standalone node has unsupported cards, the node cannot be converted to a node controller or a subtended shelf controller.

Note When a subtending shelf controller (SSC) having active and standby control cards is initially connected to the node controller, the Software Download In-progress alarm is not raised on the standby control card of SSC.

Procedure

Step 1 If you want to set up the login node as the node controller, complete the following steps. If not, continue with Step 2.

a) In node view (single-node mode) or multishelf view (multishelf mode), click the **Provisioning** > **General** > **Multishelf Config** tabs.

b) Click **Enable as Node Controller**.

c) From the LAN Config drop-down list, complete one of the following:

- Choose **Ethernet Switch** if MS-ISC-100T cards or the Catalyst 2950 or the Catalyst 3560 switches are already installed and configured. Choose the public VLAN ID and private VLAN ID for the ONS 15454 multishelf node. In case of ONS 15454 M6, the public VLAN ID and private VLAN ID are static (1 and 2 respectively).

  Note Before a SSC is connected to a multishelf node controller shelf, ensure **Ethernet Switch** is selected from the LAN Config drop-down list.

  Note Public VLAN ID is used by the node controller to communicate with the external network. Private VLAN ID is used by the node controller to communicate with the subtending shelves.

  Note If the ONS 15454 M6 shelf is used as the node controller, then you can connect the subtending shelves directly to the MSM ports on the ECU. However, a Catalyst 3560 switch can also be used along with the ONS 15454 M6 node controller to extend the number of subtending shelves.

- Choose **Stand-Alone** if MS-ISC-100T cards are not installed yet but will be included in the final layout. This option will allow a safe migration of the control card database when the multishelf configuration is complete.

d) Click **Apply**.
e) In the confirmation dialog box, click **Yes** to allow the node to reboot. The CTC view changes to network view and the node icon changes to gray. Wait for the reboot to finish. (This might take several minutes.)
f) After the node reboots, double-click the node. The multishelf view appears.

Note The shelf ID of the node controller is automatically assigned as 1.

Step 2 If you want to add a node as a subtending shelf in the multishelf configuration, complete the following steps. If not, you have completed this procedure.

Note A Cisco ONS 15454 node configured with TCC2P and TCC3 cards must not be added to a multishelf configuration containing either of the following configurations:

- Cisco ONS 15454 node with TCC3 as the node controller
- Cisco ONS 15454 M6 node with TNC as the node controller

a. In multishelf view, right-click the white space in the rack and choose **Add Shelf** from the shortcut menu.

b. Select the type of subtending shelf.

c. In the Shelf ID Selection dialog box, choose a shelf ID (from 2 to 50) from the drop-down list.

d. Click **OK**. The shelf appears in multishelf view.

e. Disconnect the cross-over (CAT-5) LAN cable from the RJ-45 LAN (TCP/IP) port of the ONS 15454 subtending shelf TCC2/TCC2P/TCC3 card in Slot 11 or Slot 7, or from the EMS RJ-45 LAN (TCP/IP) on the ONS 15454 M6 subtending shelf that correspond to the TNC/TNCE/TSC/TSCE card.

f. Connect your Windows PC or Solaris workstation network interface card (NIC) to the RJ-45 LAN (TCP/IP) port on the TCC2/TCC2P/TCC3 card in Slot 11 or Slot 7, or to the EMS RJ-45 LAN (TCP/IP) on the ONS 15454 M6 subtending shelf that correspond to the TNC/TNCE/TSC/TSCE card.

g. Complete the DLP-G46 Log into CTC task at the subtending shelf.

h. Click the **Provisioning** > **General** > **Multishelf Config** tabs.

i. Click **Enable as Subtended Shelf**.

j. From the Shelf ID drop-down list, choose the shelf ID that you created in Step c.

k. Click **Apply**.

l. In the confirmation dialog box, click **Yes** to reboot the shelf. The CTC view changes to network view and the node icon changes to gray. Wait for the reboot to finish. (This might take several minutes.)

m. Disconnect your Windows PC or Solaris workstation NIC from the RJ-45 LAN (TCP/IP) port of the ONS 15454 subtending shelf TCC2/TCC2P/TCC3 card in Slot 11 or Slot 7, or from the EMS RJ-45 LAN (TCP/IP) on the ONS 15454 M6 subtending shelf that correspond to the TNC/TNCE/TSC/TSCE card.

n. Reconnect the cross-over (CAT-5) LAN cable (disconnected in Step e) to the RJ-45 LAN (TCP/IP) port of the subtending shelf TCC2/TCC2P/TCC3 card in Slot 11 or Slot 7, or to the EMS RJ-45 LAN (TCP/IP) on the ONS 15454 M6 subtending shelf that correspond to the TNC/TNCE/TSC/TSCE card.

o. Repeat Steps a through n to set up additional subtending shelves.

Note To connect the subtending shelves to the node controller, refer to the applicable procedures in the Cisco ONS 15454 Hardware Installation Guide.

Note Non-LAN connected Multishelf nodes are not manageable from CTC unless SOCKS Proxy is enabled on the node.

Stop. You have completed this procedure.

Duplicate Node Controller

(Only on ONS 15454 M6 and NCS 2015) When a TNC/TNC-E/TSC/TSC-E/TNCS/TNCS-2/TNCS-2O/TNCS-O node controller connects to the same switch where an ONS 15454 M6 or NCS 2015 node controller exists, both the node controllers raise the critical Duplicate Node Controller (DUP-NC) alarm. The subtending shelves of both the node controllers raise the Shelf Communication Failure (SHELF-COMM-FAIL) alarm. Both the node controllers and their subtending shelves shut down their ports on ASIC towards the MSM ports in ECU. However, the traffic is not affected. This feature enables the original node to operate seamlessly in case of such misconfigurations, without the risk of its subtending shelves treating the new node controller as its primary.

The duplicate node controller can be any one of the following combinations.

- A node controller without any subtending shelf.
- A node controller with one or more subtending shelves connected through switch or daisy chain.

Recovering the Duplicate Node Controller

Note It is recommended to recover the nodes from the DUP-NC critical alarm in less than ten minutes.

Perform the following steps to recover the duplicate node controller.

- Disconnect the duplicate node controller's cable from switch.
- Perform soft reset of the active control card on both the node controllers. The DUP-NC alarm clears.
- Perform hard reset of the active control card on the subtending shelves to restore the multi-shelf.

NTP-G23 Create Users and Assign Privileges

Purpose	This procedure creates users and assigns their privilege levels.
Tools/Equipment	None

Prerequisite Procedures	• NTP-G22 Verifying Common Card Installation • DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Superuser only

Procedure

Step 1 Log into the node where you need to create users.

Note You must log in as a Superuser to create additional users. The root user can be used to set up other users.

Step 2 Complete the DLP-G54 Create a Local User on a Single Node Using CTC or the DLP-G55 Creating a New User on Multiple Nodes as needed.

Note You must add the same user name and password to each node that a user will access.

Step 3 Complete the DLP-G282 Viewing and Terminating Active Logins as needed.

Step 4 If you want to modify the security policy settings, including password aging and idle user timeout policies, complete the NTP-G88 Modify Users and Change Security procedure.

Stop. You have completed this procedure.

DLP-G54 Create a Local User on a Single Node Using CTC

Purpose	This task creates a local user on a single node.
Tools/Equipment	None
Prerequisite Procedures	• DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Superuser only

Procedure

Step 1 In node view or network view, click the **Provisioning** > **Security** > **Users** tabs.

Step 2 In the Users window, click **Create**.

Step 3 In the Create User dialog box, enter the following:

- Name—Type the user name. The user name must be a minimum of six and a maximum of 40 characters (only up to 39 characters for the TACACS and RADIUS authentication). It includes alphanumeric (a-z, A-Z, 0-9) characters and the allowed special characters are @, " - " (hyphen), and " . " (dot). For TL1 compatibility, the user name must be of 6 to 10 characters.
- Password—Type the user password.

  Note The password change of root user is not supported from CTC.

  The minimum password length for CTC is six and maximum of 127 characters. To set the maximum length of a password, refer to . The password must be a combination of alphanumeric (a-z, A-Z, 0-9) and special (+, #,%) characters, where at least two characters are not alphabetic and at least one character is a special character; or the password can contain any character. The password must not contain the user name.
- Confirm Password—Type the password again to confirm it.
- Security Level—Choose a security level for the user: **RETRIEVE**, **MAINTENANCE**, **PROVISIONING**, or **SUPERUSER**.

Step 4 Click **OK**.

Step 5 Return to your originating procedure (NTP).

DLP-G55 Creating a New User on Multiple Nodes

Purpose	This task adds a new user to multiple ONS 15454 nodes managed by CTC.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Superuser only

Note All nodes where you want to add users must be accessible in network view.

Procedure

Step 1 From the View menu, choose **Go to Network View**.

Step 2 Click the **Provisioning** > **Security** > **Users** tabs.

Step 3 In the Users window, click **Create**.

Step 4 In the Create User dialog box, enter the following:

- Name—Type the user name. The user name must be a minimum of six and a maximum of 40 characters (only up to 39 characters for the TACACS and RADIUS authentication). It includes alphanumeric (a-z, A-Z, 0-9) characters and the allowed special characters are @, " - " (hyphen), and " . " (dot). For TL1 compatibility, the user name must be of 6 to 10 characters.
- Password—Type the user password.

  The password length, by default, is set to a minimum of six and a maximum of 127 characters. To set the maximum length of a password, refer to Setting Maximum Password Length Using CTC, on page 65. The minimum length can be set to two, four, eight, ten or twelve characters, and the maximum length to 127 characters. The password must be a combination of alphanumeric (a-z, A-Z, 0-9) and special (+, #,%) characters, where at least two characters are not alphabetic and at least one character is a special character; or the password can contain any character. The password must not contain the user name.
- Confirm Password—Type the password again to confirm it.
- Security Level—Choose a security level for the user: **RETRIEVE**, **MAINTENANCE**, **PROVISIONING**, or **SUPERUSER**.

  Note Each security level has a different idle time. The idle time is the length of time that CTC can remain idle before it locks up and the password must be reentered. The defaults are: Retrieve user = unlimited, Maintenance user = 60 minutes, Provisioning user = 30 minutes, and Superuser = 15 minutes. To change the idle times, refer to the NTP-G88 Modify Users and Change Security procedure.

  TACACS idle timeout considerations:

  - From release 11.1.2.3 onwards, the TACACS server sends the idle timeout value in the minute unit. Previously, the idle timeout value was measured in the second unit. After you upgrade to release 11.1.2.3, the idle timeout unit gets adjusted to minute unit from the second unit.

    Example: On the TACACS server, the idle timeout value of 900 seconds gets changed to 15 minutes after you upgrade to release 11.1.2.3.
  - The default idle timeout value on the TACACS server is 60 minutes. If you set an idle timeout value on the ISE/ACS TACACS server, the TACACS authenticated sessions expire once the idle timeout value is reached. However, the CTC sessions remain open if the CTC client is active after the idle timeout is expired.

Step 5 In the Select Applicable Nodes area, deselect any nodes where you do not want to add the user (all network nodes are selected by default).

Step 6 Click **OK**.

Step 7 In the User Creation Results dialog box, verify that the user was added to all the nodes chosen in Step 5. If not, click **OK** and repeat Steps 2 through 6. If the user was added to all nodes, click **OK** and continue with the next step.

Step 8 Return to your originating procedure (NTP).

Setting Maximum Password Length Using CTC

Purpose	This task sets the maximum password length for a local user.
Tools/Equipment	None
Prerequisite Procedures	• DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Superuser only

Procedure

Step 1 In node view, click the **Provisioning** > **Security** > **Policy** tabs.

Step 2 In the **Password Complexity** area, click **Maximum Length** drop-down list and choose the desired maximum length for password.

Note The maximum password length for CTC is of 20, 80, or 127 characters.

Step 3 Click **Apply**.

Step 4 Return to your originating procedure (NTP).

NTP-G24 Setting Up Node Identification Information

Purpose	This procedure provisions node identification information, including the node name, node alias, a contact name with phone number, the location of the node, and the date, time, and time zone.
Tools/Equipment	None
Prerequisite Procedures	• NTP-G22 Verifying Common Card Installation, on page 54 • DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Procedure

Step 1 Log into the node that is to be turned up. If you are already logged in, go to Step 2.

Step 2 In node view (single-shelf mode) or multishelf view (multishelf mode), click the **Provisioning** > **General** > **General** tabs.

Step 3 In the Node Name/TID field, type a name for the node. For TL1 compliance, names must begin with an alpha character and have no more than 20 alphanumeric (a-z, A-Z, 0-9) characters.

Note To avoid errors when you import the Cisco Transport Planner configuration file using the NTP-G143 Importing the Cisco Transport Planner NE Update Configuration File, on page 99, the CTC node name and the Cisco Transport Planner site name must either be the same or at least easy to identify.

Step 4 (Optional) In the Contact field, type the name of the node contact person and the phone number, using up to 255 characters.

Step 5 (Optional) In the Node Alias field, type the alias of the node, up to 128 characters. For TL1 compliance, the alias must not contain any commas, colons, or semi-colons. It does not support any international characters set.

Note Node alias is displayed when the node is in the discovered state. It shows as a tool tip in the Network Map and Explorer Tree of the CTC. It also shows as a separate column in the Tab View pane of the Network view.

Step 6 (Optional) In the Latitude field, enter the node latitude: N (north) or S (south), degrees, and minutes.

Step 7 (Optional) In the Longitude field, enter the node longitude: E (east) or W (west), degrees, and minutes.

Note The latitude and longitude values indicate only the geographical position of the nodes in the actual network and not the CTC node position.

Step 8 (Optional) In the Description field, type a description of the node. The description can be a maximum of 255 characters.

Step 9 (Optional) Check the Use NTP/SNTP Server check box if you want CTC to use a Network Time Protocol (NTP) or Simple Network Time Protocol (SNTP) server to set the date and time of the node. Using an NTP or SNTP server ensures that all the network nodes use the same date and time reference. The server synchronizes the node's time after power outages or software upgrades.

a) If you check the Use NTP/SNTP Server check box, complete the following fields:

- Use NTP/SNTP Server—Type the IP address of the primary NTP/SNTP server connected to the chassis or of another ONS 15454/15600/15310-CL/15310-MA as GNE with NTP/SNTP enabled that is connected to the ONS 15454 ENE.
- Backup NTP/SNTP Server—Type the IP address of the secondary NTP/SNTP server connected to the chassis or of another ONS 15454/15600/15310-CL/15310-MA as GNE with NTP/SNTP enabled that is connected to the ONS 15454 ENE.

  When the primary NTP/SNTP server fails or is not reachable, the node uses the secondary NTP/SNTP server to synchronize its date and time. If both the primary and secondary NTP/SNTP servers fail or are not reachable, an SNTP-FAIL alarm is raised. The node checks for the availability of the primary or secondary NTP/SNTP server at regular intervals until it can get the time from any one of the NTP/SNTP servers. After the node gets the time from any one server, it synchronizes its date and time with the server's date and time and the SNTP-FAIL alarm is cleared. For each retry and

resynchronization, the node checks the availability of the primary NTP/SNTP server first, followed by the secondary NTP/SNTP server. The node synchronizes its date and time every hour.

Note You will not be able to identify which NTP/SNTP server is being used for synchronization.

Note If you plan to check gateway network element (GNE) for the SOCKS proxy server (see DLP-G56 Provisioning IP Settings, on page 70), external nodes must reference the gateway for NTP/SNTP timing. For more information about the gateway settings, refer to "Manage Network Connectivity" chapter.

Caution If you reference another ONS 15454 for the NTP/SNTP server, make sure that the second ONS 15454 references an NTP/SNTP server and not the first ONS 15454 (that is, do not create an NTP/SNTP timing loop by having two ONS 15454 nodes reference each other).

b) If you do not check Use SNTP/NTP Server, complete the Date and Time fields. The node will use these fields for alarm dates and times. By default, CTC displays all alarms in the CTC computer time zone for consistency. To change the display to the node time zone, complete the DLP-G118 Display Alarms and Conditions Using Time Zone task.

- Date—Type the current date in the format m/d/yyyy, for example, September 24, 2002 is 9/24/2002.
- Time—Type the current time in the format hh:mm:ss, for example, 11:24:58. The node uses a 24-hour clock, so 10:00 PM is entered as 22:00:00.

Step 10 Click the Time Zone field and choose a city within your time zone from the drop-down list. The list displays the 80 World Time Zones from –11 through 0 (GMT) to +14. Continental United States time zones are GMT-05:00 (Eastern), GMT-06:00 (Central), GMT-07:00 (Mountain), and GMT-08:00 (Pacific).

Step 11 Check the Use Daylight Savings Time check box if the time zone that you chose uses Daylight Savings Time.

Note The Insert AIS-V on STS-1 SD-P and SD-P BER field are not used in DWDM networks.

Step 12 Click **Apply**.

Step 13 In the confirmation dialog box, click **Yes**.

Step 14 Review the node information. If you need to make corrections, repeat Steps 3 through 12 to enter corrections. If the information is correct, continue with the NTP-G25 Setting Battery Power Monitor Thresholds, on page 67.

Stop. You have completed this procedure.

NTP-G25 Setting Battery Power Monitor Thresholds

Purpose	This procedure provisions extreme high, low, and extreme low input battery power thresholds within a –48 VDC environment.
Tools/Equipment	None

Prerequisite Procedures	• NTP-G22 Verifying Common Card Installation, on page 54 • DLP-G46 Log into CTC
Required/As Needed	Required
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Caution The default battery voltage thresholds are normally not changed. Threshold changes should only be performed at the direction of your site administrator.

The voltage threshold range for each battery is -40.5 to -72.0.

Note When the thresholds are crossed, the control card generates warning alarms in CTC. For power specifications, see the Hardware Specifications.

Procedure

Step 1 Login to the node that you will set up. If you are already logged in, continue with Step 2.

Step 2 In node view (single-shelf mode) or shelf view (multishelf mode), click the **Provisioning** > **General** > **Power Monitor** tabs.

Note In multishelf mode, power monitor thresholds must be provisioned separately for each shelf within the multishelf including the node controller and all subtending shelves.

Step 3 To change the extreme low battery voltage threshold in 0.5 VDC increments, choose a voltage from the ELWBATVGVdc drop-down list. The default value is -40.5.

Step 4 To change the low battery voltage threshold in 0.5 VDC increments, choose a voltage from the LWBATVGVdc drop-down list. The default value is -44.

Step 5 To change the high battery voltage threshold in 0.5 VDC increments, choose a voltage from the HIBATVGVdc drop-down list. The default value is -54.

Step 6 To change the extreme high battery voltage threshold in 0.5 VDC increments, choose a voltage from the EHIBATVGVdc drop-down list. The default value is -56.5.

Step 7 Click **Apply**.

Stop. You have completed this procedure.

