

Chapter 8: Optical Networking

This chapter provides only a subset of Cisco products and part numbers.

Optical Networking At-a-Glance		
Product	Features	Page
METRO CORE		
Cisco ONS 15600 SONET/SDH Multiservice Switching Platform	<ul style="list-style-type: none"> • Solution allows service providers to transparently integrate their metropolitan (metro) core and metro edge networks while dramatically reducing initial turn-up costs • Provides 320 gigabits of switching, grooming, aggregation, and bandwidth-management capacity in a single shelf • Platform offers any service, any port (ASAP) service cards that hold up to four pluggable I/O (ASAP 4-PIO or ASAP-1-PIO modules, each capable of supporting up to four 2.5-Gbps SFP optics or one 10-Gbps XFP optics capable of both fixed-rate and multirate formats • Combines the functions of multiple metro systems, including SONET/SDH multiplexers and digital cross-connect network elements • Provides carrier-class availability, serviceability, and management • Scalable, easy-to-use platform supports all metro topologies 	8-2
Cisco ONS 15454 SONET/SDH Multiservice Provisioning Platform	<ul style="list-style-type: none"> • Integrates the functions of traditional SONET or SDH network elements with next-generation SONET/SDH transport and multiservice interfaces • Solution combines multiplexing, optical networking, and switching functions in one easy-to-use platform that supports all metro topologies 	8-2
METRO, REGIONAL, AND LONG-HAUL DWDM		
Cisco ONS 15454 Multiservice Transport Platform (MSTP) *NEW UPDATES*	<ul style="list-style-type: none"> • Solution delivers integrated, intelligent dense wavelength-division multiplexing (DWDM) functions, including fully reconfigurable optical add/drop multiplexer (ROADM) technology for metropolitan, regional networks, and long-haul networks (from 32 to 80 wavelengths per node) • Offers a compact 40 wavelengths ROADM solution 2 or 4 degrees, based on the Single Module ROADM technology and 2-slot / 6-slot compact chassis • Offers multiservice time-division multiplexing (TDM) and data aggregation over 2.5- and 10-Gbps wavelengths • Video services include D1 and high-definition television (HDTV) 	8-3
Cisco ONS 15216 Metropolitan/Regional DWDM System and Transmission Families	<ul style="list-style-type: none"> • Supports 32 ITU-grid wavelengths launched by the Cisco ONS 15454 MSTP, ONS MSPP, ONS 15600, ONS 15310, or alien wavelengths and creates a more desirable per-wavelength cost • Optical add/drop multiplexer (OADM) • Cisco ONS 15216 Erbium-Doped Fiber Amplifier (EDFA)-3 Optical Amplification • Compact, modular design 	8-3
METRO EDGE ACCESS		
Cisco ONS 15310-MA SONET Multiservice Platform	<ul style="list-style-type: none"> • Offers high-density aggregation and transports up to 168 DS-1, 6 DS-3, or 32 Layer 1 or Layer 2/3 Ethernet ports (10, 100, and 1000 Mbps) • Offers tremendous service flexibility, supporting DS-1, DS-3/EC1, Layer 1, and Layer 2/3 Ethernet, and Small Form-Factor Pluggable (SFP)-enabled optics for OC-3, OC-12, and OC-48. • Environmentally hardened design supports up to 99.999-percent reliability for both access and edge networks • Platform comes in a compact 6-rack unit (6RU) form factor 	8-3
Cisco ONS 15310-MA SDH Multiservice Platform	<ul style="list-style-type: none"> • Offers high-density aggregation and transports up to 126 E-1, 6 E-3/DS-3, or 32 Layer 1 or Layer 2/3 Ethernet ports (10, 100, and 1000 Mbps) • Offers tremendous service flexibility, supporting E-1, E-3/DS-3, Layer 1, and Layer 2/3 Ethernet, and Small Form-Factor Pluggable (SFP)-enabled optics for STM-1, STM-4, and STM-16 • Environmentally hardened design supports up to 99.999-percent reliability for both access and edge networks • Platform comes in a compact 6-rack unit (6RU) form factor 	8-4
Cisco ONS 15310-CL SONET Multiservice Platform	<ul style="list-style-type: none"> • Compact 1RU single-system controller design is optimized for data and TDM services over protected SONET transport for the customer location • 1RU AC or dual-DC power chassis • Single system controller, timing, and synchronization • Two SFP optical ports for rings • 21 DS-1 and 3 DS-3 ports • One expansion slot • Fan cooling 	8-4
Cisco ONS 15305 SDH Multiservice Provisioning Platforms (MSPPs)	<ul style="list-style-type: none"> • Ultra-compact integrated systems that extend next-generation optical networks (access nodes or customer premises equipment [CPE]) • Low-cost access and CPE platform 	8-4
OPTICAL NETWORK MANAGEMENT		

