Alcatel-Lucent 1830 Photonic Service Switch

Metro/regional/long-haul WDM platform

The Alcatel-Lucent 1830 Photonic Service Switch (PSS) is the industry's first metro/regional/long-haul wavelength division multiplexing (WDM) platform purpose-built for flexible and automated WDM networking. Building on the unique Alcatel-Lucent Zero Touch Photonics technology, which enables easier operations and faster time to market for wavelength services, the Alcatel-Lucent 1830 PSS helps service providers meet the new requirements for profitable Internet growth while controlling costs.

Zero Touch Photonics: Changing the WDM paradigm

Today's WDM networking solutions, including those based on reconfigurable optical add-drop multiplexing (ROADM) technology, offer high bandwidth capacity to meet traffic growth. However, deploying and operating a WDM network requires heavy manual involvement and on-site interventions at each step of the network life cycle, from planning to service provisioning. These limitations translate into hidden costs that negatively affect business cases, making it difficult for service providers to price competitively and offer on-demand, content-focused services in a timely fashion.

Maintaining a sustainable business requires supporting bandwidth growth while optimizing total cost of ownership (TCO) and expanding the revenue-generating potential with more dynamic service options. These requirements drive the new demands for the next-generation photonic infrastructure. A WDM network must be:

- Flexible in plan, design and installation while being ready for service
- Simple to operate, manage and monitor for an assured quality of experience (QoE)
- Quick to change when meeting more dynamic traffic demands

Alcatel-Lucent Zero Touch Photonics technology innovation changes the WDM paradigm. The Alcatel-Lucent 1830 PSS product family clearly focuses on new revenue generation and relieves cost concerns with increased scalability capacity, networking flexibility and operational automation by offering:

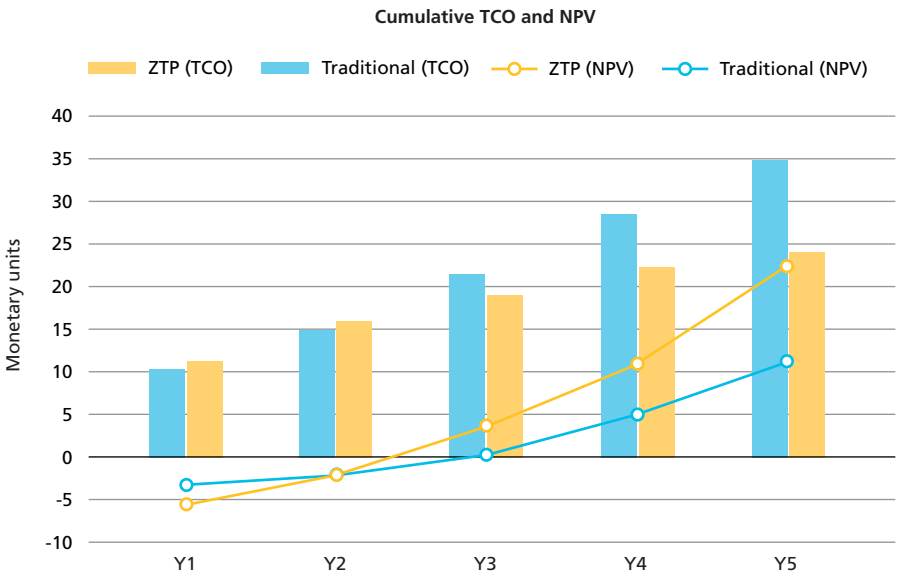
- Photonic switching: Multi-degree tunable and reconfigurable optical add/drop multiplexing (T/ROADM) design allows full networking flexibility, where any client service can be transported over any wavelength in any direction.
- Photonic operations, administration and maintenance (OA&M): Wavelength Tracker technology enables end-to-end power control, monitoring, tracing and fault localization for each individual wavelength channel, helping you monitor the health of the network and proactively prevent service degradation.
- Scalable form factors with high-density support of client service interfaces for coarse WDM (CWDM) and dense WDM (DWDM) networking from the access to the metro/regional/long-haul space.
- 100G Polarization Division Multiplexed Quadrature Phase-Shift Keying (PDM-QPSK) coherent technology, which has the highest bandwidth utilization and allows for coexistence of 100 Gb/s in existing systems that are transmitting 10 Gb/s and 40 Gb/s
- Multi-reach platform covering metro, regional and long-haul applications up to 2200 km