NTP-G26 Setting Up CTC Network Access

Purpose	This procedure provisions network access for a node, including its subnet mask, default router, Dynamic Host Configuration Protocol (DHCP) server, Internet Inter-Orb Protocol (IIOP) listener port, gateway settings, static routes, Open Shortest Path First (OSPF) protocol, Routing Information Protocol (RIP), and designated SOCKS servers.
Tools/Equipment	None
Prerequisite Procedures	NTP-G22 Verifying Common Card Installation, on page 54
Required/As Needed	Required
Onsite/Remote	Onsite or remote
Security Level	Superuser only

Procedure

Step 1 Complete the DLP-G46 Log into CTC task. If you are already logged in, continue with Step 2.

Step 2 Complete the DLP-G56 Provisioning IP Settings, on page 70 to provision the ONS 15454 IP address, subnet mask, default router, DHCP server, IIOP listener port, and SOCKS proxy server settings.

If you cannot log into the node, you can change its IP address, default router, and network mask by using the LCD on the ONS 15454 fan-tray assembly (unless LCD provisioning is suppressed). See the DLP-G57 Setting the IP Address, Default Router, and Network Mask Using the LCD, on page 75 for instructions. However, you cannot use the LCD to provision any other network settings. In an ONS 15454 M2 shelf assembly, the LCD is on the fan-tray assembly. In a ONS 15454 M6 shelf assembly, the LCD is a separate unit installed above the external connection unit (ECU). In a ONS 15454 M15 shelf assembly, the LCD unit is integrated with the fan tray assembly

Note When accessing CTC from a machine running Windows XP operating system, CTC may sometimes fail to reconnect to a GNE when the GNE proxies for several ENE nodes (approximately 15 ENE nodes). This can happen when there is a side switch or when the LAN is enabled/disabled. This is due to the Windows XP operating system limiting the number of simultaneous TCP/IP connection attempts. As a workaround, close the existing CTC session and relaunch CTC on the GNE node. You can configure a designated socks server list on the CTC to mitigate the problem.

Step 3 If the control cards are installed and you want to turn on the secure mode, which allows two IP addresses to be provisioned for the node, complete the DLP-G264 Enabling Node Security Mode, on page 77. Secure mode is not available if TCC2 cards are installed.

Step 4 If static routes are needed, complete the DLP-G58 Creating a Static Route, on page 79. For more information about static routes, see Managing Network Connectivity.

Step 5 If the ONS 15454 is connected to a LAN or WAN that uses OSPF and you want to share routing information between the LAN or WAN and the ONS network, complete the DLP-G59 Setting Up or Changing Open Shortest Path First Protocol, on page 80.

Step 6 If the ONS 15454 is connected to a LAN or WAN that uses RIP, complete the DLP-G60 Setting Up or Changing Routing Information Protocol, on page 83.

Step 7 Complete the DLP-G439 Provisioning the Designated SOCKS Servers, on page 73 after the network is provisioned and one or more of the following conditions exist:

- SOCKS proxy is enabled.
- The ratio of ENEs to GNEs is greater than eight to one.
- Most ENEs do not have LAN connectivity.

Stop. You have completed this procedure.

DLP-G56 Provisioning IP Settings

Purpose	This task provisions IP settings, which includes the IP address, IP address version, default router, DHCP access, firewall access, and SOCKS proxy server settings for ONS 15454 node.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	Required
Onsite/Remote	Onsite or remote
Security Level	Superuser only

Caution All network changes should be approved by your network (or LAN) administrator.

Caution Verify that the IPv4 or IPv6 addresses assigned to the node are unique in the network. Duplicate IP addresses in the same network cause loss of visibility.

Procedure

Step 1 In node view (single-shelf mode) or multishelf view (multishelf mode), click the **Provisioning** > **Network** > **General** tabs.

Step 2 Complete the following information in the fields listed:

- IP Address—Type the IP address assigned to the ONS 15454 node.

Note If the control cards are installed, dual IP addressing is available using the secure mode. When secure mode is off (sometimes called repeater mode), the IP address entered in the IP Address field applies to the backplane LAN port (ONS 15454), EMS RJ-45 port or Craft port on the ECU (ONS 15454 M6), EMS RJ-45 port on the power module (ONS 15454 M2), and the control card (LAN) port. When secure mode is on, the IP Address field shows the address assigned to the control card (LAN) port and the Superuser can enable or disable display of the backplane IP address. See the DLP-G264 Enabling Node Security Mode, on page 77 as needed. See Managing Network Connectivity chapter for more information about secure mode.

- Net/Subnet Mask Length—Type the subnet mask length (decimal number representing the subnet mask length in bits) or click the arrows to adjust the subnet mask length.
- MAC Address—(Display only) Displays the IEEE 802 MAC address.

Note In secure mode, the front and back TCP/IP (LAN) ports are assigned different MAC addresses, and the backplane information can be hidden or revealed by a Superuser.

- Default Router—If the node is connected to a LAN, enter the IP address of the default router. The default router forwards packets to network devices that the node cannot directly access. This field is ignored if any of the following are true:
  - The node is not connected to a LAN.
  - The SOCKS proxy server is enabled and the node is provisioned as an end network element (ENE).
  - OSPF is enabled on both the node and the LAN where the node is connected. (OSPF is provisioned in the DLP-G59 Setting Up or Changing Open Shortest Path First Protocol, on page 80.)
- LCD IP Setting—Choose one of the following:
  - **Allow Configuration**—Displays the node IP address on the LCD and allows users to change the IP settings using the LCD. This option enables the DLP-G57 Setting the IP Address, Default Router, and Network Mask Using the LCD, on page 75.
  - **Display Only**—Displays the node IP address on the LCD but does not allow users to change the IP settings using the LCD.
  - **Suppress Display**—Suppresses the node IP address display on the LCD.
- Suppress CTC IP Display—Check this check box if you want to prevent the node IP address from appearing in CTC to users with Provisioning, Maintenance, or Retrieve security levels. (The IP address suppression is not applied to users with Superuser security level.)

Note IP address suppression is not applied to users with Superuser security level. However, in secure mode the backplane IP address visibility can be restricted to only a locally connected Superuser viewing the routing table. In this case, the backplane IP address is not revealed to any user at any other NE, either on the routing table or in autonomous messages (such as the TL1 REPT DBCHG message, alarms, and performance monitoring [PM] reporting).

- IPv6 Configuration—Allows provisioning of IPv6 addresses. After you provision an IPv6 address, you can access the device using the IPv6 address. Configure these settings only if you want to enable IPv6 on the node. IPv6 cannot be configured using the LCD push buttons.

- Enable IPv6—Select this check box to assign an IPv6 address to the node. The IPv6 Address, Prefix Length, and IPv6 Default Router fields are enabled only if this check box is selected. The check box is disabled by default.

  Note Enable SOCKS Proxy on Port check box is enabled when you enable IPv6 and can be disabled only when IPv6 is disabled.

  Note By default, when IPv6 is enabled, the node processes both IPv4 and IPv6 packets on the LAN interface. If you want the node to process only IPv6 packets, you need to disable IPv4 on the node. For more information, see DLP-G317 Change Node Access and PM Clearing Privilege.

- IPv6 Address—Enter the IPv6 address that you want to assign to the node. This IP address is the global unicast IPv6 address. This field is disabled if the Enable IPv6 check box is not selected.
- Prefix Length—Enter the prefix length of the IPv6 address. This field is disabled if the Enable IPv6 check box is not selected.
- IPv6 Default Router—Enter the IPv6 address of the default router of the IPv6 NE. This is optional. This field is disabled if the Enable IPv6 check box is not selected.

  Note The DWDM node uses NAT-PT internally to support native IPv6. NAT-PT uses the IPv4 address range 128.0.0.0 to 128.0.1.254 for packet translation. Do not use this address range when you enable IPv6 feature.

  Note You can provision IPv6 in secure or nonsecure mode. To enable secure mode, see DLP-G264 Enabling Node Security Mode, on page 77.

- Forward DHCP Request To—Check this check box to enable DHCP. Also, enter the DHCP server IP address in the Request To field. Unchecked is the default. If you will enable any of the gateway settings to implement the SOCKS proxy server features, do not check this check box.

  Note If you enable DHCP, computers connected to the node can obtain temporary IP addresses from an external DHCP server. The node only forwards DHCP requests; it does not act as a DHCP server.

- Gateway Settings—Provisions the SOCKS proxy server features. (SOCKS is a standard proxy protocol for IP-based applications.) Do not change these options until you review Scenario 7 “Provisioning the ONS 15454 Proxy Server” in "Manage Network Connectivity" chapter. In SOCKS proxy server networks, the node is either an ENE, a GNE, or a proxy-only server. Provisioning must be consistent for each NE type.
- Enable SOCKS proxy server on port—If checked, the node serves as a proxy for connections between CTC clients and nodes that are connected by data communications channels (DCCs) to the proxy node. The CTC client establishes connections to DCC-connected nodes through the proxy node. The CTC client does not require IP connectivity to the DCC-connected nodes; it only requires IP connectivity to the proxy node. If the Enable SOCKS proxy server on port check box is unchecked, the node does not proxy for any CTC clients. When this box is checked, you can provision one of the following options:
  - **External Network Element (ENE)**—Choose this option when the node is not connected to a LAN but has DCC connections to other nodes. A CTC computer connected to the ENE through the control card TCP/IP (craft) port can manage nodes that have DCC connections to the ENE. However, the CTC computer does not have direct IP connectivity to these nodes or to any LAN or WAN that those nodes might be connected to.

- **Gateway Network Element (GNE)**—Choose this option when the node is connected to a LAN and has DCC connections to other nodes. A CTC computer connected to the LAN can manage all nodes that have DCC connections to the GNE, but the CTC computer does not have direct IP connectivity to them. The GNE option isolates the LAN from the DCC network so that IP traffic originating from the DCC-connected nodes and any CTC computers connected to them is prevented from reaching the LAN.
- **SOCKS proxy only**—Choose this option when the node is connected to a LAN and the LAN is separated from the node by a firewall. The SOCKS proxy only option is the same as the GNE option, except that the SOCKS proxy only option does not isolate the DCC network from the LAN.

Note If a node is provisioned in secure mode, it is automatically provisioned as a GNE with SOCKS proxy enabled. However, this provisioning can be overridden, and the secure node can be changed to an ENE. In secure mode, SOCKS cannot be disabled. For information about provisioning, including GNE and ENE status, see the DLP-G264 Enabling Node Security Mode, on page 77.

Step 3 Click **Apply**.

Step 4 Click **Yes** in the confirmation dialog box.

The control cards reboot one at a time if changes were made to the IP address, subnet mask, or gateway settings. During this time (approximately 5 to 6 minutes), the active and standby control card LEDs will blink, turn on, and turn off at different intervals. Eventually, a "Lost node connection, switching to network view" message appears.

Step 5 Click **OK**. The network view appears. The node icon appears in gray, during which time you cannot access the node.

Step 6 Double-click the node icon when it becomes green.

Step 7 Return to your originating procedure (NTP).

DLP-G439 Provisioning the Designated SOCKS Servers

Purpose	This task identifies the ONS 15454 SOCKS servers in SOCKS-proxy-enabled networks. Identifying the SOCKS servers reduces the amount of time required to log into a node and have all NEs appear in network view (NE discovery time). The task is recommended when the combined CTC login and NE discovery time is greater than five minutes in networks with SOCKS proxy enabled. Long (or failed) login and NE discovery times can occur in networks that have a high ENE-to-GNE ratio and a low number of ENEs with LAN connectivity.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	Required
Onsite/Remote	Onsite or remote

Security Level	Superuser only

Note To complete this task, you must have either the IP addresses or DNS names of all the nodes in the network with LAN access that have SOCKS proxy enabled.

Note SOCKS proxy servers can be any accessible ONS network nodes that have LAN access, including the ONS 15310-MA, ONS 15310-CL, ONS 15454, ONS 15454 SDH, ONS 15600, ONS 15600 SDH, ONS 15454 M6, and ONS 15454 M2 nodes.

Note You must repeat this task any time that changes to SOCKS proxy server nodes occur, for example, whenever LAN connectivity is added to or removed from a node, or when nodes are added or removed from the network.

Note If you cannot log into a network node, complete the DLP-G46 Log into CTC task choosing the Disable Network Discovery option. Complete this task, then login again with network discovery enabled.

Procedure

Step 1 From the CTC Edit menu, choose **Preferences**.

Step 2 In the Preferences dialog box, click the **SOCKS** tab.

Step 3 In the Designated SOCKS Server field, type the IP address or DNS node name of the first SOCKS server. The server that you enter must have SOCKS proxy server enabled, and it must have LAN access.

Step 4 Click **Add**. The node is added to the SOCKS server list. If you need to remove a node on the list, click **Remove**.

Step 5 Repeat Steps 3 and 4 to add all qualified nodes within the network. Add all the nodes that have SOCKS proxy enabled and are connected to the LAN.

Step 6 Click **Check All Servers**. CTC verifies that all nodes can perform as SOCKS servers. Once verified, a check is placed next to the node IP address or node name in the SOCKS server list. An X placed next to the node indicates one or more of the following:

- The entry does not correspond to a valid DNS name.
- The numeric IP address is invalid.
- The node cannot be reached.
- The node can be reached, but the SOCKS port cannot be accessed, for example, a firewall problem might exist.

Step 7 Click **Apply**. The list of nodes, including ones that received an X in Step 6, are added as SOCKS servers.

Step 8 Click **OK** to close the Preferences dialog box.

Step 9 Return to your originating procedure (NTP).

DLP-G57 Setting the IP Address, Default Router, and Network Mask Using the LCD

Purpose	This task changes the ONS 15454 IP address, default router, and network mask using the LCD on the fan-tray assembly. Use this task if you cannot log into CTC. In a ONS 15454 M2 shelf assembly, the LCD is on the fan-tray assembly. In a ONS 15454 M6 shelf assembly, the LCD is a separate unit installed above the external connection unit (ECU). In a ONS 15454 M15 shelf assembly, the LCD unit is integrated with the fan tray assembly.
Tools/Equipment	None
Prerequisite Procedures	Installing the TNC, TNCE, TSCE, TNCS-2, TNCS-2O, TNCS-O, or TNCS Card, on page 36
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Note You cannot perform this task if the LCD IP Display field on the node view Provisioning > Network tab is set to Display Only or Suppress Display. See the DLP-G56 Provisioning IP Settings, on page 70 to view or change the LCD IP Display field. If the node is locked in secure mode with the LCD display disabled, you will not be able to change this provisioning unless the lock is disabled by Cisco Technical Support. See Managing Network Connectivity chapter for more information about secure mode.

Note The LCD reverts to normal display mode after 5 seconds of button inactivity.

Procedure

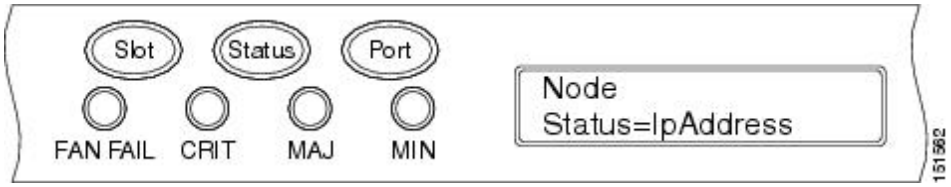
Step 1 On the ONS 15454 front panel, repeatedly press the **Slot** button until SHELF appears on the first line of the LCD. You are in the Shelf menu.

Note In a ONS 15454 M2 shelf assembly, the LCD panel and the **Slot**, **Port**, and **Status** buttons are present on the fan-tray assembly. In a ONS 15454 M6 shelf assembly, the LCD is a separate unit installed above the external connection unit (ECU); the **Slot**, **Port**, and **Status** buttons are present on the LCD unit. In a ONS 15454 M15 shelf assembly, the **Slot**, **Port**, and **Status** buttons are present on the LCD unit that is integrated with the fan tray assembly.

Step 2 Repeatedly press the **Port** button until the following information appears:

- To change the node IP address, Node Status=IpAddress
- To change the node network mask, Node Status=Net Mask
- To change the default router IP address, Node Status=Default Rtr

Figure 9: Selecting the IP Address Option

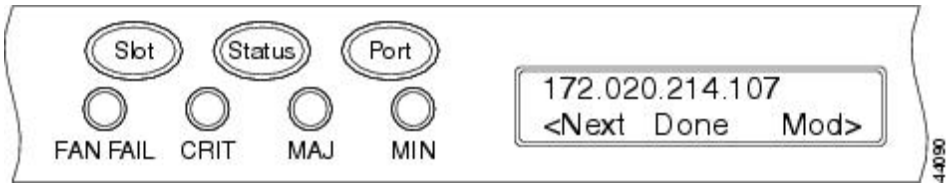


Step 3 Press the **Status** button to display the node IP address, the node subnet mask length, or the default router IP address.

The following IP addresses are displayed in the LCD one after the other:

- Regular IP—Node IP address that is used to access the node when the controller card is in nonsecure mode.
- Secure IP (15454 secure mode IP)—IP address that is assigned to the backplane LAN port. This port connects the node to an operations support system (OSS) through a central office LAN or private enterprise network. This IP address becomes a private address in the secure mode and prevents the front-access craft port user from accessing the LAN through the backplane port.

Figure 10: Changing the IP Address



Step 4 Push the **Slot** button to move to the digit of the IP address, subnet mask, or default router that you want to change. The selected digit flashes.

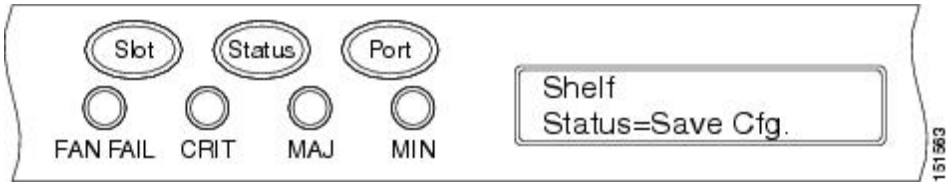
Tip The Slot, Status, and Port button positions correspond to the positions of the commands shown on the LCD. For example, you press the Slot button to invoke the Next command and the Status button to invoke the Done command.

Step 5 Press the **Port** button to cycle the IP address, subnet mask, or default router to the correct digit.

Step 6 When the change is complete, press the **Status** button to return to the relevant Node Status menu.

Step 7 Repeatedly press the **Port** button until the Shelf Save Configuration option appears.

Figure 11: Selecting the Save Configuration Option



Step 8 Press the **Status** button to choose the Save Configuration option.

A Save and REBOOT message appears.

Figure 12: Saving and Rebooting the Control Card

Step 9 Press the **Slot** button to apply the new IP address, subnet mask, or default router configuration or press **Port** to cancel the configuration.

Note The IP address and default router must be on the same subnet. If not, you cannot apply the configuration.

Step 10 Saving the new configuration causes the control cards to reboot. During the reboot, a message appears on the LCD. The LCD returns to the normal alternating display after both the control cards finish rebooting.

Step 11 Return to your originating procedure (NTP).

