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. DLP-G722 Changing the Card OTN Settings	*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-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	-	• 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

Feature	Description	Where Documented
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
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