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COMMON PHOTONIC LAYER



Features and Benefits

- Features a modular architecture that scales incrementally: low initial first cost, low incremental cost
- Enables automatic continuous dynamic system optimization, without the need for user intervention
- Offers management on a per wavelength granularity with support for remote configurability: no stranded capacity anywhere
- Features ROADM (Reconfigurable Optical Add/Drop Multiplexing) for total network agility
- Enables significant CAPEX/OPEX savings through footprint, power efficiency and automation of complex tasks

Ciena's Common Photonic Layer is a self-optimizing, agile DWDM transport platform designed for cost-effective metro, regional and long-haul networks. Its modular design provides an extremely small initial/final footprint and delivers significantly lower power consumption compared to other solutions. The platform offers operational simplicity by providing a high level of automation that facilitates network planning, engineering, configuration and deployment as well as accelerates the setup of end-to-end wavelengths.

Cost-optimized solution

CPL offers an initial system with a significantly small footprint that scales modularly and provides a pay-as-you-go structure that can grow as revenue-generating opportunities or capacity exhaust drive expansion of the network. Deployments can scale anywhere between 5 to 2000km reach and beyond, and from 2 to 88 wavelengths and beyond. Each site is deployed with the footprint that matches its required capacity without limiting future scalability. CPL allows a seamless evolution to 100 Gb/s-based networking over existing 10 Gb/s lines on any fiber type (new/old, clean/dirty) without network reengineering or the deployment of dispersion compensating modules.

Open photonic networking

The Common Photonic Layer can be deployed in conjunction with Ciena's optical networking products, including: 6500 Packet-Optical Platform, 5200 Advanced Services Platform, and Optical Metro 3500. Furthermore, the platform supports other vendor network elements for open photonic interworking.

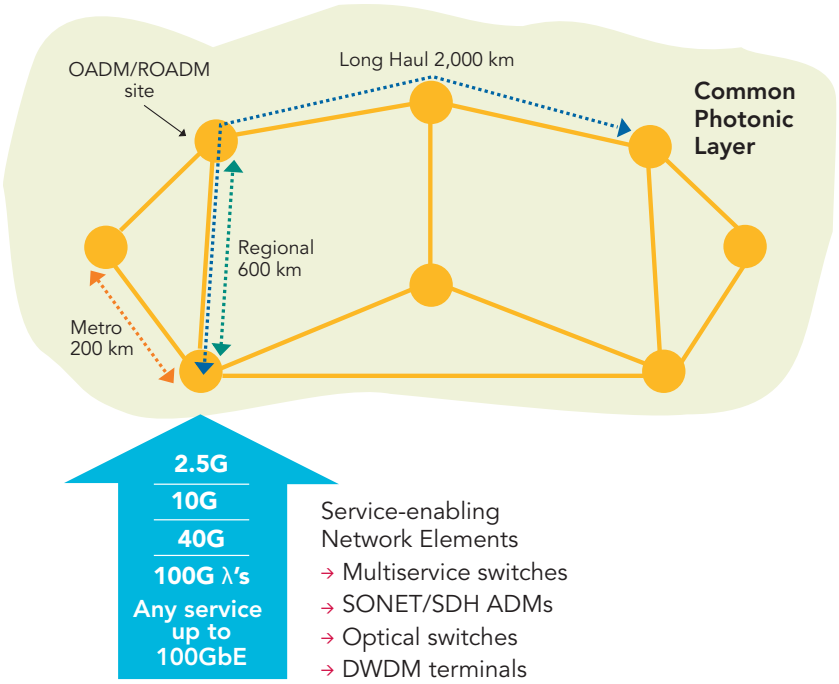


Figure 1. The Common Photonic Layer concept

Distributed Intelligence for Operational Simplicity

Upon system turn-up or in-service addition of new wavelengths, the embedded Domain Optical Control (DOC) software performs a series of automated processes for equipment provisioning. Combined with in-skin electronic Variable Optical Attenuators (VOAs), rapid initialization and adjustment of system components is achieved for a complete deploy-and-forget process.

CPL offers a dynamic and continuous system optimization to ensure optimal performance of the wavelengths transported end to end. DOC performs continuous background checks, optical output power optimization, and fault isolation functions to ensure the network runs at an optimal state with the least human intervention and time consumption. This autonomous process alerts the operations center of any degradation warning signs that cannot be corrected automatically. Since the DOC software is fully distributed throughout the system, any failure or disruption of any part of the communications network does not affect the rest of the system.