DLP-G264 Enabling Node Security Mode

Purpose	This task enables the security mode. When security mode is enabled, two IP addresses are assigned to the node. One address is assigned to the backplane LAN port (ONS 15454) or to the EMS port (ONS 15454 M2 and ONS 15454 M6). The other address is assigned to the RJ-45 TCP/IP (LAN) port of the control cards. The TCC2 card does not support security mode. The security mode options are not available in CTC if TCC2 cards or a mix of TCC2 and TCC2P cards are installed.
Tools/Equipment	The control cards must be installed.
Prerequisite Procedures	• NTP-G103 Backing Up the Database • DLP-G46 Log into CTC `
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Superuser only

Caution The IP address assigned to the control card TCP/IP (LAN) port must reside on a different subnet from the backplane LAN port (ONS 15454) and the EMS port (ONS 15454 M2 and ONS 15454 M6). Verify that the new control card IP address meets this requirement.

Note The node will reboot after you complete this task, causing a temporary disconnection between the CTC computer and the node.

Note If an OTS-to-OTS PPC is created between nodes, it will no longer function if the node Security Mode is enabled. The reason for this is that if the Secure mode is enabled, it is no longer possible for the DCN extension feature to use the LAN interface to extend the internal network (due to the network isolation in this configuration mode). The result is that the topology discovery on the OTS-to-OTS PPC no longer operates.

Procedure

Step 1 Click the **Provisioning** > **Security** > **Data Comm** tabs.

Step 2 Click **Change Mode**.

Step 3 Review the information on the Change Secure Mode page, then click **Next**.

Step 4 On the Ethernet Port page, enter the IP address and subnet mask for the the control card LAN port.

Step 5 Click **Next**.

Step 6 If needed, on the Backplane Ethernet Port page, modify the backplane IP address, subnet mask, and default router. You normally do not modify these fields if no network changes have occurred.

Step 7 Click **Next**.

Step 8 On the SOCKS Proxy Server Settings page, choose one of the following options:

- **External Network Element (ENE)**—If selected, the CTC computer is only visible to the ONS 15454 where the CTC computer is connected. The CTC computer is not visible to the nodes connected to the DCC. In addition, firewall is enabled, which means that the node prevents IP traffic from being routed between the DCC and the LAN port.
- **Gateway Network Element (GNE)**—If selected, the CTC computer is visible to other DCC-connected nodes. The node prevents IP traffic from being routed between the DCC and the LAN port.

  Note The SOCKS proxy server is automatically enabled when you enable secure mode.

Step 9 Click **Finish**.

Within the next 30 to 40 seconds, the control cards reboot. CTC switches to network view, and the CTC Alerts dialog box appears. In network view, the node changes to gray and a DISCONNECTED condition appears in the Alarms tab.

Step 10 In the CTC Alerts dialog box, click **Close**. Wait for the reboot to finish. (This might take several minutes.)

Step 11 After the DISCONNECTED condition clears, complete the following steps to suppress the backplane IP address from appearing in CTC and the LCD. If you do not want to suppress the backplane IP address display, continue with Step 12.

a) Display the node in node view (single-shelf mode) or multishelf view (multishelf mode).
b) Click the **Provisioning** > **Security** > **Data Comm** tabs.
c) In the LCD IP Setting field, choose **Suppress Display**. The IP address will not appear on the LCD.

d) Check the **Suppress CTC IP Address** check box. The IP address will not appear in the CTC information area or the Provisioning > Security > Data Comm tabs.
e) Click **Apply**.

Note After you turn on secure mode, the control card IP address becomes the node IP address.

Step 12 Return to your originating procedure (NTP).

DLP-G58 Creating a Static Route

Purpose	This task creates a static route to establish CTC connectivity to a computer on another network. This task is performed when one of the following conditions exists: • CTC computers on one subnet need to connect to ONS 15454 nodes that are connected by a router to ONS 15454 nodes residing on another subnet. • OSPF is not enabled (the OSPF Active on LAN check box is not checked on the Provisioning > Network > OSPF tab) and the External Network Element (ENE) gateway setting is not checked. • You need to enable multiple CTC sessions among ONS 15454 nodes residing on the same subnet and the External Network Element (ENE) gateway setting is not checked.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed.
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Procedure

Step 1 In node view (single-shelf mode) or multishelf view (multishelf mode), click the **Provisioning** > **Network** tabs.

Step 2 Click the **Static Routing** tab. Click **Create**.

Step 3 In the Create Static Route dialog box, enter the following:

- Destination—Enter the IP address of the computer running CTC. To limit access to one computer, enter the full IP address and a subnet mask of 255.255.255.255. To allow access to all computers on the 192.168.1.0 subnet, enter 192.168.1.0 and a subnet mask of 255.255.255.0. You can enter a destination of 0.0.0.0 to allow access to all CTC computers that connect to the router.
- Mask—Enter a subnet mask. If the destination is a host route (that is, one CTC computer), enter a 32-bit subnet mask (255.255.255.255). If the destination is a subnet, adjust the subnet mask accordingly, for

example, 255.255.255.0. If the destination is 0.0.0.0, CTC automatically enters a subnet mask of 0.0.0.0 to provide access to all CTC computers. You cannot change this value.

- Next Hop—Enter the IP address of the router port or the node IP address if the CTC computer is connected to the node directly.
- Cost—Enter the number of hops between the node and the computer.

Step 4 Click **OK**. Verify that the static route appears in the Static Route window.

Note Static route networking examples are provided in the Managing Network Connectivity chapter.

Step 5 Return to your originating procedure (NTP).

DLP-G59 Setting Up or Changing Open Shortest Path First Protocol

Purpose	This task enables the OSPF routing protocol on the ONS 15454. Perform this task if you want to include the ONS 15454 in OSPF-enabled networks.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC You will need the OSPF Area ID, Hello and Dead intervals, and authentication key (if OSPF authentication is enabled) provisioned on the router to which the ONS 15454 is connected.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Procedure

Step 1 In node view (single-shelf mode) or multishelf view (multishelf mode), click the **Provisioning** > **Network** > **OSPF** tabs.

Step 2 On the top left side of the OSPF area, complete the following:

- DCC/GCC OSPF Area ID Table—In dotted decimal format, enter the number that identifies the ONS 15454 nodes as a unique OSPF area ID. The Area ID can be any number between 000.000.000.000 and 255.255.255.255, but must be unique to the LAN OSPF area.

  ANSI Nodes

- SDCC Metric—This value is normally unchanged. It sets a cost for sending packets across the Section DCC, which is used by OSPF routers to calculate the shortest path. This value should always be higher than the LAN metric. The default SDCC metric is 100.
- LDCC Metric—Sets a cost for sending packets across the Line DCC. This value should always be lower than the SDCC metric. The default LDCC metric is 33. It is usually not changed.

ETSI Nodes

- RS-DCC Metric—This value is normally unchanged. It sets a cost for sending packets across the regenerator section DCC (RS-DCC), which is used by OSPF routers to calculate the shortest path. This value should always be higher than the LAN metric. The default RS-DCC metric is 100.
- MS-DCC Metric—Sets a cost for sending packets across the multiplex section DCC (MS-DCC). This value should always be lower than the SDCC metric. The default MS-DCC metric is 33. It is usually not changed.

Step 3 In the OSPF on LAN area, complete the following:

- OSPF active on LAN—When checked, enables the ONS 15454 OSPF topology to be advertised to OSPF routers on the LAN. Enable this field on ONS 15454 nodes that directly connect to OSPF routers.
- LAN Port Area ID—Enter the OSPF area ID (dotted decimal format) for the router port where the ONS 15454 is connected. (This number is different from the DCC/GCC OSPF Area ID.)

Step 4 By default, OSPF is set to No Authentication. If the OSPF router requires authentication, complete the following steps. If not, continue with Step 5.

a) Click the **No Authentication** button.

b) In the Edit Authentication Key dialog box, complete the following:

- Type—Choose **Simple Password**.
- Enter Authentication Key—Enter the password.
- Confirm Authentication Key—Enter the same password to confirm it.

c) Click **OK**.

The authentication button label changes to Simple Password.

Step 5 Provision the OSPF priority and interval settings. The OSPF priority and interval defaults are the defaults most commonly used by OSPF routers. Verify that these defaults match the ones used by the OSPF router where the ONS 15454 is connected.

- Router Priority—Provision the router priority, which determines the designated router for a subnet.
- Hello Interval (sec)—Provision the number of seconds between OSPF hello packet advertisements sent by OSPF routers. Ten seconds is the default.
- Dead Interval—Provision the number of seconds that will pass while an OSPF router's packets are not visible before its neighbors declare the router down. Forty seconds is the default.
- Transit Delay (sec)—Provision the service speed. One second is the default.
- Retransmit Interval (sec)—Provision the number of seconds that will elapse before a packet is resent. Five seconds is the default.
- LAN Metric—Provision the cost for sending packets across the LAN. This value should always be lower than the SDCC or RS-DCC metric. Ten is the default.

Step 6 Under OSPF Area Range Table, create an area range table if one is needed:

Note Area range tables consolidate the information that is outside an OSPF area border. One node in the ONS 15454 OSPF area is connected to the OSPF router. An area range table on this node points the router to the other nodes that reside within the ONS 15454 OSPF area.

a) Click **Create**.
b) In the Create Area Range dialog box, enter the following:
   - Range Address—Enter the area IP address for the ONS 15454 nodes that reside within the OSPF area. For example, if the ONS 15454 OSPF area includes nodes with IP addresses 10.10.20.100, 10.10.30.150, 10.10.40.200, and 10.10.50.250, the range address would be 10.10.0.0.
   - Range Area ID—Enter the OSPF area ID for the ONS 15454 nodes. This is either the ID in the DCC OSPF Area ID field or the ID in the Area ID for LAN Port field.
   - Mask Length—Enter the subnet mask length. In the Range Address example, this is 16.
   - Advertise—Check this box if you want to advertise the OSPF range table.
c) Click **OK**.

Step 7 All OSPF areas must be connected to Area 0. If the ONS 15454 OSPF area is not physically connected to Area 0, use the following steps to create a virtual link table that will provide the disconnected area with a logical path to Area 0:

a) Under the OSPF Virtual Link Table, click **Create**.
b) In the Create Virtual Link dialog box, complete the following fields. OSPF settings must match OSPF settings for the ONS 15454 OSPF area:
   - Neighbor—Enter the router ID of the Area 0 router.
   - Transit Delay (sec)—Enter the service speed. One second is the default.
   - Hello Int (sec)—Provision the number of seconds between OSPF hello packet advertisements sent by OSPF routers. Ten seconds is the default.
   - Auth Type—If the router where the ONS 15454 is connected uses authentication, choose **Simple Password**. Otherwise, choose **No Authentication**.
   - Retransmit Int (sec)—Provision the time that will elapse, in seconds, before a packet is resent. Five seconds is the default.
   - Dead Int (sec)—Provision the number of seconds that will pass while an OSPF router's packets are not visible before its neighbors declare the router down. Forty seconds is the default.
c) Click **OK**.

Step 8 After entering the ONS 15454 OSPF area data, click **Apply**.

If you changed the Area ID, the control cards reset, one at a time. The reset takes approximately 10 to 15 minutes.

Step 9 Return to your originating procedure (NTP).

DLP-G60 Setting Up or Changing Routing Information Protocol

Purpose	This task enables RIP on the ONS 15454. Perform this task if you want to include the ONS 15454 in RIP-enabled networks.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC You need to create a static route to the router adjacent to the ONS 15454 for the ONS 15454 to communicate its routing information to non-DCC-connected nodes.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Procedure

Step 1 In node view (single-shelf mode) or multishelf view (multishelf mode), click the **Provisioning** > **Network** > **RIP** tabs.

Step 2 Check the **RIP Active** check box if you are activating RIP.

Step 3 Choose either RIP Version 1 or RIP Version 2 from the drop-down list, depending on which version is supported in your network.

Step 4 Set the RIP metric. The RIP metric can be set to a number between 1 and 15 and represents the number of hops.

Step 5 By default, RIP is set to No Authentication. If the router that the ONS 15454 is connected to requires authentication, complete the following steps. If not, continue with Step 6.

a) Click the **No Authentication** button.

b) In the Edit Authentication Key dialog box, complete the following:

- Type—Choose **Simple Password**.
- Enter Authentication Key—Enter the password.
- Confirm Authentication Key—Enter the same password to confirm it.

c) Click **OK**.

The authentication button label changes to Simple Password.

Step 6 If you want to complete an address summary, complete the following steps. If not, continue with Step 7. Complete the address summary only if the ONS 15454 is a gateway NE with multiple external ONS 15454 NEs attached with IP addresses in different subnets.

a) In the RIP Address Summary area, click **Create**.

b) In the Create Address Summary dialog box, complete the following:

- Summary Address—Enter the summary IP address.

- Mask Length—Enter the subnet mask length using the up and down arrows.
- Hops—Enter the number of hops. The smaller the number of hops, the higher the priority.

c) Click **OK**.

Step 7 Return to your originating procedure (NTP).

NTP-G194 Setting Up EMS Secure Access to the Node

Purpose	This procedure provisions nodes and CTC computers for secure access.
Tools/Equipment	None
Prerequisite Procedures	NTP-G26 Setting Up CTC Network Access, on page 69
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Superuser

Procedure

Step 1 In node view, click the **Provisioning** > **Security** > **Access** pane.

Step 2 Under the **EMS Access** area, change the **Access State** to **Secure**.

Step 3 Click **Apply**. The CTC disconnects and reconnects through a secure socket connection.

Step 4 To create a secure connection, enter **https://node-address**.

Note After setting up a CTC connection in secure mode, http requests are automatically redirected to https mode.

Step 5 A first time connection is authenticated by the **Website Certification is Not Known** dialog box. Accept the certificate and click **OK**. The **Security Error: Domain Name Mismatch** dialog box appears. Click **OK** to continue.

Stop. You have completed this procedure.

NTP-G27 Setting Up the Node for Firewall Access

Purpose	This procedure provisions ONS 15454 nodes and CTC computers for access through firewalls.
Tools/Equipment	IIOP listener port number provided by your LAN or firewall administrator

Prerequisite Procedures	• NTP-G22 Verifying Common Card Installation, on page 54 • DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

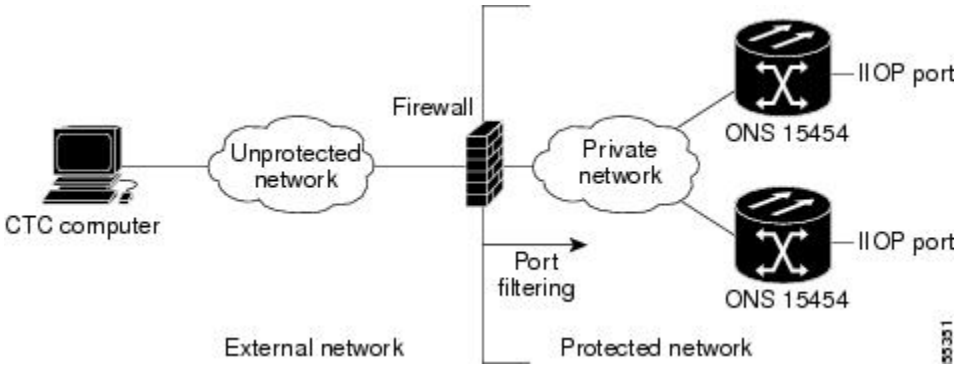
Procedure

Step 1 Log into a node that is behind the firewall. If you are already logged in, continue with Step 2.

Step 2 If the node is in a protected network and the CTC computer is in an external network, complete the DLP-G61 Provisioning the IIOP Listener Port on the ONS 15454, on page 87.

The following figure shows nodes in a protected network and the CTC computer in an external network. For the computer to access the nodes, you must provision the IIOP listener port specified by your firewall administrator on the node.

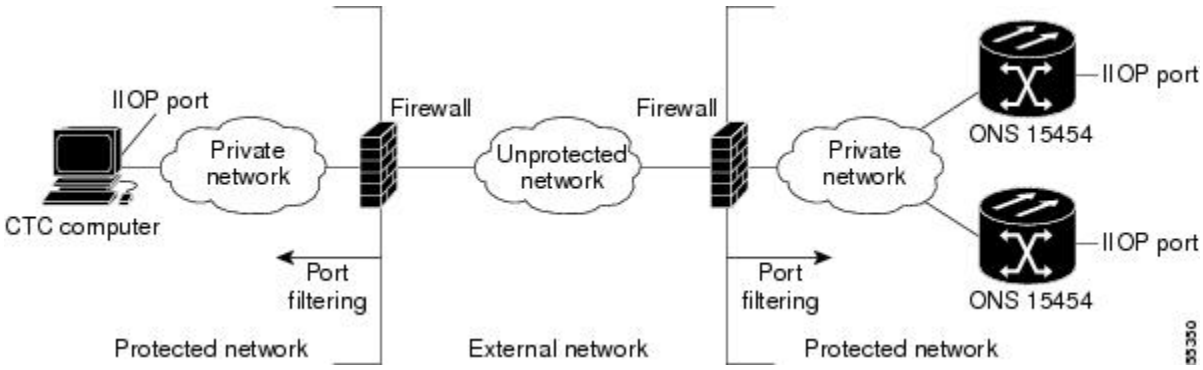
Figure 13: Nodes Behind a Firewall



Step 3 If the CTC computer resides behind a firewall, complete the DLP-G62 Provisioning the IIOP Listener Port on the CTC Computer, on page 88.

The following figure shows a CTC computer and node behind firewalls. For the computer to access the node, you must provision the IIOP port on the CTC computer and on the node.

Figure 14: CTC Computer and Nodes Residing Behind Firewalls



Stop. You have completed this procedure.

NTP-G28 Creating FTP Host

Purpose	This procedure provisions an FTP Host that you can use to perform database backup and restore or software download to an End Network Element (ENE) when proxy or firewall is enabled.
Tools/Equipment	None
Prerequisite Procedures	• NTP-G26 Setting Up CTC Network Access, on page 69 • NTP-G27 Setting Up the Node for Firewall Access, on page 84 • DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Superuser

Procedure

Step 1 If you want to turn on the ONS 15454 secure mode, which allows two IPv4 addresses to be provisioned for the node if the control cards are installed, complete the DLP-G264 Enabling Node Security Mode, on page 77. Refer to the Managing Network Connectivity chapter for information about secure mode.

Step 2 In Node view, click the **Provisioning** > **Network** > **FTP Hosts** tabs.

Step 3 Click **Create**.

Step 4 Enter a valid IP address in the FTP Host Address field. A maximum of 12 host can be entered.

Note In Software Release 9.1 and later, you can configure an IPv6 address for an FTP server, in addition to an IPv4 address.

Step 5 The Mask is automatically set according to the Net/Subnet Mask length specified in DLP-G56 Provisioning IP Settings, on page 70. To change the Mask, click the Up/Down arrows on the Length menu.

Step 6 Check the **FTP Relay Enable** radio button to allow FTP commands at the GNE relay. If you will enable the relay at a later time, go to Step 8. Certain TL1 commands executed on an ENE require FTP access into the Data Communication Network (DCN), the FTP relay on the GNE provides this access. The FTP hosts that you have configured in CTC can be used with the TL1 COPY-RFILE (for database backup and restore or software download) or COPY-IOSCFG (for Cisco IOS Configuration File backup and restore) commands.