Cisco Transport Manager 9.2 *NEW UPDATES*	<ul style="list-style-type: none"> Advanced optical transport domain manager that delivers element and network management layer functions Offers efficient management of the entire Cisco ONS product family. Provides a resilient, adaptable, and integrated carrier-class element-management-system (EMS) solution. GUI-based management system makes advanced management capabilities such as A-to-Z circuit provisioning easy to learn and use. Solution is cost-effective, using industry-standard platforms such as Sun Solaris, Oracle, and Microsoft Windows to fit smoothly into various IT environments, solution offers a variety of northbound interface options (for example, Simple Network Management Protocol [SNMP], TL1, and CORBA) 	8-4
--	--	-----

FOR MORE INFORMATION

Product Ordering
 To place an order, visit: <http://www.cisco.com/en/US/ordering/index.shtml>.

End-of-Life and End-of-Sale
 Please visit the end-of-life and end-of-sale website for a complete and up-to-date listing of products that are no longer being sold or supported, what replacement products are available, and information about product support.
http://www.cisco.com/en/US/products/prod_end_of_life.html

NOTE: This chapter provides only a subset of Cisco products and part numbers. For the most up-to-date and comprehensive information, refer to the Cisco website at <http://www.cisco.com>, the Cisco ordering website at <http://www.cisco.com/en/US/ordering/index.shtml>, or reference the URL listed in the "For More Information" section of each product.

Cisco ONS 15600 SONET/SDH Multiservice Switching Platform

The Cisco ONS SONET/SDH 15600 Multiservice Switching Platform (MSSP) provides flexibility in designing next-generation metropolitan (metro) networks. Fully engineered and optimized for metro applications, the Cisco ONS 15600 MSPP simplifies and revolutionizes bandwidth management in the metro core by allowing service providers to transparently integrate their metro core and metro edge networks, while dramatically reducing initial turn-up costs. The any service, any port (ASAP) interface cards of the Cisco ONS 15600 provide 1 to 16 ports of capacity per slot to aggregate and transport mission-critical regional and metro-area traffic using a modular, flexible, and scalable design that allows single- and multiple-rate optics from OC-3/STM-1 to OC-192/STM-64, including Gigabit Ethernet SFP optics. Delivering scalability to 960 Gbps of traffic in a single rack, it complements the market-leading Cisco ONS 15454 MSPP by taking advantage of its proven architecture and operating software, allowing service providers to dramatically simplify their metro networks and realize immediate cost, space, and operational benefits. The Cisco ONS 15600 MSPP provides complete integration of metro core and edge networks for service provisioning and network management.



For More Information
<http://www.cisco.com/go/ons15600>

Cisco ONS 15454 SONET/SDH Multiservice Provisioning Platform

The Cisco ONS 15454 Multiservice Provisioning Platform (MSPP) provides key building blocks in optical networks because of its unprecedented transport performance and economics. It offers supercharged transport capability by combining the best of traditional SONET/SDH time-division multiplexing (TDM) and statistical multiplexing in single units. The Cisco ONS 15454 aggregates traditional facilities such as E-1/DS-1, E-3/DS-3, VC-3/VC-4/STS-1, STM-1/OC-3, STM-4/OC-12, and STM-16/OC-48, including multi-wavelength dense wavelength-division multiplexing (DWDM) optics, and also supports data interfaces for 10 Gigabit Ethernet, 100 Gigabit Ethernet, and Gigabit Ethernet data and video. This drastically improved efficiencies in the transport layer and breakthrough cost savings for initial and life-cycle deployment. A single Cisco ONS 15454 shelf can support combinations of STM-1/OC-3/c, STM-4/OC-12/c, STM-16/OC-48/c, and STM-64/OC-192. It also offers an international optical transport solution that combines the best of traditional SONET/SDH time-division multiplexing (TDM) and statistical multiplexing in a single platform.



For More Information
<http://www.cisco.com/go/ons15454>

Cisco ONS 15454 Multiservice Transport Platform (MSTP)

The Cisco ONS 15454 Multiservice Transport Platform (MSTP) sets the industry benchmark for metropolitan and regional dense wavelength-division multiplexing (DWDM) solutions by using proven Cisco MSPP networking technologies to deliver simple, fast, and intelligent DWDM capabilities and lower capital expenditures (CapEx) and operating expenses (OpEx). A

metropolitan network, being close to or on a customer's premises -- unlike its long-haul counterpart -- requires support for a great diversity of service interfaces. The service interfaces allow network providers to offer new tariffs and allow enterprise customers to natively transport a wide variety of services over a common transport network without unnecessary conversion stages and equipment. Additionally, a wide service mix simplifies the planning for services. The Cisco ONS 15454 MSTP, with its multiservice provisioning platform (MSPP) capabilities, supports a broad range of standards-based services in a single platform.