Alcatel-Lucent 1830 PSS: Improving your bottom line

A network built with the new Alcatel-Lucent 1830 PSS can generate a more positive return than one built with traditional WDM technology. A baseline case of very high traffic growth in a metro/regional/long-haul environment yields a 94% improvement in net present value (NPV) of investment over five years (see Figure 1) and it also:

- Provides payback in 12 months
- Reduces operational expenditures (OPEX) by 78% through simplified operations
- Reduces capital expenditures (CAPEX) by 17% through high-density technology
- Generates revenue from new on-demand services and more dynamic protections

Figure 1. Alcatel-Lucent 1830 PSS financial returns



The Alcatel-Lucent 1830 PSS provides a fully T/ROADM WDM platform with complete optical layer visibility at the individual wavelength level, simplifying service delivery and speeding revenue generation. Using the innovative Alcatel-Lucent Zero Touch Photonics technology, the Alcatel-Lucent 1830 PSS delivers advanced CWDM and DWDM transport capabilities in a highly scalable and versatile package.

The Alcatel-Lucent 1830 PSS supports interoffice core transport and wavelength multiservice capabilities such as SONET/SDH and Gigabit Ethernet (GigE)/10GigE. This support allows operators to enhance their revenue opportunities by offering an intelligent optical layer for delivering voice, video and data services while minimizing OPEX and CAPEX.

The highly efficient Alcatel-Lucent Zero Touch Photonics layer enables service providers to lower transport-network costs by eliminating unnecessary optical-to-electrical-to-optical (OEO) conversions. This also ensures the network can support future traffic demands and scale to multiple tens of channels at any rate — 10 Gb/s, 40 Gb/s, 100 Gb/s — by eliminating the technology constraints that may be imposed by OEO network architectures when applied to high scalable WDM networking (see Figure 2).

Control plane enhancements improve the operations environment by providing automated support, including autodiscovery of new circuit packs, turn-up and continuous service level agreement (SLA) monitoring.

Enabling the 100G era

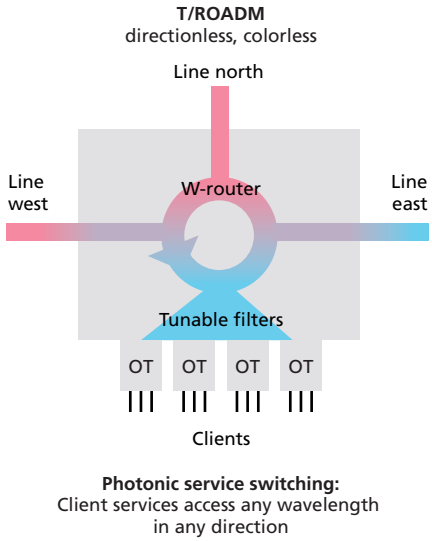
Addressing the need for continuous scaling of bandwidth across the network driven by bandwidth-intensive Web 2.0 applications, video and supercomputing is a must for the communication service providers.

Alcatel-Lucent next-generation coherent technology enables operators to migrate their network infrastructure to 100 Gb/s and beyond, in a cost-effective and automated manner, without loss of performance.

The unique 100G PDM-QPSK with coherent technology available in the 1830 PSS ensures compatibility with massive existing 10 Gb/s and increasing 40 Gb/s lines as well as that fiber impairments at higher speeds do not impact 100 Gb/s performance.

Furthermore, this next-generation of coherent technology, which is developed in-house by Bell Labs, allows for the best-in-class density and energy consumption and migration to speeds higher than 100 Gb/s in the future.

Figure 2. Alcatel-Lucent 1830 PSS system architecture



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- Extends the Alcatel-Lucent 1830 PSS family to the edges of the network
- Supports a full range of network topologies, including ring-mesh and point-to-point
- Offers a family of network interfaces and functions, depending on the application:
  - ¬ Supports stackable configurations through a single networking address

Reliable, flexible, fully managed bandwidth on demand

The Alcatel-Lucent 1830 PSS lets you:

- Accelerate time to service: Integrated network and photonic layer management allows you to turn up services from the Network Operations Center (NOC) and to deliver end-to-end services quickly.
- Simplify planning, commissioning and operations: The Alcatel-Lucent 1830 PSS gives you flexibility in network design and planning, plug-and-play turn-up, commissioning and SLA assurance.
- Optimize network resilience: The Alcatel-Lucent 1830 PSS provides colorless, directionless add/drop capabilities that enable restoration at the photonic layer. Zero Touch Photonics technology detects degraded performance before an outage occurs.
- Improve network expenses: The colorless, directionless optical add/drop capabilities provide better resource utilization.