Step 7 Enter the time, in minutes, that FTP Relay will be enabled. A valid entry is a number between 0 and 60. The number 0 disallows FTP command relay. After the specified time has elapsed the FTP Relay Enable flag is unset and FTP command relay is disallowed.

Step 8 Click **OK**.

Step 9 Repeat Step 3 through Step 8 to provision additional FTP Hosts.

Stop. You have completed this procedure.

DLP-G61 Provisioning the IIOP Listener Port on the ONS 15454

Purpose	This task sets the IIOP listener port on the ONS 15454shelf which enables you to access nodes that reside behind a firewall.
Tools/Equipment	IIOP listener port number provided by your LAN or firewall administrator
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note If the Enable SOCKS proxy on port 1080 check box is checked, CTC will use Port 1080 and ignore the configured IIOP port setting. If the check box is later unchecked, the configured IIOP listener port will be used.

Procedure

Step 1 In node view (single-shelf mode) or multishelf view (multishelf mode), click the **Provisioning** > **Security** > **Access** tabs.

Step 2 In the TCC CORBA (IIOP) Listener Port area, choose a listener port option:

- **Default - TCC Fixed**—Uses Port 57790 to connect to the nodes on the same side of the firewall or if no firewall is used (default). This option can be used for access through a firewall if Port 57790 is available.

- **Standard Constant**—Uses Port 683, the Common Object Request Broker Architecture (CORBA) default port number.
- **Other Constant**—If Port 683 is not used, type the IIOP port specified by your firewall administrator.

Step 3 Click **Apply**.

Step 4 When the Change Network Configuration message appears, click **Yes**.

The control cards reboot, one at a time. The reboot takes approximately 15 minutes.

Step 5 Return to your originating procedure (NTP).

DLP-G62 Provisioning the IIOP Listener Port on the CTC Computer

Purpose	This task selects the IIOP listener port for CTC and must be completed if the computer running CTC resides behind a firewall.
Tools/Equipment	IIOP listener port number from LAN or firewall administrator
Prerequisite Procedures	• NTP-G22 Verifying Common Card Installation, on page 54 • DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Procedure

Step 1 From the Edit menu, choose **Preferences**.

Step 2 In the Preferences dialog box, click the **Firewall** tab.

Step 3 In the CTC CORBA (IIOP) Listener Port area, choose a listener port option:

- **Default - Variable**—Use to connect to ONS 15454 nodes from within a firewall or if no firewall is used (default).
- **Standard Constant**—Use Port 683, the CORBA default port number.
- **Other Constant**—If Port 683 is not used, enter the IIOP port defined by your administrator.

Step 4 Click **Apply**. A warning appears telling you that the port change will apply during the next CTC login.

Step 5 Click **OK**.

Step 6 In the Preferences dialog box, click **OK**.

Step 7 To access the ONS 15454 using the IIOP port, log out of CTC then log back in. (To log out, choose **Exit** from the File menu).

Step 8 Return to your originating procedure (NTP).

NTP-G132 Provisioning OSI

Purpose	This procedure provisions the ONS 15454 so it can be installed in networks with other vendor NEs that use the OSI protocol stack for data communications network (DCN) communications. This procedure provisions the Target Identifier Address Resolution Protocol (TARP), OSI routers, manual area addresses, subnetwork points of attachment, and IP-over-Connectionless Network Service (CLNS) tunnels.
Tools/Equipment	None
Prerequisite Procedures	• Installing the TNC, TNCE, TSCE, TNCS-2, TNCS-2O, TNCS-O, or TNCS Card, on page 36 • DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Provisioning or higher

Caution This procedure requires an understanding of OSI protocols, parameters, and functions. Before you begin, review the OSI reference sections in the Managing Network Connectivity chapter and ensure that you know the role of the ONS 15454 within the OSI and IP network.

Note This procedure requires provisioning of non-ONS equipment including routers and third party NEs. Do not begin until you have the capability to complete that provisioning.

Procedure

As needed, complete the following tasks:

- DLP-G283 Provisioning OSI Routing Mode, on page 90—Complete this task first.
- DLP-G284 Provisioning the TARP Operating Parameters, on page 91—Complete this task second.
- DLP-G285 Adding a Static TID-to-NSAP Entry to the TARP Data Cache, on page 93—Complete this task as needed.
- DLP-G287 Adding a TARP Manual Adjacency Table Entry, on page 94—Complete this task as needed.
- DLP-G288 Provisioning OSI Routers, on page 95—Complete this task as needed.

- DLP-G289 Provisioning Additional Manual Area Addresses, on page 96—Complete this task as needed.
- DLP-G290 Enabling the OSI Subnet on the LAN Interface, on page 97—Complete this task as needed.
- DLP-G291 Creating an IP-Over-CLNS Tunnel, on page 98—Complete this task as needed.

Stop. You have completed this procedure.

DLP-G283 Provisioning OSI Routing Mode

Purpose	This task provisions the OSI routing mode. Complete this task when the ONS 15454 is connected to networks with third party NEs that use the OSI protocol stack for DCN communication.
Tools/Equipment	None
Prerequisite Procedures	• Installing the TNC, TNCE, TSCE, TNCS-2, TNCS-2O, TNCS-O, or TNCS Card, on page 36 • DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Provisioning or higher

Caution Do not complete this task until you confirm the role of the node within the network. It will be either an End System, Intermediate System Level 1, or IS Level 1/Level 2. This decision must be carefully considered. For additional information about OSI provisioning, refer to Managing Network Connectivity chapter.

Caution Link State Protocol (LSP) buffers must be the same at all NEs within the network, or loss of visibility might occur. Do not modify the LSP buffers unless you confirm that all NEs within the OSI have the same buffer size.

Caution LSP buffer sizes cannot be greater than the LAP-D maximum transmission unit (MTU) size within the OSI area.

Note For ONS 15454 nodes, three virtual routers can be provisioned. The node primary Network Service Access Point (NSAP) address is also the Router 1 primary manual area address. To edit the primary NSAP, you must edit the Router 1 primary manual area address. After you enable Router 1 on the Routers subtab, the Change Primary Area Address button is available to edit the address.

Procedure

Step 1 In node view (single-shelf mode) or multishelf view (multishelf mode), click the **Provisioning** > **OSI** tabs.

Step 2 Choose a routing mode:

- **End System**—The ONS 15454 performs OSI end system (ES) functions and relies upon an intermediate system (IS) for communication with nodes that reside within its OSI area.

  Note The End System routing mode is not available if more than one virtual router is enabled.

- I**ntermediate System Level 1**—The ONS 15454 performs OSI IS functions. It communicates with IS and ES nodes that reside within its OSI area. It depends upon an IS L1/L2 node to communicate with IS and ES nodes that reside outside its OSI area.
- **Intermediate System Level 1/Level 2**—The ONS 15454 performs IS functions. It communicates with IS and ES nodes that reside within its OSI area. It also communicates with IS L1/L2 nodes that reside in other OSI areas. Before choosing this option, verify the following:
  - The node is connected to another IS Level 1/Level 2 node that resides in a different OSI area.
  - The node is connected to all nodes within its area that are provisioned as IS L1/L2.

Step 3 If needed, change the LSP data buffers:

- L1 LSP Buffer Size—Adjusts the Level 1 link state protocol data unit (PDU) buffer size. The default is 512. It should not be changed.
- L2 LSP Buffer Size—Adjusts the Level 2 link state PDU buffer size. The default is 512. It should not be changed.

Step 4 Return to your originating procedure (NTP).

DLP-G284 Provisioning the TARP Operating Parameters

Purpose	This task provisions the TARP operating parameters including TARP PDU propagation, timers, and loop detection buffer (LDB).
Tools/Equipment	None
Prerequisite procedures	DLP-G46 Log into CTC
Required/As needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Superuser only

Procedure

Step 1 In node view (single-shelf mode) or multishelf view (multishelf mode), click the **Provisioning** > **OSI** > **TARP** > **Config** tabs.

Step 2 Provision the following parameters, as needed:

- TARP PDUs L1 Propagation—If checked (default), TARP Type 1 PDUs that are received by the node and are not excluded by the LDB are propagated to other NEs within the Level 1 OSI area. (Type 1 PDUs request a protocol address that matches a target identifier [TID] within a Level 1 routing area.) The propagation does not occur if the NE is the target of the Type 1 PDU, and PDUs are not propagated to the NE from which the PDU was received.

  Note The TARP PDUs L1 Propagation parameter is not used when the Node Routing Area (on the Provisioning > OSI > Main Setup tab) is set to End System.

- TARP PDUs L2 Propagation—If checked (default), TARP Type 2 PDUs that are received by the node and are not excluded by the LDB are propagated to other NEs within the Level 2 OSI areas. (Type 2 PDUs request a protocol address that matches a TID within a Level 2 routing area.) The propagation occurs if the NE is not the target of the Type 2 PDU, and PDUs are not propagated to the NE from which the PDU was received.

  Note The TARP PDUs L2 Propagation parameter is only used when the Node Routing Area is provisioned to Intermediate System Level 1/Level 2.

- TARP PDUs Origination—If checked (default), the node performs all TARP origination functions including:
  - TID-to-NSAP resolution requests (originate TARP Type 1 and Type 2 PDUs)
  - NSAP-to-TID requests (originate Type 5 PDUs)
  - TARP address changes (originate Type 4 PDUs)

  Note TARP Echo and NSAP to TID are not supported.

- TARP Data Cache—If checked (default), the node maintains a TARP data cache (TDC). The TDC is a database of TID-to-NSAP pairs created from TARP Type 3 PDUs received by the node and modified by TARP Type 4 PDUs (TID-to-NSAP updates or corrections). TARP 3 PDUs are responses to Type 1 and Type 2 PDUs. The TDC can also be populated with static entries entered on the TARP > Static TDC tab.

  Note TARP Data Cache is only used when the TARP PDUs Origination parameter is enabled.

- L2 TARP Data Cache—If checked (default), the TIDs and NSAPs of NEs originating Type 2 requests are added to the TDC before the node propagates the requests to other NEs.

  Note The L2 TARP Data Cache parameter is designed for Intermediate System Level 1/Level 2 nodes that are connected to other Intermediate System Level 1/Level 2 nodes. Enabling the parameter for Intermediate System Level 1 nodes is not recommended.

- LDB—If checked (default), enables the TARP loop detection buffer. The LDB prevents TARP PDUs from being sent more than once on the same subnet.

Note The LDB parameter is not used if the Node Routing Mode is provisioned to End System or if the TARP PDUs L1 Propagation parameter is not enabled.

- LAN TARP Storm Suppression—If checked (default), enables TARP storm suppression. This function prevents redundant TARP PDUs from being unnecessarily propagated across the LAN network.
- Send Type 4 PDU on Startup—If checked, a TARP Type 4 PDU is originated during the initial startup. Type 4 PDUs indicate that a TID or NSAP change has occurred at the NE. (The default setting is not enabled.)
- Type 4 PDU Delay—Sets the amount of time that will pass before the Type 4 PDU is generated when Send Type 4 PDU on Startup is enabled. 60 seconds is the default. The range is 0 to 255 seconds.

Note The Send Type 4 PDU on Startup and Type 4 PDU Delay parameters are not used if TARP PDUs Origination is not enabled.

- LDB Entry—Sets the TARP loop detection buffer timer. The loop detection buffer time is assigned to each LDB entry for which the TARP sequence number (tar-seq) is zero. The default is 5 minutes. The range is 1 to 10 minutes.
- LDB Flush—Sets the frequency period for flushing the LDB. The default is 5 minutes. The range is 0 to 1440 minutes.
- T1—Sets the amount of time to wait for a response to a Type 1 PDU. Type 1 PDUs seek a specific NE TID within an OSI Level 1 area. The default is 15 seconds. The range is 0 to 3600 seconds.
- T2—Sets the amount of time to wait for a response to a Type 2 PDU. TARP Type 2 PDUs seek a specific NE TID value within OSI Level 1 and Level 2 areas. The default is 25 seconds. The range is 0 to 3600 seconds.
- T3—Sets the amount of time to wait for an address resolution request. The default is 40 seconds. The range is 0 to 3600 seconds.
- T4—Sets the amount of time to wait for an error recovery. This timer begins after the T2 timer expires without finding the requested NE TID. The default is 20 seconds. The range is 0 to 3600 seconds.

Note The T1, T2, and T4 timers are not used if the TARP PDUs Origination check box is not checked.

Step 3 Click **Apply**.

Step 4 Return to your originating procedure (NTP).

DLP-G285 Adding a Static TID-to-NSAP Entry to the TARP Data Cache

Purpose	This task adds a static TID-to-NSAP entry to the TDC. The static entries are required for NEs that do not support TARP and are similar to static routes. For a specific TID, you must force a specific NSAP.
Tools/Equipment	None
Prerequisite procedures	DLP-G46 Log into CTC

Required/As needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioner or higher

Procedure

Step 1 In node view (single-shelf mode) or multishelf view (multishelf mode), click the **Provisioning** > **OSI** > **TARP** > **Static TDC** tabs.

Step 2 Click **Add Static Entry**.

Step 3 In the Add Static Entry dialog box, enter the following:

- TID—Enter the TID of the NE. (For ONS nodes, the TID is the Node Name parameter on the node or multishelf view Provisioning > General tab.)
- NSAP—Enter the OSI NSAP address in the NSAP field or, if preferred, click **Use Mask** and enter the address in the Masked NSAP Entry dialog box.

Step 4 Click **OK** to close the Masked NSAP Entry dialog box, if used, and then click **OK** to close the Add Static Entry dialog box.

Step 5 Return to your originating procedure (NTP).

DLP-G287 Adding a TARP Manual Adjacency Table Entry

Purpose	This task adds an entry to the TARP manual adjacency table (MAT). Entries are added to the MAT when the ONS 15454 must communicate across routers or NEs that lack TARP capability.
Tools/Equipment	None
Prerequisite procedures	DLP-G46 Log into CTC
Required/As needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Procedure

Step 1 In node view (single-shelf mode) or multishelf view (multishelf mode), click the **Provisioning** > **OSI** > **TARP** > **MAT** tabs.

Step 2 Click **Add**.

Step 3 In the Add TARP Manual Adjacency Table Entry dialog box, enter the following:

- Level—Sets the TARP Type Code that will be sent:
  - **Level 1**—Indicates that the adjacency is within the same area as the current node. The entry generates Type 1 PDUs.
  - **Level 2**—Indicates that the adjacency is in a different area than the current node. The entry generates Type 2 PDUs.
- NSAP—Enter the OSI NSAP address in the NSAP field or, if preferred, click **Use Mask** and enter the address in the Masked NSAP Entry dialog box.

Step 4 Click **OK** to close the Masked NSAP Entry dialog box, if used, and then click **OK** to close the Add Static Entry dialog box.

Step 5 Return to your originating procedure (NTP).

DLP-G288 Provisioning OSI Routers

Purpose	This task enables an OSI router and edits its primary manual area address.
Tools/Equipment	None
Prerequisite Procedures	• NTP-G22 Verifying Common Card Installation, on page 54 • DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note Router 1 must be enabled before you can enable and edit the primary manual area addresses for Routers 2 and 3.

Note The Router 1 manual area address, System ID, and Selector “00” create the node NSAP address. Changing the Router 1 manual area address changes the node NSAP address.

Note The System ID for Router 1 is the node MAC address. The System IDs for Routers 2 and 3 are created by adding 1 and 2 respectively to the Router 1 System ID. You cannot edit the System IDs.

Procedure

Step 1 Click the **Provisioning** > **OSI** > **Routers** > **Setup** tabs.

Step 2 Chose the router you want provision and click **Edit**. The OSI Router Editor dialog box appears.

Step 3 In the OSI Router Editor dialog box:

a) Check **Enable Router** to enable the router and make its primary area address available for editing.

b) Click the manual area address, then click **Edit**.

c) In the Edit Manual Area Address dialog box, edit the primary area address in the Area Address field. If you prefer, click **Use Mask** and enter the edits in the Masked NSAP Entry dialog box. The address (hexadecimal format) can be 8 to 24 alphanumeric characters (0–9, a–f) in length.

d) Click **OK** successively to close the following dialog boxes: Masked NSAP Entry (if used), Edit Manual Area Address, and OSI Router Editor.

Step 4 Return to your originating procedure (NTP).

DLP-G289 Provisioning Additional Manual Area Addresses

Purpose	This task provisions the OSI manual area addresses. One primary area and two additional manual areas can be created for each virtual router.
Tools/Equipment	None
Prerequisite Procedures	• NTP-G22 Verifying Common Card Installation, on page 54 • DLP-G288 Provisioning OSI Routers, on page 95 • DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Procedure

Step 1 Click the **Provisioning** > **OSI** > **Routers** > **Setup** tabs.

Step 2 Chose the router where you want provision an additional manual area address and click **Edit**. The OSI Router Editor dialog box appears.

Step 3 In the OSI Router Editor dialog box:

a) Check **Enable Router** to enable the router and make its primary area address available for editing.

b) Click the manual area address, then click **Add**.

c) In the Add Manual Area Address dialog box, enter the primary area address in the Area Address field. If you prefer, click **Use Mask** and enter the address in the Masked NSAP Entry dialog box. The address (hexadecimal format) can be 2 to 24 alphanumeric characters (0–9, a–f) in length.

d) Click **OK** successively to close the following dialog boxes: Masked NSAP Entry (if used), Add Manual Area Address, and OSI Router Editor.

Step 4 Return to your originating procedure (NTP).

DLP-G290 Enabling the OSI Subnet on the LAN Interface

Purpose	This task enables the OSI subnetwork point of attachment on the LAN interface.
Tools/Equipment	None
Prerequisite Procedures	• NTP-G22 Verifying Common Card Installation, on page 54 • DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note When you create communication channels (optical service channel [OSC] or generic communications channel [GCC]), OSI subnetwork points of attachment are enabled on the communication channels. See the NTP-G38 Provisioning OSC Terminations, on page 126 and the DLP-G76 Provisioning DCC/GCC Terminations task.

Note The OSI subnetwork point of attachment cannot be enabled for the LAN interface if the OSI routing mode is set to ES.

Note If secure mode is on, the OSI subnet is enabled on the backplane LAN port, not the front control card TCP/IP (LAN) port.

Procedure

Step 1 Click the **Provisioning** > **OSI** > **Routers** > **Subnet** tabs.

Step 2 Click **Enable LAN Subnet**.

Step 3 In the Enable LAN Subnet dialog box, complete the following fields:

- ESH—Sets the End System Hello (ESH) propagation frequency. An ES NE transmits ESHs to inform other ESs and ISs about the NSAPs it serves. The default is 10 seconds. The range is 10 to 1000 seconds.

- ISH—Sets the Intermediate System Hello (ISH) PDU propagation frequency. An intermediate system NE sends ISHs to other ESs and ISs to inform them about the IS NEs it serves. The default is 10 seconds. The range is 10 to 1000 seconds.
- IIH—Sets the Intermediate System to Intermediate System Hello (IIH) PDU propagation frequency. The IS-IS Hello PDUs establish and maintain adjacencies between ISs. The default is 3 seconds. The range is 1 to 600 seconds.
- IS-IS Cost—Sets the cost for sending packets on the LAN subnet. The IS-IS protocol uses the cost to calculate the shortest routing path. The default IS-IS cost for LAN subnets is 20. It normally should not be changed.
- DIS Priority—Sets the designated intermediate system (DIS) priority. In IS-IS networks, one router is elected to serve as the DIS (LAN subnets only). Cisco router DIS priority is 64. For the LAN subnet, the default DIS priority is 63. It normally should not be changed.