The Cisco ONS 15454 MSTP, extends the traditional point to point service capability of the DWDM into sub-wavelength grooming with its next generation aggregation cards. Sub-wavelength grooming is available at both TDM and data level (OC3/STM1, OC12/STM4, OC48/STM16, GE) enabling lambda sharing across multiple services in mesh networks, keeping the high availability characteristic, and complementing Carrier Ethernet over DWDM transport.

Critical to offering a wide service mix is the ability of a DWDM system to offer the level of transparency required by the service. The ultimate in network-management flexibility is achieved through an industry-leading, fully reconfigurable optical add/drop multiplexer (ROADM) that allows 0 to 32, 40, 72, or 80 channels of pass-through or add/drop, A-to-Z wavelength provisioning, and full, real-time power monitoring of each individual wavelength. The Cisco ONS 15454 MSTP solution offers the choice of multiservice aggregation, wavelength aggregation, and wavelength transport, combined with integrated, intelligent DWDM transmission, in a single platform to optimize network costs for any mix of service types. Using digital-wrapper technology (defined in ITU-T G.709) facilitates transparency while still allowing enhanced wavelength management and providing extended optical reach with integrated Forward Error Correction (FEC). The Cisco ONS 15454 MSTP is also used to build IP over DWDM (IPoDWDM) architectures. Cisco routers with integrated optics such as the Cisco CRS-1 Carrier Routing System (10 Gigabit Ethernet and OC-768), Cisco 12000 Series (10 Gigabit Ethernet), Cisco ASR9000 Series (10 Gigabit Ethernet) and Cisco 7600 Series (10 Gigabit Ethernet) have integrated, ITU-grid optics that allow for direct connection to the Cisco ONS 15454 MSTP without using external transponders.

For More Information

<http://www.cisco.com/en/US/products/hw/optical/ps2006/ps5320/index.html>



Cisco ONS 15216 Metropolitan/Regional DWDM System

The Cisco ONS 15216 Metropolitan/Regional DWDM System supercharges wavelength services by supporting up to 32 ITU-grid wavelengths, and provides unprecedented transport flexibility with optical filtering, optical add/drop multiplexer (OADM), optical performance monitoring, and amplification. It allows service providers to deliver more services per wavelength and more wavelengths per fiber.

The Cisco ONS 15216 Metropolitan Dense Wavelength-Division Multiplexing (DWDM) FlexLayer filter solution is an ultraflexible filter architecture that allows cable multiple system operators and service providers to build "pay-as-you-grow" networks with the flexibility to upgrade in service without preprovisioning channels that are not required. This approach creates a more desirable per-wavelength cost.

The FlexLayer architecture allows for deployment of point-to-point, point-to-multipoint, ring, bus, and tree-and-branch architectures. These networks can be deployed as unprotected or protected networks, and they can also be deployed in transmit-only applications for broadcast networks. This flexibility is inherent in the design of the FlexLayer architecture.

For More Information

<http://www.cisco.com/en/US/products/hw/optical/ps1996/ps1999/index.html>



Cisco ONS 15310-MA SONET Multiservice Platform

The Cisco ONS 15310-MA SONET Multiservice Platform is a compact but high-density SONET device capable of multiservice time-division multiplexing (TDM) and data aggregation and transport. The Cisco ONS 15310-MA offers tremendous service flexibility, supporting DS-1, DS-3/EC-1, Layer 1, and Layer 2/3 Ethernet (10, 100, and 1000 Mbps), and Small Form-Factor Pluggable (SFP)-enabled optics for OC-3, OC-12, and OC-48. The Cisco ONS 15310-MA is a hardened design, and supports up to 99.999-percent reliability for both access and edge networks. The Cisco ONS 15310-MA is a carrier-class multiservice provisioning platform (MSPP) that efficiently switches Ethernet and TDM traffic for use in metropolitan and regional optical networks. The Cisco ONS 15310-MA can be managed using the Cisco Transport Controller element management system and Cisco Transport Manager for network management.