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- Allows provisioning and reconfiguring of wavelengths remotely while adding any-wavelength-to-anywhere flexibility to the network infrastructure with its T/ROADM technology
- Provides optical path tracing and power monitoring using Alcatel-Lucent Zero Touch Photonics technology, reducing the overall complexity and cost of network wavelength management similar to managing SONET/SDH traffic, and making it easier to engineer, implement and maintain networks
- Uses Wavelength Tracker to monitor and trace each wavelength at any point in the network for governing the health of the network
- Offers cost-effective gain equalization of individual wavelengths and forward error correction (FEC) technology, improving system performance and eliminating the need for costly regeneration in metro applications

Simplified operations and accelerated time to service

Modular metro WDM platform

- Fixed Optical Add-Drop Multiplexer (OADM) (Fixed Optical Add/Drop Multiplexer (FOADM)), ROADM and T/ROADM
- Photonic switching: Any-to-any non-blocking connectivity in any direction for flexible NOC-based end-to-end networking
- Photonic OA&M – wavelength tracking and monitoring for:
  - ¬ Up to 8 degree nodes for maximum connectivity
  - ¬ 88 x 10 Gb/s/40 Gb/s/100 Gb/s mixed DWDM channels
  - ¬ Up to 8 CWDM wavelengths
  - ¬ Up to 96 10 Gb/s or 576GigE per bay
- A wide range of software-configurable multiservice cards, including GigE, SONET/SDH and in-line amplifier (ILA)
- 100 Gb/s interfaces with PDM-QPSK coherent technology
  - ¬ 10 x 10 Gb/s Mux OT client side ports and 100 Gb/s/50 GHz coherent line side
  - ¬ 100 Gb/s client side ports and 100 Gb/s/50 GHz coherent line side
- Ring and mesh network configurations
- Full C-band tunable/pluggable optics
- Up to 2200 km at 10 Gb/s rate and 1200 at 40 Gb/s rate for 88 channels and 1000 km at 100 Gb/s km reach
- Multi-shelf configuration: Up to 24 shelves as a single network element
- Pluggable FOADM, B&W/CWDM-DWDM optics
- Integrated Layer 2 switching capability
- Client and line Small Form Factor Pluggables (SFPs) and 10 Gb/s Form Factor Pluggables (XFPs)
- Temperature-hardened versions
- Remote in-band management

Wavelength Tracker: Photonic OA&M

Exclusive to Alcatel-Lucent, Wavelength Tracker delivers innovative wavelength-path tracing and monitoring capabilities, enabling delivery of true optical SLAs while reducing network operating costs. Wavelength Tracker enables full control of next-generation photonic networks:

- Provides service-aware wavelength management
- Prevents service degradation by proactive path management at each individual wavelength end to end
- Enables quick troubleshooting and fault isolation with a graphic display
- Prevents wavelength misconnections through unique wavelength keying and path tracing
- Enables remote and automatic optical power control on a wavelength basis
- Decreases specialized training and expensive optical test equipment, minimizing on-site interventions

Exceptional operations environment

- Industry-leading technology integration and port density
- Fully NOC-based automated network life cycle, from planning to service turn-up
- Industry-exclusive Alcatel-Lucent Zero Touch Photonics technology simplifies operations and accelerates time to service
- Graphical user interface (GUI)-based network Engineering and Planning Tool (EPT)
- Tunable laser technology for reduced sparing requirements
- Flexible family of transponder configurations

Recognized world leader in optical networking

Alcatel-Lucent delivers end-to-end communications solutions to service providers and enterprises anywhere in the world. Leveraging its network equipment as well as services, Alcatel-Lucent facilitates its customers' service offerings and revenue streams. As the recognized world leader in optical networking, Alcatel-Lucent is in a unique position to help service providers navigate through current market conditions. Alcatel-Lucent, with its global reach and scale, combined with local presence in over 130 countries, makes use of a deep understanding of global market dynamics, as well as the ability to anticipate local requirements.

Visit the Alcatel-Lucent Web site at alcatel-lucent.com.

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