Step 4 Click **OK**.

Step 5 Return to your originating procedure (NTP).

DLP-G291 Creating an IP-Over-CLNS Tunnel

Purpose	This task creates an IP-over-CLNS tunnel to allow ONS 15454nodes to communicate across equipment and networks that use the OSI protocol stack.
Tools/Equipment	None
Prerequisite Procedures	• NTP-G22 Verifying Common Card Installation, on page 54 • DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Caution IP-over-CLNS tunnels require two endpoints. You will create one point on a ONS 15454. The other endpoint is generally provisioned on non-ONS equipment including routers and other vendor NEs. Before you begin, verify that you have the capability to create an OSI-over-CLNS tunnel on the other equipment location.

Note The Cisco proprietary tunnel is slightly more efficient than the GRE tunnel because it does not add the GRE header to each IP packet. The two tunnel types are not compatible. Most Cisco routers support the Cisco IP tunnel, while only a few support both GRE and Cisco IP tunnels. You generally should create Cisco IP tunnels if you are tunneling between two Cisco routers or between a Cisco router and the node.

Procedure

Step 1 Click the **Provisioning** > **OSI** > **Tunnels** tabs.

Step 2 Click **Create**.

Step 3 In the Create IP Over CLNS Tunnel dialog box, complete the following fields:

- Tunnel Type—Choose a tunnel type:
  - **Cisco**—Creates the proprietary Cisco IP tunnel. Cisco IP tunnels add the CLNS header to the IP packets.
  - **GRE**—Creates a generic routing encapsulation (GRE) tunnel. GRE tunnels add the CLNS header and a GRE header to the IP packets.

    Caution Always verify that the IP-over-CLNS tunnel type that you choose is supported by the equipment at the other end of the tunnel.

- IP Address—Enter the IP address of the IP-over-CLNS tunnel destination.
- IP Mask—Enter the IP address subnet mask of the IP-over-CLNS destination.
- OSPF Metric—Enter the OSPF metric for sending packets across the IP-over-CLNS tunnel. The OSPF metric, or cost, is used by OSPF routers to calculate the shortest path. The default is 110. Normally, it is not be changed unless you are creating multiple tunnel routes and want to prioritize routing by assigning different metrics.
- NSAP Address—Enter the destination NE or OSI router NSAP address.

Step 4 Click **OK**.

Step 5 Provision the other tunnel endpoint using the documentation provided by the manufacturer of the third party vendor NE.

Step 6 Return to your originating procedure (NTP).

NTP-G143 Importing the Cisco Transport Planner NE Update Configuration File

Purpose	This procedure imports the Cisco Transport Planner NE Update configuration file and creates a log file.
Tools/Equipment	A Cisco Transport Planner NE Update file for the network where the node is installed must be accessible to the CTC computer.
Prerequisite Procedures	• NTP-G139 Verifying Cisco Transport Planner Reports and Files, on page 52 • DLP-G46 Log into CTC

Required/As Needed	Required
Onsite/Remote	Onsite or remote
Security Level	Superuser only

Caution Verify that you have the correct Cisco Transport Planner network file before you begin this procedure. The file will have an XML extension and a name assigned by your network planner. Check with your network planner or administrator if you have any questions.

Note The import operation of Cisco Transport Planner NE Update configuration file is based on the number of configurations. The import operation takes more time for a very large configuration that includes several pluggable modules and ports. When the configuration file is imported in non-interactive mode, CTC can be used for other operations.

Note The configuration file, which is provided in XML format, provisions internal patchcords, optical sides and card parameters for optical units, transponders, and passive units (DCUs and patch panels). Finally, the NE Update file installs the ANS parameters calculated by Cisco Transport Planner. The log file, which is a text document records the results of the NE update.

Note The Cisco Transport Planner configuration file contains parameters for the node, shelf, card type, port (including the card's wavelength), pluggable port module (PPM), as well as OTN and FEC parameters. Only the values present in XML format appear in the configuration file parameters; if the values are not in XML format, a column appears blank. The XML file values are independently reported and do not affect any configuration changes that you apply.

Note Common control cards are not provisioned by Cisco Transport Planner.

Procedure

Step 1 If you choose the Provision Node Layout option to preprovision the cards in the shelf, complete the following steps. If not, continue with Step 2.

a) Display the node in node view (single-shelf mode) or multishelf view (multishelf mode).

b) Verify that the common control cards are the only cards installed. If in single or multishelf mode, verify that each shelf in the multishelf has two control cards.

- If common control cards are the only cards installed, continue with Step 2.
- If other cards appear, continue with Step c.

c) If a physical card other than the common control cards is installed, remove it from the shelf.
d) If preprovisioned DWDM cards are present, delete them using the DLP-G351 Deleting a Card in CTC, then repeat Steps a and b.

Step 2 If you have not created a log file to record the results of the NE update, complete the following steps. If a log file has been created, continue with Step 3.
a) Open a text editor or word processing application.
b) Create a new text (TXT) document with a file name of your choosing.
c) Save the text document in a directory that is easy to navigate to from CTC.

Step 3 In CTC node view (single-shelf mode) or multishelf view, click the **Provisioning** > **WDM-ANS** > **Node Setup** tabs.

Step 4 Choose **Load latest installation file from node** to reload the latest XML file that was applied and stored in the node. Continue with Step 7.

Step 5 Choose **Load installation file from network repository** and navigate to the Cisco Transport Planner node setup file containing the parameters for the network where the node resides. This option downloads the XML file from the remote server. Continue with Step 7.

Step 6 In the field under Select XML file, type the path to the Cisco Transport Planner node setup file containing the parameters for the network where your node resides, or click **Browse** and navigate to the file on your computer. Click the file, then click **Open**. The file will have an XML extension. Continue with Step 7.

Step 7 In the field under Select Log file, type the path to the text file that you created in Step 2, or click **Browse** and navigate to the file on your computer or a network server where you want the node setup results recorded.

Note The log file records the parameters that were updated successfully and provides an explanation of why an update could not be completed. Each node setup session overwrites the log file contents. If you want to save the results from a previous NE update, save the log file with new name.

Step 8 Click **Apply**.

Step 9 When **Load installation file from network repository** option is chosen, the FTP Remote Installation File *Node-Name* page appears.
a) When the node is configured as a Gateway Network Element (GNE) node, enter the parameters (host name, port, user name, password, remote directory, and XML file name of the remote server) and click **Next**.
b) When the node is configured as a Elementary Network Element (ENE) node, an additional parameter called GNE Selector appear. From the **GNE Selector** drop-down list, select the appropriate GNE in the network. The FTP relay must be configured on the selected GNE to the remote server where the XML file is stored. See NTP-G28 Creating FTP Host, on page 86 to configure the FTP relay on the selected GNE.

Step 10 When the Node Setup Selection for *Node-Name* page appears, complete the following steps. If not, continue with Step 11.
a) Choose the node profile that you want to apply to the node. The Cisco Transport Planner XML file contains profiles for all nodes in the network. Choose the profile that applies to the node you are provisioning.
b) Click **Next**.

Step 11 On the Node Setup for *node name* page, choose one or more of the following:

- Node Layout—Preprovisions the slots in each shelf in CTC for the cards defined in the network plan. Choose this option when no DWDM cards are installed. (Errors will occur if cards are installed or the slots are preprovisioned.) Preprovisioning the slots before the physical cards are installed ensures that card installers place the cards in the correct slots. Preprovisioning the slots is also useful if you want to

set up the network prior to card installation. The node layout also preprovisions the chassis and passive units.

- Card Parameters—If checked, provisions the following parameters, if the cards are installed.
  - TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, and OTU2_XP cards—Provisions the OTN and FEC parameters.
  - OPT-AMP-L, OPT-AMP-17-C, OPT-AMP-C, OPT-EDFA-17, OPT-EDFA-24, OPT-EDFA-35, GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards—Provisions the card mode.
- Pluggable Port Modules— If checked, allows the provisioning of PPMs on TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, and OTU2_XP cards, including PPM payloads.
- Internal Patchcords—If checked, allows creation of internal patchcords among cards provisioned in the node.
- Optical Sides—If checked, allows the provisioning of optical sides.
- ANS Parameters—If checked, installs the ANS parameters. ANS parameters provision the values required for the node to function within the specified network design. ANS parameters include span losses, optical power, optics thresholds, amplifier working mode, gain, tilt, and many others. Refer to Node Reference chapter for a list of ANS parameters.

  Note If you are importing the Cisco Transport Planner configuration file for the first time, you normally choose all the available options.

- Skip Interactive Mode—If checked, CTC provisions all the chosen setup components automatically without allowing you to view the results after each one.
- Save Installation Files (XML and log) On Node—If checked, CTC saves the XML and log files on the node.

Step 12 Click **Next.** If you chose Skip Interactive Mode, continue with Step 13. If not, the wizard page that appears depends on the options chosen in Step 11. Complete the steps shown in the following table for each option.

Table 23: NE Update Wizard Options

NE Update Function	
Node/Shelves Layout	View the cards and slots on the left side of the page and verify that they are the same as th Cisco Transport Planner Shelf Layout (see Cisco Transport Planner Node Setup Informati page 53). If the cards and slots match, click **Apply**. If not, click **Cancel**. and contact your support to verify that you have the correct node setup file. If the site has a multishelf conf **Next** and repeat this step for each shelf at the site. CTC preprovisions the slots. This might take a few seconds. The results appear in the Log that are successfully provisioned display an "Applied" status. A "Slot not empty" status a cannot be provisioned because a card is physically installed or the slot is already provision complete the following steps. Otherwise, continue with the next NE Update function. **a.** Click **Cancel**, then click **Yes** in the confirmation dialog box. The slot preprovisioning when you click Cancel. **b.** If a physical card is installed, remove it from the shelf. **c.** Perform one of the following steps: • Delete all the preprovisioned slots using the DLP-G351 Deleting a Card in CTC Steps 1 through Step 12 . • Delete the slot where the Slot Not Empty error occurred using the DLP-G351 De CTC task. Complete the DLP-G353 Preprovisioning a Slot task to provision the sl repeat Steps 1 through 12 making sure to uncheck the Provision Node Layout op **Note** When you preprovision a slot, the card is purple in the CTC shelf gr (not present) appears on the card. After the physical card is installed, to white and "NP" is removed from the CTC shelf graphic.
Passive Units Layout	**a.** Review the passive unit settings. **b.** Click **Apply**. **c.** Click **Next.**
Pluggable Port Modules	**a.** Review the PPM settings for each TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XP card. **b.** Click **Apply**. **c.** Click **Next.**
Card Parameters	**a.** Review the OTN, FEC, and card mode settings for each TXP, MXP, GE_XP, 10GE_X 10GE_XPE, and OTU2_XP card. **b.** Click **Apply**. **c.** Click **Next.**

NE Update Function	
Internal Patchcords	**a.** Review the internal patchcords. **b.** Click **Apply**. **c.** Click **Next.**
Optical Sides	**a.** Review the optical side assignments. **b.** Click **Apply**. **c.** Click **Next.**
ANS Parameters	**a.** Review the ANS parameters on the left half of the page. **b.** Click **Apply**. The log file displays the results. At the end, a Done status will appear. If a pa not be applied, a Setting Refused status appears. If this occurs, contact your next level of
Select All	If checked, selects all the options.
Skip Interactive Mode	If checked, CTC provisions all the chosen setup components automatically without allowing the results after each one.
Save Installation Files (XML and log) On Node	If checked, CTC saves the XML and log files on the node.

Step 13 Click **Finish**, then click **OK** in the Wizard Complete confirmation dialog box. The confirmation box indicates whether the xml import process was completed successfully.

Stop. You have completed this procedure.

NTP-G320 Configuring the Node as a Non-DWDM Network

Purpose	This tasks configures a node as a Non-DWDM network.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Procedure

Step 1 In node view (single-shelf mode) or multishelf view (multishelf mode), click the **Provisioning** > **WDM-ANS** > **Provisioning** tabs.

Step 2 From the Selector area, select Network Type.

Step 3 Choose **Not-DWDM**, from the Value drop-down list. Click **Apply**.

Step 4 In node view (single-shelf mode) or multishelf view (multishelf mode), click the **Provisioning** > **WDM-ANS** > **Port Status** tabs.

Step 5 Click the **Launch ANS** button. The relevant ports in the node will be in IS state.

Step 6 Click **OK**.

Step 7 Return to your originating procedure (NTP).

DLP-G348 Using the Cisco Transport Planner Shelf Layout Report

Purpose	This task describes how to use the Cisco Transport Planner shelf layout report to install cards in a DWDM node.
Tools/Equipment	None
Prerequisite Procedures	NTP-G139 Verifying Cisco Transport Planner Reports and Files, on page 52
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Provisioning or higher

Procedure

Step 1 Display the Cisco Transport Planner shelf layout report for your site. The report can be viewed in Cisco Transport Planner. It can also be viewed as a JPEG graphic. Refer to the *Cisco Transport Planner DWDM Operations Guide* for information about generating shelf layout reports.

Step 2 Review the following installation information:

- Rack—Indicates the rack in the node where the cards must be installed.
- Shelf—Indicates the shelf in the rack where the cards must be installed. Shelf options include:
  - Flex Shelf—The ONS 15216 FlexLayer mechanical shelf houses Y-cable modules. Flex shelf positions are numbered 1 to 4 from left to right.
  - DCU Shelf—The Cisco ONS 15216 dispersion compensation shelf assembly houses DCUs. DCU positions are numbered 1 to 2 from left to right.
  - Shelf-ANSI-*n* or Shelf-ETSI-*n*—The ONS 15454 shelf assembly houses ONS 15454 common, DWDM, and client cards. Positions in this type of shelf are numbered 1 to 17 from left to right. Multiple shelves might appear.

- Slot—Indicates the slot in the specific shelf where the cards must be installed:
  - Unit Name (Product ID)— Identifies the card by its Product ID.
  - Unit Description—Identifies the card by its name.
- Unit Side—Identifies the side of the node that the specific card is serving: A, B, C, D, E, F, G, or H.
- Unit Plug-in Modules—Identifies the type and number of PPMs that will be used with specific TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or OTU2_XP cards.

Step 3 Return to your originating procedure (NTP).

NTP-G31 Installing the DWDM Dispersion Compensating Units

Purpose	This procedure describes how to install the DCUs for DWDM shelves.
Tools/Equipment	DCUs
Prerequisite Procedures	• Installing the TNC, TNCE, TSCE, TNCS-2, TNCS-2O, TNCS-O, or TNCS Card, on page 36 • NTP-G30 Installing the DWDM Cards • NTP-G139 Verifying Cisco Transport Planner Reports and Files, on page 52
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Provisioning or higher

Warning Class I (CDRH) and Class 1M (IEC) laser products. Statement 1055

Warning Warning Invisible laser radiation may be emitted from the end of the unterminated fiber cable or connector. Do not view directly with optical instruments. Viewing the laser output with certain optical instruments (for example, eye loupes, magnifiers, and microscopes) within a distance of 100 mm may pose an eye hazard. Statement 1056

Caution Always use the supplied ESD wristband when working with a powered ONS 15454. For detailed instructions on how to wear the ESD wristband, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.

Note For US installations, complies with the US Federal Drug Administration Code of Federal Regulations Title 21, Sections 1040.10 and 1040.11, except for deviations pursuant to Laser Notice No. 50, dated July 26, 2001.

Procedure

Step 1 Remove the DCU from its packaging, then remove the protective caps from the connectors. (Safety caps are typically yellow.)

Step 2 Use both hands to push the DCU all the way into the chassis until the connector spring lock on the right side of the module clicks into place.

Step 3 Open the cover with the laser warning on the connector adapter and then connect the cable connector.

Note The Side A DCU is commonly installed on the left side and the Side B DCU is commonly installed on the right side.

Note Double-check the placement of the DCU card(s) with your Cisco Transport Planner shelf layout. If you install the wrong DCU in a slot, remove the DCU and install the correct one.

Stop. You have completed this procedure.

NTP-G239 Managing Passive Units and Passive Shelves

Purpose	This procedure explains how to add or delete passive units or passive shelves.
Tools/Equipment	None
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Procedure

Step 1 Complete the DLP-G46 Log into CTC task to log in to a ONS 15454 node on the network.

Step 2 As needed, complete the following tasks:

- Complete the DLP-G543 Adding Passive Units or Passive Shelves Manually, on page 108 to manually preprovision a passive unit or passive shelf.
- Complete the DLP-G544 Deleting a Passive Unit or Passive Shelf, on page 109 to delete a passive unit or passive shelf.
- Upgrade the firmware of the passive shelves.
- Complete the #unique_114 to associate a passive unit or passive shelf with the USB port, perform a Blink LED operation, or a Power Refresh on the passive units or passive shelves.

Stop. You have completed this procedure.

DLP-G543 Adding Passive Units or Passive Shelves Manually

Purpose	This task preprovisions passive units (passive shelves, patch panels, and DCUs) in CTC. Preprovisioning of the passive units is normally performed when you complete the NTP-G143 Importing the Cisco Transport Planner NE Update Configuration File, on page 99 . Use this task if you need to manually preprovision a passive unit or passive shelf. All slot preprovisioning must be based upon the Cisco Transport Planner shelf layout prepared for your site.
Tools/Equipment	Cisco Transport Planner shelf layout table or JPG file.
Prerequisite Procedures	• DLP-G46 Log into CTC • NTP-G139 Verifying Cisco Transport Planner Reports and Files, on page 52
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Procedure

Step 1 In the node view (single-shelf mode) or multishelf view (multishelf mode), click the **Provisioning** > **WDM-ANS** > **Passive Cards** tabs.

Step 2 Click **Create**. The Create Passive Card dialog box appears.

Step 3 Choose the unit from the Card Type drop-down list and click **OK**.

If PASSIVE SHELF MF or PASSIVE SHELF MF10 is selected, go to the next step, otherwise go to Step 5.

Note You can also add a passive unit in the multishelf view by right-clicking the slot inside the rack. Refer to the NTP-G146 Add a Rack, Passive Unit, or Shelf to a Multishelf Node procedure.

Note If you need to view the details of the passive units that have been installed on a node, click the Inventory tab.

Step 4 Enter a shelf ID in the PShelf ID field.

The range is from 1 to 126. The next available ID is automatically assigned if a value is not specified.

Step 5 Choose the shelf where the passive unit is to be provisioned from the Passive Shelf drop-down list.

The drop-down list contains all provisioned passive shelves. If you want to provision a passive unit outside the passive shelf, choose the N/A option.

Step 6 Choose the slot from the Slot drop-down list if you have selected a passive shelf in Step 5.

Step 7 Choose the DCU type from the DCU Type drop-down list. The available values are SMF and ELEAF.

Step 8 Choose the DCU compensation from the DCU Compensation drop-down list.