For More Information

<http://www.cisco.com/go/ons15300>

Cisco ONS 15310-MA SDH Multiservice Platform

The Cisco ONS 15310-MA SONET Multiservice Platform is a compact but high-density SDH device capable of multiservice time-division multiplexing (TDM) and data aggregation and transport. The Cisco ONS 15310-MA SDH offers tremendous service flexibility, supporting E-1, E-3/DS-3, Layer 1, and Layer 2/3 Ethernet (10, 100, and 1000 Mbps), and Small Form-Factor Pluggable (SFP)-enabled optics for STM-1, STM-4, and STM-16. The Cisco ONS 15310-MA SDH is a hardened design, and supports up to 99.999-percent reliability for both access and edge networks. The Cisco ONS 15310-MA is a carrier-class multiservice provisioning platform (MSPP) that efficiently switches Ethernet and TDM traffic for use in metropolitan and regional optical networks. The Cisco ONS 15310-MA can be managed using the Cisco Transport Controller element management system and Cisco Transport Manager for network management.



For More Information

<http://www.cisco.com/go/ons15300>

Cisco ONS 15310-CL SONET Multiservice Platform

By extending the metropolitan (metro) edge to customer premises and providing direct high-speed LAN connectivity, the Cisco ONS 15310-CL SONET Multiservice Platform allows service providers to cost-effectively offer scalable, high-speed data services over their transport networks. For the enterprise, the Cisco ONS 15310-CL offers the efficiency, scalability, and high availability to meet the bandwidth demands of the mission-critical e-business infrastructure. These features are available without implementing new technology or upgrading the existing transport network infrastructure.



Optimized for the customer location, this evolutionary platform is based on the same technology as the industry-leading Cisco ONS 15454, Cisco ONS 15600 and ONS 15310-MA, supporting high optical bandwidth, and it can support DS-1, DS-3, and Layer 1/2 10/100 Ethernet. The Cisco ONS 15310-CL also provides comprehensive STS- and VT-level bandwidth management and integrated data switching.

The integrated multiservice optical networking functions of the Cisco ONS 15310-CL dramatically reduce service-delivery costs. Packaged in a 1-rack unit (1RU), industrially temperature-hardened Network Equipment Building Standards (NEBS) 3-compliant assembly, the Cisco ONS 15310-CL delivers fast provisioning and low initial cost, while maintaining a small footprint and low operational cost throughout the life of the product. It can be managed using the Cisco Transport Controller element management system and Cisco Transport Manager for network management.

For More Information

<http://www.cisco.com/go/ons15300>

Cisco ONS 15305 SDH Multiservice Provisioning Platform

The Cisco ONS 15305 Multiservice Provisioning Platform (MSPP) customer premises equipment (CPE) and aggregation solution is an ultra-compact, integrated system that offers cost-effective solutions. The platform provides native multiservice capabilities (that is, time-division multiplexing [TDM] interfaces, multiplexing, and Ethernet data interfaces).



The Cisco ONS 15305 aggregation platform provides the following TDM interfaces: protected or unprotected optical interfaces (8-port S-1.1 optical module, 2-port S-4.1 optical module, 1-port S-16.1 optical module, 1+1 MSP, SNCP, and 2F MS-SPRing for STM-16) and electrical customer interfaces (8- and 63-port E1 modules and a 6-port E3/DS-3 module). This product also provides native Ethernet customer access through an 8-port 10/100BASE-T module and a 2-port Gigabit Ethernet module (supports full Layer 2 capacity, bridging, VLANs, spanning tree, and priority management). An optional WAN module is available for point-to-multipoint applications.

For More Information

<http://www.cisco.com/go/ons15300>

Cisco Transport Manager 9.2

Cisco Transport Manager is an integrated optical element management system for Cisco ONS 15000 optical networking platforms. The software manages configuration, fault isolation, performance, and security for Cisco optical network elements. With integrated support for SONET, SDH, dense wavelength-division multiplexing (DWDM) and Ethernet, along with open interfaces to operations support systems (OSSs), Cisco Transport Manager delivers the full power of the wide range of advanced optical systems that Cisco offers today's network operators and enterprises.

Cisco Transport Manager is a powerful tool that increases the productivity of the network operations staff. The system provides GUI-based point-and-click network management. As such, the solution has a low learning

curve while providing advanced management capabilities such as A-to-Z circuit provisioning. Explorer-style navigation, the extensive use of wizards, tool tips, legends, and online help make it easy for an operator to perform tasks quickly and efficiently. Many otherwise tedious, time-consuming, and error-prone tasks can be fully streamlined using the features of this software.

Cisco Transport Manager works for small networks, but can also scale up to 4000 network elements and 100 concurrent clients per server. This solution is appropriate for small enterprise networks as well as large service provider networks. Cisco Transport Manager is extremely cost-effective (uses industry-standard platforms such as Sun Solaris, Oracle, and Microsoft Windows). It fits smoothly into most companies' information technology environments. Using scalable Sun server platforms, customers can minimize initial investment, but still accommodate growth by adding additional processors, memory, and disk space.

For More Information

<http://www.cisco.com/en/US/products/sw/opticsw/ps2204/index.html>

