The Alcatel-Lucent Photonic Service Switch (PSS) 1830, Release 4, adds best-in-class-multi-terabit Optical Transport Network (OTN) switching functionality to the existing best-in-class dense wave division multiplexing (DWDM) capabilities, which include 100G coherent, tunable Reconfigurable Optical Add Drop Multiplexer (ROADM), photonic Operations, Administration & Maintenance (OA&M), design tools and optical long reach. The introduction of the Alcatel-Lucent Photonic Service Switch-64 (PSS-64) and Alcatel-Lucent Photonic Service Switch-36 (PSS-36) electrical switching shelves allows for an OTN/WDM modular approach in the Alcatel-Lucent 1830 PSS product family. Plug-and-play OTN modules can be introduced into new or existing 1830 PSS-based WDM or ROADM networks.
Along with the Alcatel-Lucent 7750 Service Router, the Alcatel-Lucent 1830 PSS is part of the Alcatel-Lucent Converged Backbone Transformation Solution, which employs a Leverage Network™ architecture.

Low-cost traffic transport

Designed to ensure efficient bandwidth management and traffic forwarding at the most economical transport layer, the Alcatel-Lucent 1830 PSS WDM/OTN approach meets the exaflood challenge of explosive service growth by facilitating traffic transport at the lowest cost per bit. Synergies between the optical and electrical layers ensure the highest availability and resiliency in order to warranty service quality assurance. Moreover, the power consumption in the new electrical shelves is significantly reduced, to less than 2 W/Gb/s.

Flexible bandwidth management

Sub-wavelength ODU switching and any-client, any-line assignment maximizes the wavelength filling factor and provides flexible bandwidth management. Port-level and sub-port-level grooming enables efficient core-router traffic offload onto the optical network and supports scaling of the IP backbone.

Multi-terabit OTN switching

The OTN universal fabric can handle ODU, SONET/SDH and packets agnostically. Leveraging the non-blocking matrix design, the system provides any-rate switching at full capacity usage regardless of the ingress and egress traffic mix. The new PSS-64 and PSS-36 high density shelves present an ODU non-blocking matrix in two size variants, with 2 Tb/s capacity (Alcatel-Lucent PSS-36) and 1Tb/s capacity (Alcatel-Lucent PSS-36), upgradable to 8 Tb/s and 4 Tbps, respectively. The PSS-36 and PSS-64 modules can be integrated into new or existing 1830 PSS-based WDM or ROADM networks.

GMPLS control plane

The Alcatel-Lucent 1830 PSS-64 and Alcatel-Lucent PSS-36 enable automated operations and resilience with an integrated Generalized Multi-Protocol Label Switching (GMPLS) control plane. The control plane enables a range of benefits, including automated network and service provisioning for bandwidth-on-demand services and highly available networks that are resilient to multiple failures and have flexible restoration options for service differentiation and Service Level Agreement (SLA) support. The Alcatel-Lucent 1830 PSS with OTN and wavelength switching capabilities is ready to support multilayer GMPLS restoration for network monetization by reducing the resources required for protection and freeing bandwidth for revenue-producing traffic.

Features

- Two single chassis with 1 Tb/s and 2 Tb/s full-duplex universal switch matrixes
- High-density architecture based on innovative 65 nm silicon technology
- System supports Optical Channel Data Unit-k (ODUk) switching as well as interfaces to DWDM, Ethernet and SDH
- Support for any mix of client traffic, including 40 Gb/s signals, Gigabit Ethernet (GE) and 10GE, OTH ODUk, and SDH/SONET up to STM-64/OC-192
- Efficient bandwidth management capabilities at the sub-wavelength level, for high bit-rate traffic scaling up to 40 Gb/s and prepared for 100 Gb/s
- GMPLS control plane intelligence, with dynamic bandwidth provisioning across the OTN layer