Step 9 Return to your originating procedure (NTP).

DLP-G544 Deleting a Passive Unit or Passive Shelf

Purpose	This task deletes a passive unit or passive shelf.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Procedure

Step 1 In the node view (single-shelf mode) or multishelf view (multishelf mode), click the **Provisioning** > **WDM-ANS** > **Passive Cards** tabs.

Step 2 Click the passive unit or passive shelf you want to delete.

Step 3 Click **Delete**, then click **Yes**.

Note All slots in a shelf have to be empty to delete a passive shelf.

You can also delete a passive unit or passive shelf in the multi-shelf view. Refer to NTP-G147 Delete a Passive Unit, Shelf, or Rack from a Multishelf Node procedure.

Step 4 Return to your originating procedure (NTP).

DLP-G792 Performing a Firmware Upgrade on Passive Shelves

Purpose	This task upgrades the firmware of the fiber shuffle or MPO fan out unit.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note The firmware upgrade is non-service-affecting. However, there is a temporary loss of connectivity. It is recommended to upgrade only one fiber shuffle or MPO fan out unit per node at a time.

Note During the firmware upgrade, do not reset the TNCS or TNCS-O card nor remove the cable from USB 3.0 port of the fiber shuffle or the MPO fan out unit.

Note Firmware upgrade is allowed only when the ports are in OOS (out-of-service) or Maintenance service state.

Note Event notifications are triggered at every stage of the firmware upgrade process. These event notifications are reported as transient conditions in the multishelf view > Alarms tab in CTC. The notifications are also displayed in the multishelf view > History > Session tab in CTC. The following event notifications are displayed:

- FIRMWARE_DOWNLOAD —When the firmware download is in progress. The firmware upgrade is initiated after the download is complete.
- FIRMWARE_UPG — When the firmware upgrade is progress.
- FIRMWARE_UPG_FAIL— When the firmware download or the firmware upgrade fails.
- FIRMWARE_UPG_COMPLETE —When the firmware upgrade is completed successfully.

Procedure

Step 1 In the multishelf view, double-click the MF-6RU or MF10-6RU shelf to open shelf mode or right-click the passive shelf and choose **Open Shelf.**

Step 2 Click the **Maintenance** > **Firmware** tab.

The revision number of the bootrom and kernel are displayed. If the bootrom revision is lower than the current revision, continue with the next step. If the bootroom revision is current and the kernel revision is lower than the current revision, go to Step 5.

Note The Upgrade OS KERNEL button is disabled when the bootrom revision is lower than the current revision and is enabled only after the bootrom upgrade.

Step 3 Click the **Upgrade BOOTROM** button.

The upgrade process takes about 45 minutes.

Step 4 Verify the bootrom revision in the Maintenance > Firmware tab after the upgrade is complete.

The bootrom revision is also updated in the Inventory tab.

Step 5 Click the **Upgrade OS KERNEL** button.

The upgrade process takes about 30 minutes.

Step 6 Verify the kernel version in the Maintenance > Firmware tab after the upgrade is complete.

Step 7 Return to your originating procedure (NTP).

DLP-G762 Associating Passive Units or Passive Shelves to USB Ports

Purpose	This task associates passive units (passive shelves, patch panels, and DCUs) to the USB ports in CTC. This task is also used to perform a power refresh on the passive units or passive shelves.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Procedure

Step 1 In the node view (single-shelf mode) or multishelf view (multishelf mode), click the **Provisioning** > **WDM-ANS** > **Passive Cards** tabs.

Step 2 Select the passive unit or passive shelf to associate with the USB port.

Step 3 Click **Associate to USB Port**. The Associate USB port dialog box appears.

Step 4 Choose the shelf from the Shelf drop-down list.

Note If the passive unit selected in Step 2 is provisioned in a passive shelf, check the Associate within Passive Shelf checkbox so that the Shelf drop-down lists the passive shelves.

Step 5 Choose the USB port from the USB port drop-down list.

The USB port drop-down list contains the USB ports that are physically connected to the equipment type selected in Step 2.

Step 6 Click **OK**.

The passive unit is associated with the selected USB port and shelf.

Step 7 To perform a LED blink function of the device connected to the selected USB port, click **Blink LED**.

The LED Blink dialog box appears indicating that the LED blink has been performed.

The LED blinks in blue color helping the operator to identify a specific passive module. Click **Blink LED** again to stop the blinking.

Step 8 To retrieve the power values on the selected passive unit or passive shelf, click **Power Refresh**.

Note The Power Refresh and Blink LED functions can be performed only after associating the passive units or passive shelves to USB ports.

Step 9 Return to your originating procedure (NTP).

NTP-G152 Creating and Verifying Internal Patchcords

Purpose	This procedure imports the internal patchcords using the CTP XML file. Internal patchcords can also be manually provisioned.
Tools/Equipment	• Cisco Transport Planner shelf layout • Cisco Transport Planner Internal Connections Report
Prerequisite Procedures	• NTP-G22 Verifying Common Card Installation, on page 54 • NTP-G139 Verifying Cisco Transport Planner Reports and Files, on page 52 • DLP-G46 Log into CTC
Required/As Needed	Required
Onsite/Remote	Onsite or remote
Security Level	Superuser only

Procedure

Step 1 Login to the node where you want to provision the DWDM cable connections. If you are already logged in, continue with Step 2.

Step 2 Complete the NTP-G143 Importing the Cisco Transport Planner NE Update Configuration File, on page 99 to import the Cisco Transport Planner NE update file.

Step 3 In node view (single-shelf mode) or multishelf view (multishelf mode), click the **Provisioning** > **WDM-ANS** > **Internal Patchcords** tabs.

Note The Internal Patchcords tab does not show OPT-PRE DCU connections or span connections.

Note The number of rows in the Provisioning > WDM-ANS > Internal Patchcords tab are created dynamically, as per the number of sides present in a node.

Note On the ONS 15454 M2 and the ONS 15454 M6 shelves, you can create internal patchcords between the TNC and TNCE cards and the optical amplifier cards.

Step 4 Verify that the connections in the Internal Patchcords tab match the connections in the Cisco Transport Planner Internal Connections Report for the DWDM cards (see the DLP-G349 Using the Cisco Transport Planner

Internal Connections Report task). The Internal Patchcords tab will not show OPT-PRE DCU connections or span connections.

Step 5 Complete the NTP-G242 Creating an Internal Patchcord Manually, on page 113 for any connections that require manual provisioning, for example, to create patchcords between TXP and MXP trunk ports and OCH filter ports. If you need to delete a connection, complete the DLP-G355 Deleting an Internal Patchcord, on page 123.

Note Connections related to optical bypass circuits must be manually provisioned.

Step 6 To view patchcords that are directly connected to TXP cards only, check the TXP Only checkbox.

Stop. You have completed this procedure.

NTP-G242 Creating an Internal Patchcord Manually

Purpose	This procedure creates an internal patchcord manually.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Superuser only

Note Use only one management interface to complete the creation of internal patchcords. For example, do not begin the internal patchcord creation using the TL1 interface or CTP XML file and end the internal patchcord creation using CTC.

Procedure

Step 1 In node view (single-shelf mode) or multishelf view (multishelf mode), click the **Provisioning** > **WDM-ANS** > **Internal Patchcord** tabs.

Step 2 Click **Create**.

Step 3 Choose one of the following link types for the internal patchcord:

- Trunk to Trunk (L2)—Creates a bidirectional patchcord between the trunk ports of GE_XP and 10GE_XP cards. If you choose this option, complete NTP-G354 Creating an Internal Patchcord Manually Using the Trunk to Trunk (L2) Option, on page 114.
- OCH-Trunk to OCH-Filter—Creates an internal patchcord between an optical channel trunk port on a TXP/MXP stage card (which includes GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, OTU2_XP, 100G-LC-C, 10x10G-LC, CFP-LC, 100G-CK-C, AR_MXP, AR_XP, AR_XPE or ITU-T line cards)

and an optical channel filter port on an add/drop stage card (which includes 32MUX, 40-MUX-C, 32WSS, 40-WSS-C/40-WSS-CE, 32DMX, 32DMX-O, 40DMX, 40-SMR1-C, or 40-SMR2-C cards).

You can use this option to also create an internal patchcord between an optical channel trunk port on a TXP/MXP stage card (which includes TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, OTU2_XP, 100G-LC-C, 10x10G-LC, CFP-LC, 100G-CK-C, AR_MXP, AR_XP, AR_XPE or ITU-T line cards) and the COM port on a PSM card in channel protection configuration (where, PSM card is equipped between one TXP/MXP stage and two add/drop stages). In this case, the Internal Patchcord Creation wizard will prompt you to create patchcords between the working and protect ports on the PSM card and the ports on the two different add/drop stage cards (which includes 32MUX, 40-MUX-C, 32WSS, 40-WSS-C/40-WSS-CE, 32DMX, 32DMX-O, 40DMX, 40-SMR1-C, 40-SMR2-C, 80-WXC-C, or 16-WXC-FS cards). If you choose this option, complete DLP-G547 Creating an Internal Patchcord Manually Using the OCH-Trunk to OCH-Filter Option, on page 115.

- OCH-Filter to OCH-Filter—Creates an unidirectional or bidirectional internal patchcord between a MUX input port and a DMX output port. If you choose this option, complete DLP-G548 Creating an Internal Patchcord Manually Using the OCH-Filter to OCH-Filter Option, on page 117.
- OTS to OTS—Creates a unidirectional or bidirectional internal patchcord between two optical transport section (OTS) ports, between two optical cards, between an optical card and a passive card, between two passive cards, or between the TNC or TNCE cards and an optical amplifier card. This option also includes OSC ports. If you choose this option, complete DLP-G549 Creating an Internal Patchcord Manually Using the OTS to OTS Option, on page 119.
- Optical Path—Creates an internal patchcord between two optical cards, or between an optical card and a passive card. If you choose this option, complete DLP-G531 Creating an Internal Patchcord Manually Using the Optical Path Option, on page 122.

Note Manual creation of OTS/OCH to OTS/OCH internal patchcords is not required for standard DWDM nodes. However, manual creation might be required for non-standard nodes, for example, a hub node that has wavelength selective switches installed. In such cases, manual creation is recommended by Cisco Transport Planner.

Note To successfully create an internal patchcord between WSS/DMX channel port and TXP trunk port, choose the TXP as the source endpoint and WSS/DMX as the destination endpoint.

Stop. You have completed this procedure.

NTP-G354 Creating an Internal Patchcord Manually Using the Trunk to Trunk (L2) Option

Purpose	This task creates a bidirectional internal patchcord between the trunk ports of two GE_XP or 10GE_XP cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed

Onsite/Remote	Onsite or remote
Security Level	Superuser only

Procedure

Step 1 In node view (single-shelf mode) or multishelf view (multishelf mode), click the **Provisioning** > **WDM-ANS** > **Internal Patchcord** tabs.

Step 2 Click **Create**.

Step 3 On the Internal Patchcord Type Selection page, choose the patchcord type as Trunk to Trunk (L2) and click **Next**.

Step 4 On the Internal Patchcord Origination page, provision the internal patchcord origination parameters:

- Slot—Choose the slot containing the card where the internal patchcord originates.
- Tx Port—Choose the TX port where the internal patchcord originates. CTC automatically displays the list of ports that are available depending on the link type you choose.

Step 5 Click **Next**.

Step 6 In the Internal Patchcord Termination page, provision the internal patchcord termination parameters:

- Slot—Choose the slot containing the card where the internal patchcord terminates.
- Port—Choose the RX port where the internal patchcord terminates. CTC automatically displays the list of ports that are available depending on the link type you choose.

Step 7 Click **Next**.

Step 8 Review the display-only information on the Internal Patchcord Origination Reverse page. This page shows the slot, and port that CTC will use for the opposite internal patchcord origination route.

Step 9 Click **Next**.

Step 10 Review the information displayed on the Internal Patchcord Termination Reverse page. This display-only page shows the slot, and port that CTC will use for the reverse internal patchcord termination route.

Step 11 Click **Finish**. The new internal patchcord appears in the Internal Patchcord table.

Step 12 Return to your originating procedure (NTP).

DLP-G547 Creating an Internal Patchcord Manually Using the OCH-Trunk to OCH-Filter Option

Purpose	This task creates a bidirectional internal patchcord between a TXP, MXP, or XP trunk and a DWDM add and drop channel port.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed

Onsite/Remote	Onsite or remote
Security Level	Superuser only

Procedure

Step 1 In node view (single-shelf mode) or multishelf view (multishelf mode), click the **Provisioning** > **WDM-ANS** > **Internal Patchcord** tabs.

Step 2 Click **Create**.

Step 3 On the Internal Patchcord Type Selection page, choose the patchcord type as OCH-Trunk to OCH-Filter option and click **Next**.

Step 4 On the Internal PatchcordOCH Attributes page, provision the following parameters:

- OCHNC Wavelength—Sets the OCHNC wavelength for the OCH trunk to OCH filter internal patchcord. Use the unnamed band selection box below to display C-band or L-band wavelengths in the OCHNC Wavelength field. Provision the OCHNC wavelength to the wavelength provisioned for the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE, ADM-10G, OTU2_XP, 100G-LC-C, 10x10G-LC, CFP-LC, 100G-CK-C, AR_MXP, AR_XP, AR_XPE or ITU-T line card trunk port.
- PSM Protection—Select this check box if you have provisioned a PSM card in channel protection configuration.
- Colorless—Select this check box if you want to create a colorless patchcord.

Step 5 Click **Next**.

Step 6 On the Internal Patchcord Origination page, provision the internal patchcord origination parameters:

- Slot—Choose the slot containing the card where the internal patchcord originates.
- Tx Port—Choose the TX port where the internal patchcord originates. CTC automatically displays the list of ports that are available depending on the link type you choose.

Step 7 In the Internal Patchcord Termination page, provision the internal patchcord termination parameters:

- Type—Choose the type of card (optical or passive card) where the internal patchcord terminates.
- Side—Choose the side where the internal patchcord terminates. This field is visible only if you have chosen the type as Optical Card.
- Slot—Choose the slot containing the card where the internal patchcord terminates. This field is visible only if you have chosen the type as Optical Card.
- Unit—Choose the passive card where the internal patchcord terminates. This field is visible only if you have chosen the type as Passive Card.
- Rx Port—Choose the RX port where the internal patchcord terminates. CTC automatically displays the list of ports that are available depending on the link type you choose.

Step 8 Click **Next**.

Step 9 In the Internal Patchcord Origination Reverse page, provision the internal patchcord parameters for the reverse internal patchcord origination route:

- Type—Choose the type of card (optical or passive card) where the internal patchcord originates.
- Side—Choose the side where the internal patchcord originates. This field is visible only if you have chosen the type as Optical Card.
- Slot—Choose the slot containing the card where the internal patchcord originates. This field is visible only if you have chosen the type as Optical Card.
- Unit—Choose the passive card where the internal patchcord originates. This field is visible only if you have chosen the type as Passive Card.

  Note Choose the same passive card that you chose in Step 7.

- Tx Port—Choose the TX port where the internal patchcord originates. CTC automatically displays the list of ports that are available depending on the link type you choose.

Step 10 Click **Next**.

Step 11 In the internal Patchcord Termination Reverse page, provision the internal patchcord parameters for the reverse internal patchcord termination route:

- Slot—Choose the slot containing the card where the internal patchcord originates.
- Rx Port—Choose the RX port where the internal patchcord originates. CTC automatically displays the list of ports that are available depending on the link type you choose.

Step 12 Click **Next**.

Step 13 Click **Finish**. The new internal patchcord appears in the Internal Patchcord table.

Step 14 Return to your originating procedure (NTP).

DLP-G548 Creating an Internal Patchcord Manually Using the OCH-Filter to OCH-Filter Option

Purpose	This task creates a unidirectional or bidirectional internal patchcord between two DWDM add and drop channel ports.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Superuser only

Procedure

Step 1 In node view (single-shelf mode) or multishelf view (multishelf mode), click the **Provisioning** > **WDM-ANS** > **Internal Patchcord** tabs.

Step 2 Click **Create**.

Step 3 On the Internal Patchcord Type Selection page, choose the patchcord type as OCH-Filter to OCH-Filter option and click **Next**.

Step 4 On the Internal Patchcord OCH Attributes page, provision the following parameters:

- OCHNC Wavelength—Sets the OCHNC wavelength for the OCH trunk to OCH filter internal patchcord. Use the unnamed band selection box below to display C-band or L-band wavelengths in the OCHNC Wavelength field. Provision the OCHNC wavelength to the wavelength provisioned for the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE, ADM-10G, OTU2_XP, 100G-LC-C, 10x10G-LC, CFP-LC, 100G-CK-C, AR_MXP, AR_XP, AR_XPE or ITU-T line card trunk port.
- Bidirectional—If checked, creates a bidirectional internal patchcord.
- PSM Protection—Select this check box if you have provisioned a PSM card in channel protection configuration.

Step 5 Click **Next**.

Step 6 On the Internal Patchcord Origination page, provision the internal patchcord origination parameters:

- Type—Choose the type of card (optical or passive card) where the internal patchcord terminates.
- Side—Choose the side where the internal patchcord terminates. This field is visible only if you have chosen the type as Optical Card.
- Slot—Choose the slot containing the card where the internal patchcord terminates. This field is visible only if you have chosen the type as Optical Card.
- Unit—Choose the passive card where the internal patchcord terminates. This field is visible only if you have chosen the type as Passive Card.
- Tx Port—Choose the TX port where the internal patchcord terminates. CTC automatically displays the list of ports that are available depending on the link type you choose.

Step 7 In the Internal Patchcord Termination page, provision the internal patchcord termination parameters:

- Type—Choose the type of card (optical or passive card) where the internal patchcord terminates.
- Side—Choose the side where the internal patchcord terminates. This field is visible only if you have chosen the type as Optical Card.
- Slot—Choose the slot containing the card where the internal patchcord terminates. This field is visible only if you have chosen the type as Optical Card.
- Unit—Choose the passive card where the internal patchcord terminates. This field is visible only if you have chosen the type as Passive Card.
- Rx Port—Choose the RX port where the internal patchcord terminates. CTC automatically displays the list of ports that are available depending on the link type you choose.

Step 8 If you did not choose bidirectional in Step 4, continue with Step 13. Otherwise, continue with the next step.

Step 9 Click **Next**.

Step 10 In the Internal Patchcord Origination Reverse page, provision the internal patchcord parameters for the reverse internal patchcord origination route:

- Type—Choose the type of card (optical or passive card) where the internal patchcord originates.

- Side—Choose the side where the internal patchcord originates. This field is visible only if you have chosen the type as Optical Card.
- Slot—Choose the slot containing the card where the internal patchcord originates. This field is visible only if you have chosen the type as Optical Card.
- Unit—Choose the passive card where the internal patchcord originates. This field is visible only if you have chosen the type as Passive Card.

  Note Choose the same passive card that you chose in Step 7.

- Tx Port—Choose the TX port where the internal patchcord originates. CTC automatically displays the list of ports that are available depending on the link type you choose.

Step 11 Click **Next**.