Flexible ROADM architecture

The ROADM functionality is delivered using the Wavelength Selective Switch (WSS), a module of the Common Photonic Layer platform. The WSS enables dynamic "on the fly" optical branching to up to five different optical paths, in addition to facilitating local add/drop of individual wavelengths. It supports in-service remote configuration of wavelengths and management of transiting lambdas while minimizing the need for costly OEO (Optical to Electrical to Optical) conversions.

Unlike other ROADM configurations that are directionally dependent where a TX/RX pair connected to a filter can only be sent out of the site in the direction of the line ports of the Wavelength Selective Switch (WSS) it is connected to, CPL allows for Direction-Independent Access (DIA) where each direction can be remotely reconfigured. DIA allows the user to determine the optical direction of a channel out of a site via software and not a physical connection.

The DIA configuration uses standard Wavelength Selective Switch (WSS), amplifier, and Optical Power Monitor (OPM) components to create the directionally independent access point. This simplifies the planning of ROADM sites/networks by allowing wavelengths to be remotely redirected to another direction for photonic restoration or for more optimal path routing as bandwidth requirements change.

CPL Network Management

CPL is fully integrated into Ciena's OneControl Unified Management System. Comprehensive screen layouts provide the network element health at a glance, pull-down menus for simple access to nodal management functions, and all relevant nodal management information. Faults are centralized in OneControl and inventory, provisioning and performance management can all be controlled via a common Graphical User Interface. OneControl provides a proven interface to manage CPL and all the subtending service layer optical equipment to offer a centralized, integrated solution at the Network Operations Center.

Summary

CPL dramatically simplifies DWDM line systems to enable significant CAPEX/OPEX savings and exploit this simplicity to drastically reduce the time to deploy value-rich services. In support of these objectives, the platform provides the smallest initial/final footprint solution with significantly lower power consumption, delivering seamless scalability and in-service capacity expansion from 2 to 88 wavelengths and beyond. Its building blocks are optimized to offer cost-efficient metro, regional, and long-haul reach

configurations. The automated tools and intelligent software perform network optimization and accelerate the end-to-end provisioning/addition of wavelengths. The flexible architecture allows these wavelengths to be delivered anywhere, anytime. Ciena's OnePlanner Unified Design System and OneControl complement CPL's flexibility advantages with efficient network planning, simple service provisioning, proactive service monitoring, and intuitive fault isolation across the entire network.

Technical Information

Wavelengths Supported (1.25G, 2.5G, 10G, 40G, 100G)	44 (100GHz), 88 (50GHz), or any combination to deliver between 36 and 88 wavelengths
Supported Service Layer Network Elements	3500/5200, 6500, multi-vendor support (any ITU compliant optical signal)
Reach	From 5 km up to 2000 km - and beyond - depending on service network element connected to the Common Photonic Layer
Optical Control	Auto wavelength discovery, Continuous Dynamic System Optimization, Fault Isolation
Supported Configurations	Point-to-point, Ring, Mesh (i.e. service network element protection schemes)
OAM&P Management Features Communication Ports Element/Network Management Office Alarms External Alarm	 10Base-T, RS232/modem craft access, 10/100BaseT internal (private), external (COLAN), Ethernet wayside ports at every site SNMP, TL1, Craft Interface, OneControl Unified Management System, Ethernet wayside channel 10/100BaseT clear channel) Critical, major, minor, warning CO Telemetry Ports
Connectors Terminal Facing Configurations Fiber plant facing connectors	 Any supported via flexible patch panel SC
Physical Dimensions All CPL components reside in a sliding carrier container for easy access. This container is similar for all modules and has a width = 17.3 in, depth = 11 in. 1 Rack Unit (U) = 1.75 in	Universal mounting brackets for 19" or 23" frames, ETSI frames (600mm x 300mm) Fiber Management Tray, and Fiber Patch Panel available to simplify operations. OSMINE and NEBS3 compliant Temperature: +5C to +55C (+5C to +40C Long Term) Relative Humidity: 5 to 90% (5 to 85% Long Term)
Typical Power Consumption and Footprint per site (Common Photonic Layer equipment)	Fully Filled Channel Access Site (44 wavelengths) = 103 W (8RU or 0.2 rack) per direction Fully Filled Channel Access Site (88 wavelengths) = 133 W (11RU or 0.25 rack) per direction Fully Filled Amplification site (88 wavelengths) = 95W (4RU or 0.1rack) per site Other features: Fiber management, OSMINE and NEBS3/ETSI compliant

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