Benefits

- Provides very high capacity in a scalable and sustainable manner to deliver next-generation IP services at the lowest cost per bit
- Avoids the under-utilization or over-build of optical and routing assets and allows traffic forwarding at the most economical layer
- Leverages SDH/SONET assets and operational models for smooth evolutionary upgrading to higher capacity OTN
- Enables the transparent transport of multiple operators’ traffic, all with end-to-end control and quality assurance
- Reduces operating expenditures (OPEX) with a high-density, low-power-per-bit design
Technical specifications

**Alcatel-Lucent 1830 PSS-64**
- **Shelf dimensions**
  - Height: 160 cm (63 in.)
  - Width: 50 cm (19.7 in.)
  - Depth: 30 cm (11.8 in.)
- 32 slots (64 half slots)
- 120G full duplex per slot
- **Protected**
  - 1.92 Tb/s universal switching matrix
  - Controllers
  - Power supply
  - Fan trays

**Alcatel-Lucent 1830 PSS-36**
- **Shelf dimensions**
  - Height: 65 cm (25.6 in.)
  - Width: 50 cm (19.7 in.)
  - Depth: 30 cm (11.8 in.)
- 16 slots (32 half slots)
- 120G full duplex per slot
- **Protected**
  - 960 Gb/s universal switching matrix
  - Controllers
  - Power supply
  - Fan

**I/O cards**
- Universal cards
  - 10 x 10G any (XFP): STM-64, OC-192, OTU2, OTU2e, 10GE
  - 24 x multirate any (SFP): STM-16, OC-48, GE; prepared for STM-4/1, OC-12/3, OTU1
  - 2 x 40G any: OTU3
- Ethernet cards
  - 10 x 10GE (XFP) mapping to ODU2 or ODU2e
  - 24 x GE (SFP) mapping to ODU0
- OTH cards
  - 10 x OTU2, OTU2e, STM-64/OC-192 (XFP) mapping to ODU0
  - Tunable XFP support (50-GHz spacing)

**ASON/GMPLS control plane**
- Automatic network discovery
- ODUk service restoration
- Service types
  - Unprotected
  - Source-based restoration (SBR)
  - Guaranteed restoration (GR)
  - Protection and restoration combined (PRC)
- Sub-Network Connection Protection (SNCP)
- Link bundling
- Nominal route handling
- Traffic engineering
- Service provisioning
- Maintenance functionalities

**OTH**
- Non-blocking ODUk cross-connections
- 1:N broadcast (N = 2)
- 1+1 ODUk protection
- Tandem Connection Monitoring (TCM)
- Generic Communication Channel (GCC)
- Encapsulation of SDH/SONET, GE, 10GE
- Fault and performance monitoring

**SDH/SONET**
- Linear 1+1 MSP/APS protection
- Fault and performance monitoring

**OTH gateway**
- Single node configurations to bridge OTH and SDH/SONET
- ODUk grooming and switching
- Back-to-back linear SDH/SONET protection with OTH

**Ethernet**
- Ethernet protocols (IEEE 802.3)
- Client signal fail/server signal fail (CSF/SSF) forwarding
- Jumbo-frame support
- Ethernet GFP-F mapping to ODU2
- Ethernet mapping to ODU0 and ODU2e
- Timing and physical code section (PCS) transparency

**Management**
- Alcatel-Lucent 1350 Optical Management System (OMS)
- TL-1
- CORBA (control plane)
- Zero-installation craft (ZIC) terminal

**Power and cooling**
- Power supply: -48 V DC/-60 V DC
- Power consumption: typically less than 2 W/Gb/s
- Forced air cooling

**Operating environment**
- Operating temperature: 5°C to 40°C (41°F to 104°F)
- Humidity: 5% to 85% non-condensing

**Regulatory compliance**
- CE mark
- UL
- Operating environment: ETS 300 019, Class 3.1e
- Storage: ETS 300 019, Class 1.2
- Transportation: ETS 300 019, Class 2.3
- Telcordia® GR-63 (NEBS Requirements: Physical Protection)