Step 12 In the internal Patchcord Termination Reverse page, provision the internal patchcord parameters for the reverse internal patchcord termination route:

- Type—Choose the type of card (optical or passive card) where the internal patchcord terminates.
- Side—Choose the side where the internal patchcord terminates. This field is visible only if you have chosen the type as Optical Card.
- Slot—Choose the slot containing the card where the internal patchcord terminates. This field is visible only if you have chosen the type as Optical Card.
- Unit—Choose the passive card where the internal patchcord terminates. This field is visible only if you have chosen the type as Passive Card.

  Note Choose the same passive card that you chose in Step 6.

- Rx Port—Choose the RX port where the internal patchcord terminates. CTC automatically displays the list of ports that are available depending on the link type you choose.

Step 13 Click **Finish**. The new internal patchcord appears in the Internal Patchcord table.

Step 14 Return to your originating procedure (NTP).

DLP-G549 Creating an Internal Patchcord Manually Using the OTS to OTS Option

Purpose	This task creates a unidirectional or bidirectional internal patchcord between two optical transport section (OTS) ports.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote

Security Level	Superuser only

Note When the creation of patchcords between two passive cards fails after deleting the previous internal patchcords, delete the passive cards and re-provision them.

Procedure

Step 1 In node view (single-shelf mode) or multishelf view (multishelf mode), click the **Provisioning** > **WDM-ANS** > **Internal Patchcord** tabs.

Step 2 Click **Create**.

Step 3 On the Internal Patchcord Type Selection page, choose the patchcord type as OTS to OTS and click **Next**.

Step 4 On the Internal Patchcords OTS Attributes page, provision the following parameters:

- Bidirectional—If checked, creates a bidirectional internal patchcord.
- MPO Connection—Creates all the patchcords between two MPO connectors. If this option is checked, the bidirectional option is disabled.
- Exclude Used Port—If checked, excludes the used ports for patchcord creation. If unchecked, more than one patchcord can be created starting from the same port.
- Grid Filter—Select the grid option from the drop-down list.
- Port Type—Select the port type from the drop-down list. The options are:
  - OSC only—Cards with OSC ports and OSCM cards are available for patchcord creation. The MPO Connection and Exclude Used Ports checkboxes are disabled and the Bidirectional option is checked.
  - DC only—Cards with DC ports and passive DCUs are available for patchcord creation. The MPO Connection and Exclude Used Ports checkboxes are disabled and the Bidirectional option is checked. Allows to create an internal patchcord between an optical card and a passive card.

Step 5 Click **Next.**

Step 6 On the Internal Patchcord Origination page, provision the internal patchcord origination parameters:

- Type—Choose the type of card (optical or passive card) where the internal patchcord originates.
- Slot—Choose the slot containing the card where the internal patchcord originates. This field is visible only if you have chosen the type as Optical Card.
- Unit—Choose the passive card where the internal patchcord originates. This field is visible only if you have chosen the type as Passive Card.
- Tx Port—Choose the TX port where the internal patchcord originates. CTC automatically displays the list of ports that are available depending on the link type you choose.
- MPO—Choose the port where the internal patchcord originates.CTC automatically displays the list of ports that are available depending on the link type you choose. This field is visible only if you have chosen MPO connection in Step 4.

Step 7 Click **Next.**

Step 8 In the Internal Patchcord Termination page, provision the internal patchcord termination parameters:

- Type—Choose the type of card (optical or passive card) where the internal patchcord terminates.
- Slot—Choose the slot containing the card where the internal patchcord terminates. This field is visible only if you have chosen the type as Optical Card.
- Unit—Choose the passive card where the internal patchcord terminates. This field is visible only if you have chosen the type as Passive Card.
- Rx Port—Choose the RX port where the internal patchcord terminates. CTC automatically displays the list of ports that are available depending on the link type you choose.
- MPO—Choose the port where the internal patchcord originates.CTC automatically displays the list of ports that are available depending on the link type you choose. This field is visible only if you have chosen MPO connection in Step 4.

Step 9 If you did not choose bidirectional in Step 4, continue with Step 14. Otherwise, continue with the next step.

Step 10 Click **Next.**

Step 11 In the Internal Patchcord Origination Reverse page, provision the internal patchcord parameters for the reverse internal patchcord origination route:

- Type—Choose the type of card (optical or passive card) where the internal patchcord originates.
- Side—Choose the side where the internal patchcord originates. This field is visible only if you have chosen the type as Optical Card.
- Slot—Choose the slot containing the card where the internal patchcord originates. This field is visible only if you have chosen the type as Optical Card.
- Unit—Choose the passive card where the internal patchcord originates. This field is visible only if you have chosen the type as Passive Card.

  Note Choose the same passive card that you chose in Step 8.

- Tx Port—Choose the TX port where the internal patchcord originates. CTC automatically displays the list of ports that are available depending on the link type you choose.

Step 12 Click **Next.**

Step 13 In the Internal Patchcord Termination Reverse page, provision the internal patchcord parameters for the reverse internal patchcord termination route:

- Type—Choose the type of card (optical or passive card) where the internal patchcord terminates.
- Side—Choose the side where the internal patchcord terminates. This field is visible only if you have chosen the type as Optical Card.
- Slot—Choose the slot containing the card where the internal patchcord terminates. This field is visible only if you have chosen the type as Optical Card.
- Unit—Choose the passive card where the internal patchcord terminates. This field is visible only if you have chosen the type as Passive Card.

  Note Choose the same passive card that you chose in Step 6.

- Rx Port—Choose the RX port where the internal patchcord terminates. CTC automatically displays the list of ports that are available depending on the link type you choose.

Step 14 Click **Finish**. The new internal patchcord appears in the Internal Patchcord table.

Step 15 Return to your originating procedure (NTP).

DLP-G531 Creating an Internal Patchcord Manually Using the Optical Path Option

Purpose	This task creates an internal patchcord manually between two optical cards or between an optical card and a passive card.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Superuser only

Note When the creation of patchcords between two passive cards fails after deleting the previous internal patchcords, delete the passive cards and re-provision them.

Procedure

Step 1 In node view (single-shelf mode) or multishelf view (multishelf mode), click the **Provisioning** > **WDM-ANS** > **Internal Patchcord** tabs.

Step 2 Click **Create**.

Step 3 On the Internal Patchcord Type Selection page, choose the patchcord type as Optical Path and click **Next**.

Step 4 On the Internal Patchcord Card List page, provision the following parameters:

- Card From Selection area:
  - Type—Choose the type of card (optical or passive card) where the internal patchcord originates.
  - Shelf—(Multishelf nodes only) Choose the shelf where the internal patchcord originates.
  - Slot—Choose the slot containing the card where the internal patchcord originates.
- Card To Selection area:
  - Type—Choose the type of card (optical or passive card) where the internal patchcord terminates.
  - Shelf—(Multishelf nodes only) Choose the shelf where the internal patchcord terminates.

- Slot—Choose the slot containing the card where the internal patchcord terminates.

- Choose the required patchcord from the list that CTC generates.

Step 5 Click **Next** to continue creating internal patchcords between cards and repeat Step 4. In the Internal Patchcord Card List page that follows, CTC automatically populates the Card From Selection fields with the values you entered in the Card To Selection fields in the previous page.

Note After an internal patchcord is created, the selected optical card appears in the **Unit** drop-down list under *Passive Card Type*. To remove the optical card from the *Passive Card Type*, you must choose *Optical Card* and then *Passive Card* in the **Type** drop-down list. You must do this for every internal patchcord creation to correct the misplacement of the optical card.

Step 6 After creating all the internal patchcords between cards, click **Finish**. The new internal patchcords appear on the Internal Patchcord table.

Step 7 Return to your originating procedure (NTP).

DLP-G355 Deleting an Internal Patchcord

Purpose	This task deletes an internal patchcord.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Superuser only

Procedure

Step 1 In node view (single-shelf mode) or multishelf view (multishelf mode), click the **Provisioning** > **WDM-ANS** > **Internal Patchcord** tabs.

Step 2 Click the connection you want to delete.

Step 3 Click **Delete**, then click **Yes**.

Step 4 Return to your originating procedure (NTP).

NTP-G209 Creating, Editing, and Deleting Optical Sides

Purpose	This procedure allows you to create, edit, and delete optical sides on a DWDM node.

Tools/Equipment	None
Prerequisite Procedures	• NTP-G143 Importing the Cisco Transport Planner NE Update Configuration File, on page 99 • DLP-G46 Log into CTC
Required/As Needed	Required
Onsite/Remote	Onsite or remote
Security Level	Superuser only

Note For any node type including mesh nodes, the association between the shelf, line card and side is reported in the left top window of CTC (Vital Status Pane) in the mode view.

Note For mesh nodes, the association between sides and the 40-WXC-C cards can be found in the **Provisioning** > **WDM-ANS** > **Internal Patchcords** screen. For example: PP-MESH, LC (A): Shelf 1, Slot 3 (40 WXC), port EXP-TX PP-MESH, MPO (A): Shelf 1, Slot 3 (40 WXC), port EXP-RX The above rows indicate that the: WXC port located in Shelf 1, Slot 3 is connected to the LC connector A (Side A) on PP-MESH. WXC port located in Shelf 1, Slot 3 is connected to the MPO connector A (Side A) on PP-MESH.

Procedure

As needed, complete the following tasks:

- Complete the DLP-G491 Creating an Optical Side, on page 124.
- Complete the DLP-G492 Editing an Optical Side, on page 125.
- Complete the DLP-G480 Deleting an Optical Side, on page 126.

Stop. You have completed this procedure.

DLP-G491 Creating an Optical Side

Purpose	This task creates an optical side.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote

Security Level	Superuser only

Procedure

Step 1 In node view (single-shelf mode) or multishelf view (multishelf mode), click the **Provisioning** > **WDM-ANS** > **Optical Sides** tabs.

Step 2 Click **Create**.

Step 3 In the Create Side dialog box, enter the following:

- Side ID—Choose a side ID (A, B,C, D, E, F, G, or H) from the drop-down list.
- Line In—Choose an RX port from the drop-down list.
- Line Out—Choose a TX port from the drop-down list.

Note For a terminal node equipped with a PSM card in line or multiplex section protection configuration, you can only choose the W-RX and W-TX ports while creating an optical side. After you create the working (w) optical side, the control card automatically creates the protected (p) optical side involving the P-RX and P-TX ports of the PSM card. CTC refreshes the Optical Sides tab with both the working and protected optical sides.

Step 4 Return to your originating procedure (NTP).

DLP-G492 Editing an Optical Side

Purpose	This task edits the side ID of an optical side.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Superuser only

Procedure

Step 1 In node view (single-shelf mode) or multishelf view (multishelf mode), click the **Provisioning** > **WDM-ANS** > **Optical Sides** tabs.

Step 2 Click the optical side that you want to edit.

Step 3 Click **Edit**.

Step 4 In the Edit Side ID dialog box, enter the following information:

- Side ID—Choose a side ID from the drop-down list.

- Side Description—Specify a description to identify the side.

Step 5 Click **OK**.

Step 6 Return to your originating procedure (NTP).

DLP-G480 Deleting an Optical Side

Purpose	This task deletes an optical side.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Superuser only

Procedure

Step 1 In node view (single-shelf mode) or multishelf view (multishelf mode), click the **Provisioning** > **WDM-ANS** > **Optical Sides** tabs.

Step 2 Click the optical side that you want to delete.

Step 3 Click **Delete**.

Step 4 In the confirmation dialog box, click **Yes** to continue.

Step 5 Return to your originating procedure (NTP).

NTP-G38 Provisioning OSC Terminations

Purpose	This procedure provisions the OSC terminations.
Tools/Equipment	None
Prerequisite Procedures	• NTP-G143 Importing the Cisco Transport Planner NE Update Configuration File, on page 99 • DLP-G46 Log into CTC
Required/As Needed	Required
Onsite/Remote	Onsite or remote
Security Level	Superuser only

Note The OSC provides a bidirectional channel that connects all nodes within a DWDM ring. The OSC carries a supervisory data channel and synchronizes clocking at network nodes. The OSC also carries a user data channel.

Note Before provisioning OSC terminations on TNC ports carrying Fast Ethernet (FE) payloads, ensure to set the ALS mode on these ports to Disabled.

Note This procedure automatically turns on any OPT-RAMP-C, OPT-RAMP-CE, or RAMAN-CTP cards installed in the DWDM ring.

Note The DCCs, GCCs, and OSCs should not be provisioned between SONET (ANSI) and SDH (ETSI) nodes using CTC or TL1 because they cannot operate between SONET and SDH nodes. These communication channels should be provisioned on similar nodes, such as SONET-to-SONET or SDH-to-SDH.

Note In a pure ONS 15454 M6 network configuration, provision the OSC in GE or FE SFP mode. If an OC3 OSC is mandatory, then the network must be timing-synchronized as SONET. Identify the primary node and provide external timing signal to the BITS input pins of the primary node and provision line timing to the remaining nodes in the network. In a mixed ONS 15454 and ONS 15454 M6 network configuration, provision the OSC only in OC3 SFP mode. Identify the primary node and provide external timing signal to the BITS input pins of the primary node and provision line timing to the remaining nodes in the network.

Procedure

Step 1 In node view (single-shelf mode) or multishelf view (multishelf mode), click the **Provisioning** > **Comm Channels** > **OSC** tabs.

Step 2 In the OSC Terminations area, click **Create**.

Step 3 In the Create OSC Terminations dialog box, choose the ports where you want to create the OSC termination. To select more than one port, press the **Shift** key (to select a range of ports) or the Ctrl key (to select multiple individual ports).

Note The number of OSC terminations that you create depends on the node type defined by Cisco Transport Planner. Terminal nodes require one OSC termination. Hub, OADM, and ROADM nodes require two OSC terminations.

Step 4 In the Layer 3 area, check the OSI box if the following conditions are met:

- The OSC termination is between two nodes.

- Third party NEs that use the OSI protocol stack are on the same network.

  If you checked OSI, complete the following steps. If not, continue with Step 5.

a) Click **Next**.
b) Provision the following fields:
   - Router—Choose the OSI router.
   - ESH—Set the ESH propagation frequency. End system NEs transmit ESHs to inform other ESs and ISs about the NSAPs they serve. The default is 10 seconds. The range is 10 to 1000 seconds.
   - ISH—Sets the ISH PDU propagation frequency. Intermediate system NEs send ISHs to other ESs and ISs to inform them about the IS NETs it serves. The default is 10 seconds. The range is 10 to 1000 seconds.
   - IIH—Sets the IIH PDU propagation frequency. The IS-IS Hello PDUs establish and maintain adjacencies between ISs. The default is 3 seconds. The range is 1 to 600 seconds.
   - Metric—Sets the cost for sending packets on the LAN subnet. The IS-IS protocol uses the cost to calculate the shortest routing path. The default metric cost for LAN subnets is 20. It normally should not be changed.

Step 5 Click **Finish**. Ports are automatically placed in service. The following alarms might appear in the node view (single-shelf mode) or multishelf view (multishelf mode) Alarms tab Description field. They will remain until all the network OSC connections between the adjacent nodes are created:

- SDCC Termination Failure (ANSI) or RS-DCC Termination Failure (ETSI) on the OSCM or OSC-CSM card
- LOS on the OC-3 port (Port 1) on the OSCM, OSC-CSM, or OPT-BST card
- OPWR-LFAIL on the OPT-BST or OSC-CSM card

Note After the OSC termination is created, the line ports are placed in service and span power levels are checked.

Stop. You have completed this procedure.

NTP-G37 Running Automatic Node Setup

Purpose	This procedure runs the Launch ANS function.
Tools/Equipment	The Cisco Transport Planner Installation Parameters file

Prerequisite Procedures	• NTP-G139 Verifying Cisco Transport Planner Reports and Files, on page 52 • NTP-G152 Creating and Verifying Internal Patchcords, on page 112 • NTP-G143 Importing the Cisco Transport Planner NE Update Configuration File, on page 99 • DLP-G46 Log into CTC
Required/As Needed	Required
Onsite/Remote	Onsite or remote
Security Level	Superuser only

Note Launch ANS applies the ANS parameters (calculated in the NTP-G143 Importing the Cisco Transport Planner NE Update Configuration File, on page 99) to the node and to the ports for cards installed in the node. The applied ANS parameters include span loss values, threshold values, power references, and others. Launch ANS also sets the VOA references based on the calculated power references.

Note ANS provisioning parameters must be calculated by Cisco Transport Planner. ANS provisioning parameters must be manually changed only by Cisco qualified personnel. Setting wrong ANS provisioning (either as preamplifier or booster input power thresholds) may impact traffic.

Procedure

Step 1 Referring to the "Cisco Transport Planner Installation Parameters" table, identify the parameters that have a Yes in the Manually Set column. If there are no parameters that have a Yes in the Manually Set column, continue with Step 5.

Step 2 In CTC, display the card where the parameter is to be manually provisioned in card view.

Step 3 Enter the specified Calibration parameter from the Cisco Transport Planner Installation Parameters table. Click **Apply**.

Step 4 Repeat Steps 1 through 3 for each parameter in the Cisco Transport Planner Installation Parameters table that displays Yes in the Manually Set field.

Step 5 Change to node view (single-shelf mode) or multishelf view (multishelf mode).

Step 6 Click the **Provisioning** > **WDM-ANS** > **Port Status** tabs.

Step 7 Click **Launch ANS**.

Step 8 In the Apply Launch ANS dialog box, click **Yes**.

Step 9 In the Launch ANS confirmation dialog box, click **OK**.

Step 10 Verify that one of the following status appears in the Result column for all the ports:

- Success - Changed—The parameter setpoint was recalculated successfully.

- Success - Unchanged—The parameter setpoint did not need recalculation.
- Not applicable—When ports are not in use.

If one of the following statuses is shown, complete the provided instructions:

- Fail - Out of Range—The calculated setpoint is outside the expected range. If this status appears, do not continue until you have investigated and cleared the cause. This status might appear because of an error in the Cisco Transport Planner file. It could also appear because the insertion loss of the installed cards is greater than the estimated insertion loss calculated by Cisco Transport Planner. If so, the Cisco Transport Planner file will need to be recalculated. All of these possible causes should be investigated. Contact your next level of support if you are unable to clear this status.
- Fail - Missing Input Parameter—The parameter could not be calculated because the required provisioning data is unknown or unavailable. If this status appears, check if the correct Cisco Transport Planner file was imported.
- Unchanged - Port in IS—The parameter could not be calculated because the port is in service. This status should normally not appear at this point in node turn-up. If it does, display the card in card view, change the port administrative state to OOS,DSLB (ANSI) or Locked,disabled (ETSI), and repeat Steps 5 through 10.

Note If the ports that are in service carry circuits, you must delete the circuits before you can place the ports out of service. See the Creating Optical Channel Circuits and Provisionable Patchcords chapter for information on circuit deletion.

Stop. You have completed this procedure.

NTP-G163 Upgrading Nodes in Single-Shelf Mode to Multishelf Mode

Purpose	This procedure upgrades nodes in single-shelf mode to multishelf mode.
Tools/Equipment	The node you plan to use as the node controller must be equipped with optical units and cannot have a cross-connect card installed. Any nodes that you plan to add to the multishelf configuration as subtending shelves can be equipped with transponder and muxponder units.

Prerequisite Procedures	NTP-G22 Verifying Common Card Installation, on page 54 One of the following procedures in the Cisco ONS 15454 Hardware Installation Guide: • "NTP-G301 Connect the ONS 15454 Multishelf Node and Subtending Shelves to an MS-ISC-100T Card" • "NTP-G302 Connect the ONS 15454 Multishelf Node and Subtending Shelves to a Catalyst 2950" • "NTP-G308 Connect the ONS 15454 M6 Multishelf Node and the ONS 15454 M6 Subtending Shelves" • "DLP-G682 Connect the ONS 15454 M6 as the Node Controller in a Mixed Multishelf Configuration" DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Superuser only

Caution An optical shelf in a multishelf configuration must be provisioned as the node controller shelf and not a subtending shelf, otherwise traffic will be dropped. If no slots are available on an optical shelf to install the MS-ISC-100T cards needed for a node controller shelf, install and configure the Cisco Catalyst 2950. See the "NTP-G302 Connect the ONS 15454 Multishelf Node and Subtending Shelves to a Catalyst 2950" procedure in the Cisco ONS 15454 Hardware Installation Guide.

Note If a standalone node has unsupported cards, the node cannot be converted to a node controller or a subtended shelf controller.

Procedure

Step 1 If you want to configure a shelf as the node controller, continue with Step 2. If you want to configure a shelf as a subtending shelf, continue with Step 3.

Step 2 To set up the login node as the node controller, complete the following steps:

a) In node view (single-node mode) or multishelf view (multishelf mode), click the **Provisioning** > **General** > **Multishelf Config** tabs.

b) Click **Enable as Node Controller**.

c) From the LAN Config drop-down list, complete one of the following:

- Choose **Ethernet Switch** if MS-ISC-100T cards or the Catalyst 2950 switches are already installed and configured.

- Choose **Stand-Alone** if MS-ISC-100T cards are not installed yet but will be in the final layout or if this is a line amplifier or an OSC-only site. This option will allow a safe migration of the control card database when the multishelf configuration is complete.

d) Click **Apply**.
e) In the confirmation dialog box, click **Yes** to allow the node to reboot. The CTC view changes to network view and the node icon changes to gray. Wait for the reboot to finish. (This might take several minutes.)
f) After the node reboots, double-click the node. The multishelf view appears.

Note The shelf ID of the node controller is automatically assigned as 1.

Step 3 To add a node as a subtending shelf in the multishelf configuration, complete the following:

a) In multishelf view, right-click in the white space in the rack and choose **Add Shelf**.
b) Select the type of subtending shelf.
c) In the Shelf ID Selection dialog box, choose a shelf ID (from 2 to 50 if the controller card is TNC, TNCE, TSC, TSCE, or TCC3 card, from 2 to 12 if the controller card is TCC2P card) from the drop-down list.

Note If a standalone node has unsupported cards, the node cannot be converted to a node controller or a subtended shelf controller.

d) Click **OK**. The shelf appears in the multishelf view.
e) Preprovision the new shelf so that it has the same provisioning as the actual shelf that you will add as the subtending shelf:

Caution If the subtending shelf is not preprovisioned, traffic will be lost.

- Cards, PPMs, administrative states, client and trunk port configuration—For more information on card and port settings, see the Provisioning Transponder and Muxponder Cards chapter.
- Timing—For more information, see the NTP-G53 Set Up Timing procedure.
- GCC—For more information, see the DLP-G76 Provisioning DCC/GCC Terminations.

f) Disconnect the cross-over (CAT-5) LAN cable from the RJ-45 (LAN) port of the ONS 15454 subtending shelf TCC2/TCC2P/TCC3 card in Slot 7 or Slot 11, or from the EMS port of ONS 15454 M6 subtending shelf.
g) Connect your Windows PC or Solaris workstation NIC to the RJ-45 (LAN) port on the subtending shelf ONS 15454 TCC2/TCC2P/TCC3 card in Slot 7 or Slot 11, or to the EMS port of the ONS 15454 M6 subtending shelf.
h) Complete the DLP-G46 Log into CTC task at the subtending shelf.
i) Click the **Provisioning > General > Multishelf Config** tabs.
j) Click **Enable as Subtended Shelf**.
k) Select the appropriate subtending shelf.
l) From the Shelf ID drop-down list, choose the shelf ID that you created in Step c.
m) Click **Apply**.
n) In the confirmation dialog box, click **Yes** to reboot the shelf. The CTC view changes to network view and the node icon changes to gray. Wait for the reboot to finish. (This might take several minutes.)
o) Disconnect your Windows PC or Solaris workstation network interface card (NIC) from the RJ-45 (LAN) port of the subtending shelf TCC2/TCC2P/TCC3 card in Slot 7 or Slot 11, or from the EMS port of the ONS 15454 M6 subtending shelf.

p) Reconnect the cross-over (CAT-5) LAN cable (disconnected in Step f) to the RJ-45 (LAN) port of the subtending shelf TCC2/TCC2P/TCC3 card in Slot 7 or Slot 11, or to the EMS port of the ONS 15454 M6 subtending shelf.

Note The Ethernet cable must be connected to the subtended shelf of the control card soon after the control card completes its boot phase (when it becomes active and its peer control card starts rebooting). Connecting it before the control card completes its boot phase is a risk in the conversion process. Connecting it long time after completion of the boot phase might affect traffic due to missing provisioning.

q) Repeat Steps a through p to set up additional subtending shelves.

Note Cisco Transport Manager (CTM) users can use the CTM NE Explorer to monitor and configure single-shelf and multishelf nodes. When the upgrade is complete, the original individual subtending shelves will remain the CTM network view and must be manually deleted.

Stop. You have completed this procedure.

NTP-G332 Upgrading Nodes in Single-Shelf Mode to Multishelf Mode with TCC2P Cards as Subtending Shelf Controller

Purpose	This procedure upgrades nodes in single-shelf mode to multishelf mode subtending shelf with ONS 15454 nodes with TCC2P cards in R9.60 or later releases.
Tools/Equipment	The node you plan to use as the node controller must be equipped with optical units and cannot have a cross-connect card installed. Any nodes that you plan to add to the multishelf configuration as subtending shelves can be equipped with transponder and muxponder units. For more information on multishelf configurations, see "Node Reference" chapter.
Prerequisite Procedures	NTP-G22 Verifying Common Card Installation, on page 54 One of the following procedures in the Cisco ONS 15454 Hardware Installation Guide: • "NTP-G301 Connect the ONS 15454 Multishelf Node and Subtending Shelves to an MS-ISC-100T Card" • "NTP-G302 Connect the ONS 15454 Multishelf Node and Subtending Shelves to a Catalyst 2950" • "NTP-G308 Connect the ONS 15454 M6 Multishelf Node and the ONS 15454 M6 Subtending Shelves" • "DLP-G682 Connect the ONS 15454 M6 as the Node Controller in a Mixed Multishelf Configuration" DLP-G46 Log into CTC

Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	Superuser only

Caution An optical shelf in a multishelf configuration must be provisioned as the node controller shelf and not a subtending shelf, otherwise traffic will be dropped. If no slots are available on an optical shelf to install the MS-ISC-100T cards needed for a node controller shelf, install and configure the Cisco Catalyst 2950. See the "NTP-G302 Connect the ONS 15454 Multishelf Node and Subtending Shelves to a Catalyst 2950" procedure in the Cisco ONS 15454 Hardware Installation Guide.

Note If a standalone node has unsupported cards, the node cannot be converted to a node controller or a subtended shelf controller.

Procedure

Step 1 Complete the NTP-G163 Upgrading Nodes in Single-Shelf Mode to Multishelf Mode, on page 130 to configure a single-shelf as a subtending shelf in the multishelf configuration.

Step 2 Connect the subtending shelf to the multishelf node controller. Complete the following tasks in the Cisco ONS 15454 Hardware Installation Guide as appropriate:

- NTP-G301 Connect the ONS 15454 Multishelf Node and Subtending Shelves to an MS-ISC-100T Card.
- NTP-G302 Connect the ONS 15454 Multishelf Node and Subtending Shelves to a Catalyst 2950.
- NTP-G308 Connect the ONS 15454 M6 Multishelf Node and the ONS 15454 M6 Subtending Shelves.
- DLP-G682 Connect the ONS 15454 M6 as the Node Controller in a Mixed Multishelf Configuration.

Step 3 Complete the DLP-G730 Editing the Shelf ID of the Subtending Shelf in a Multishelf Configuration Using the LCD, on page 135 to change the Shelf ID of the subtended shelf in the range between 2 and 50.

Caution The traffic is lost when you change the Shelf ID of the subtending shelf in a multishelf configuration.

Stop. You have completed this procedure.

DLP-G730 Editing the Shelf ID of the Subtending Shelf in a Multishelf Configuration Using the LCD

Purpose	This task edits the Shelf ID of a subtending shelf using LCD on the fan try assembly. In an ONS 15454 M6 shelf assembly, the LCD panel is a separate unit installed above the external connection unit (ECU).
Tools/Equipment	None
Prerequisite Procedures	NTP-G163 Upgrading Nodes in Single-Shelf Mode to Multishelf Mode, on page 130
Required/As Needed	As needed.
Onsite/Remote	Onsite
Security Level	Superuser only

Caution The traffic is lost when you change the Shelf ID of the subtending shelf in a multishelf configuration.

Note The LCD reverts to normal display mode after 5 seconds of button inactivity.

Procedure

Step 1 On the ONS 15454 front panel, repeatedly press the **Slot** button until SHELF appears on the first line of the LCD. You are in the Shelf menu.

Note In a ONS 15454 M6 shelf assembly, the LCD is a separate unit installed above the external connection unit (ECU); the **Slot**, **Port**, and **Status** buttons are present on the LCD unit.

Step 2 Repeatedly press the **Port** button until the “Controller Status = MS Configuration” appears on the LCD.

Step 3 Press the **Status** button to display the current multishelf configuration settings.

Step 4 Push the **Slot** button to move to the ID field that you want to change. The selected digit flashes.

Note The Slot, Status, and Port button positions correspond to the positions of the commands shown on the LCD. For example, you press the Slot button to invoke the Next command and the Status button to invoke the Done command.

Step 5 Press the **Port** button to change the Shelf ID to the desired number.

Step 6 When the change is complete, press the **Status** button to return to the relevant Controller Status menu.

Step 7 Repeatedly press the **Port** button until the Shelf Save Configuration option appears.

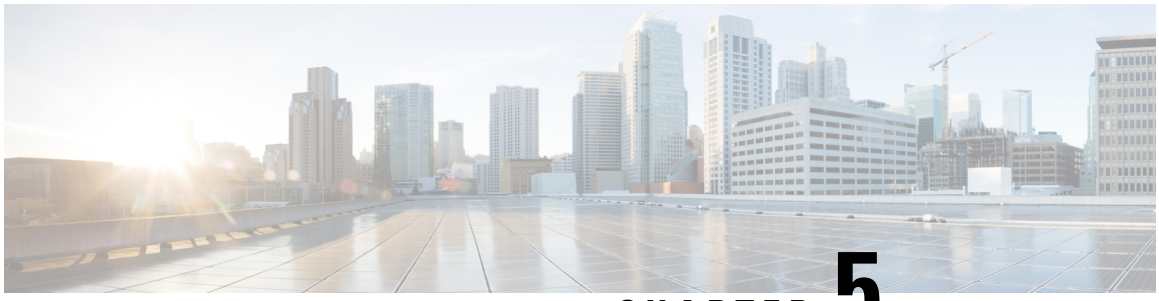
Step 8 Press the **Status** button to choose the Save Configuration option.

A Save and REBOOT message appears.

Step 9 Press the **Slot** button to apply the new Shelf ID or press **Port** to cancel the configuration.

Step 10 Saving the new configuration causes the control cards to reboot. During the reboot, a message appears on the LCD. The LCD returns to the normal alternating display after both the control cards finish rebooting.

Step 11 Return to your originating procedure (NTP).



CHAPTER 5

Synchronizing Node Timing

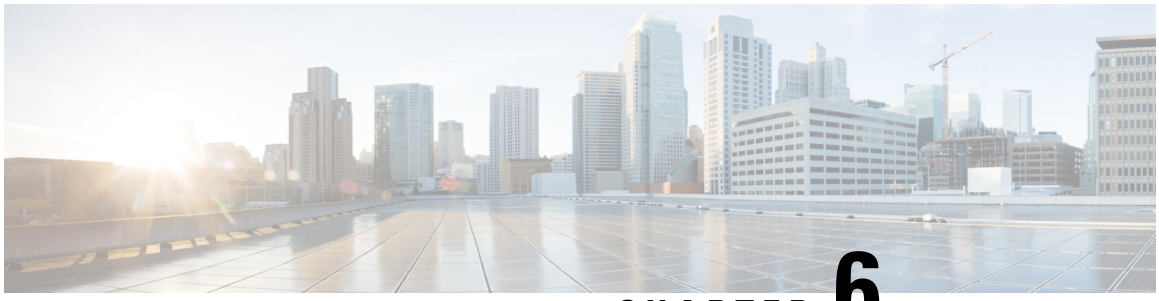
This chapter provides information about users and node timing parameters and network timing.

- Synchronizing Node Timing, on page 137

Synchronizing Node Timing

The information in this chapter is in a new location. See Timing Reference for information about users and node timing parameters, network timing, and Synchronization Status Messaging (SSM).

Synchronizing Node Timing



CHAPTER 6

Provisioning Security

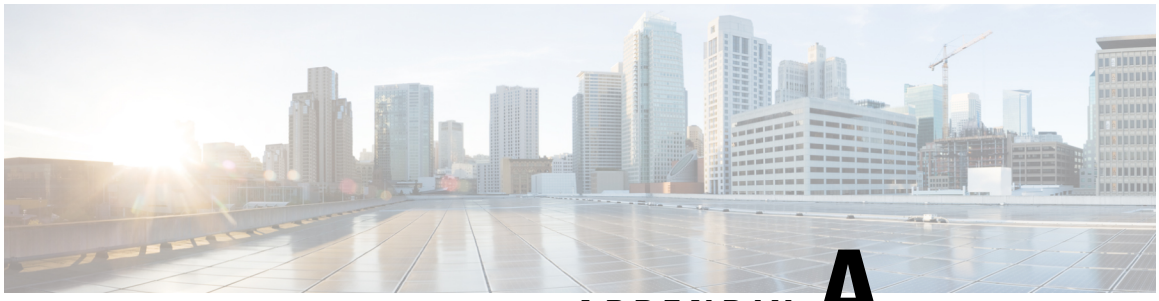
This chapter provides information related to user IDs and security levels, user privileges and policies, audit trail, and RADIUS security.

• Provisioning Security, on page 139

Provisioning Security

The information in this chapter is in a new location. See Security Reference for information related to user IDs and security levels, user privileges and policies, audit trail, and RADIUS security.

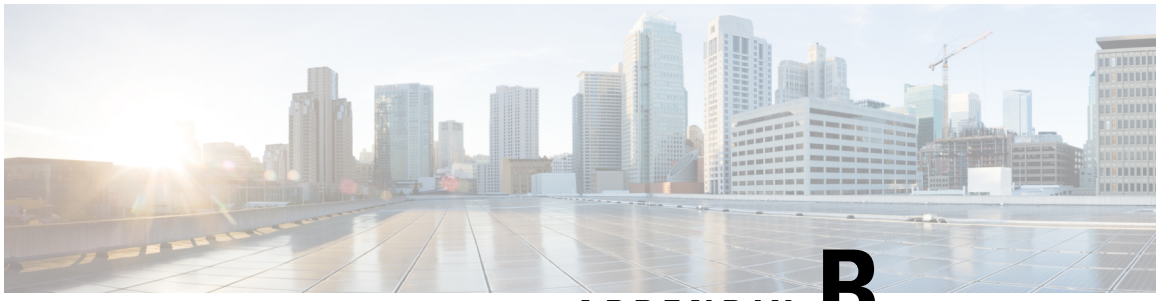
Provisioning Security



APPENDIX A

Card Specifications

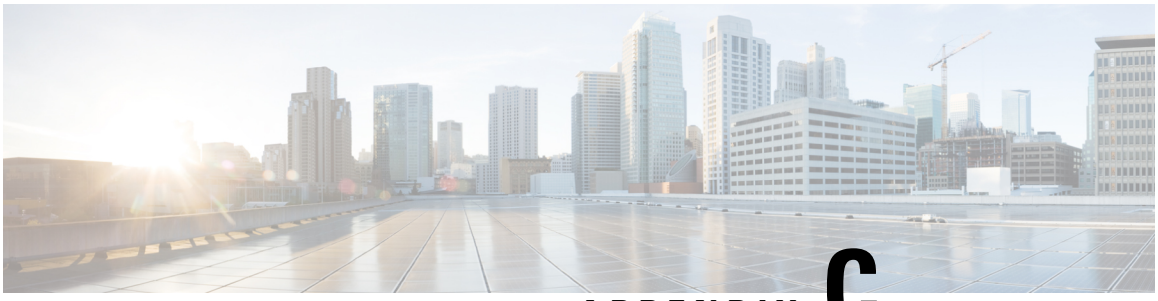
The information in this chapter is in a new location. See Hardware Specifications for information related to hardware and software specifications for the cards.



APPENDIX B

SNMP

The information in this chapter is in a new location. See SNMP for information related to Simple Network Management Protocol (SNMP).

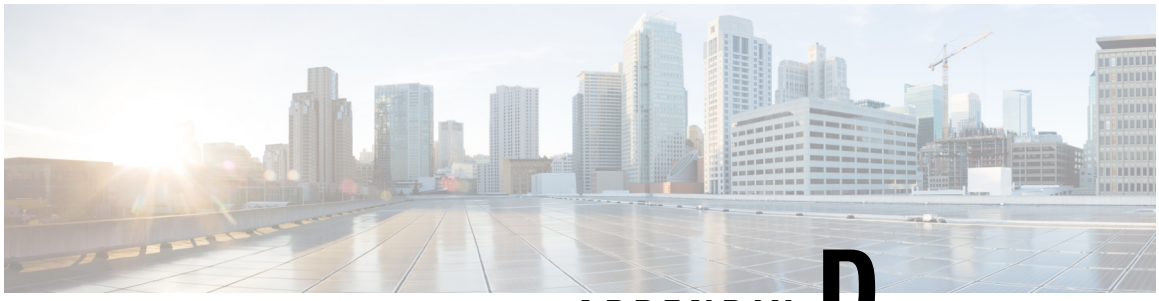


APPENDIX C

CTC Enhancements, Operations, and Shortcuts

The information in this chapter is in a new location. See CTC Enhancements, Operations, and Shortcuts for information on Cisco Transport Controller (CTC) views, menus options, tool options, shortcuts, table display options, and shelf inventory data presented in CTC.

CTC Enhancements, Operations, and Shortcuts



APPENDIX D

Network Element Defaults

The information in this chapter is in a new location. See Network Element Defaults for information related to factory-configured (default) network element (NE) settings.

Network Element Defaults

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