

ALCATEL-LUCENT 1830 PHOTONIC SERVICE SWITCH (PSS-16 AND PSS-32)

RELEASE 7.0

The Alcatel-Lucent 1830 Photonic Service Switch (PSS) supports next-generation wavelength division multiplexing (WDM) multiservice packet-optical transport from access to core. The scalable Alcatel-Lucent 1830 PSS with high-performance 100G transport drives lower total cost of ownership (TCO) and extends network life cycles.

The 1830 PSS transforms traditional WDM into a flexible transport layer with managed agile photonics, multilayer switching and services, and network intelligence. The platform supports a wide range of applications and services such as business services, mobile and broadband backhaul, multicast video, Data Center Interconnect (DCI) and Cloud. With 1830 PSS platforms ranging from access to converged Optical Transport Network (OTN)/WDM core, operators can optimize multiservice networks to meet unpredictable traffic demands in the cloud services era.



1830 PSS-16



1830 PSS-32

The Alcatel-Lucent 1830 PSS portfolio provides terabit OTN switching and photonics capacities. The Photonic Service Engine (PSE) enables high-performance 100G and an evolutionary path to 400G transport. Leveraging an intelligent control plane and integrated data, control and management planes, the 1830 PSS simplifies network management for maximum multilayer performance and efficiency.

The 1830 PSS is a multi-reach platform that spans access, metro, regional, and long-haul applications and supports a wide range of data rates, enabling service delivery in a variety of environments and applications:

- Broadband transport networks for telecommunications operators and enterprises operating as Telcos to provide high-bandwidth connectivity over long distances of up to 4000 km
- Metropolitan or national research networks for sharing IP and Fiber Channel (FC) connectivity and enabling grid computing applications
- Campus networks for data center protection or data sharing for private and public organizations, including universities, hospitals, banks and airports
- Multi-campus networks for long-distance cooperation among public and private organizations and optimization of leased dark fiber
- Support for the full range of network topologies, including ring, point-to-point, spokes and hub, and arbitrary optical mesh topologies

KEY FEATURES

- A static, tunable/reconfigurable optical add/drop multiplexer (T/ROADM) with single wavelength add/drop granularity
- Colorless and any direction add/drop capabilities
- Up to 88 wavelengths and 50 GHz ITU WDM per fiber pair
- Bidirectional dense WDM (DWDM) transmission support over a single strand of fiber for fiber-exhausted metro sites
- Support for Generalized Multiprotocol Label Switching (GMPLS) to further enhance network flexibility and improve resiliency with photonic restoration
- OTM-0.1 through OTM-0.4 interfaces and ODU0/1/2/2e/3/4/flex mapping/multiplexing structures according to G.709
- 200 Gb/s, 100 Gb/s, and 40 Gb/s channel capacity, with best-in-class SD-FEC, PDM-16QAM (200 Gb/s), PDM-QPSK (100 Gb/s) and PDM-BPSK (40 Gb/s) to support upcoming traffic needs with no interference with existing 10 Gb/s channels deployed
- Support for optional Raman amplification for extended span application using integrated Raman or hybrid (Raman/EDFA) amplifiers
- GMPLS/ASON enabling cross-layer automation and highly available networks resilient to multiple failures with flexible restoration options
- Wavelength Tracker™ monitors and traces each wavelength at any point in the network including intra-nodal fiber



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BENEFITS

- Switches any combination of packets and circuits in their native formats using a single platform
- Fully scales packet transport, smoothly progressing from all-circuit to all-packet, allowing service providers to transform networks to packet transport
- Efficiently aggregates and grooms metro and long-haul transport
- Maximizes existing infrastructure by using WDM
- Reduces TCO and simplifies operations through cross-layer network management and unified control plane
- Supports a broad range of applications, such as triple play services, business Ethernet and mobility backhaul

TECHNICAL SPECIFICATIONS

Alcatel-Lucent 1850 TSS-320 system

- 320 Gb/s switching capacity: Data, TDM or any mix
- 16 slots, 20 Gb/s per slot: 32 half slots, 10 Gb/s per half slot
- Two 320 Gb/s protected switching fabrics
- Two protected controllers
- Protected power supply
- Up to two subracks in a standard ETSI rack

Alcatel-Lucent 1850 TSS-160 system

- 160 Gb/s switching capacity: Data, TDM or any mix
- 8 slots, 20 Gb/s per slot: 16 half slots, 10 Gb/s per half slot
- Two 160 Gb/s protected switching fabrics
- Two protected controllers
- Protected power supply
- Up to three subracks in a standard ETSI rack

Interfaces

- Bidirectional Small Form Factor Pluggables (SFPs): Single working fiber (SWF)
- Data cards
 - 20 x Gigabit Ethernet (GigE) packet module, SFP
 - 2 x 10GigE packet module, 10 Gb/s Form Factor Pluggable, XFP
 - Multiservice packet over SDH (PoS) packet module, portless
 - CES gateway card 2.5-Gb/s capacity
- SONET/SDH cards
 - Bidirectional SFPs: SWF
 - 1 x STM-64: XFP
 - 8 x STM1/4, 4 x STM16 combo: SFP

- 10 x any port card: Data/TDM concentrator; SFP
- 1 x optical transport unit (OTU)-2: 10 Gb/s bidirectional transponder, tunable or XFP fixed optics
- VLH/ULH cards
 - 10 Gb/s booster +10 dBm
 - 10 Gb/s pre-amp +10 dBm
- CWDM cards
 - CWDM: Multiplexer/demultiplexer (MUX/DEMUX)
 - CWDM optical add/drop multiplexer (OAM)
 - CWDM transponder
- Fixed OADM DWDM cards (packs)
 - 8 channels MUX/DEMUX, L1 band
 - 8 channels MUX/DEMUX, L2 band
 - Optical amplifier 22/9 17 dB
 - 10 GB transponder, client and line pluggable: XFP

Service Level Agreement (SLA) management

- Traffic profiles
 - Bandwidth guaranteed
 - Regulated: Minimum bandwidth guaranteed plus burst
 - Best effort
- Hitless traffic-profile modification
- Metering
 - Single Rate Token Bucket: RFC 2697
 - Dual Rate Token Bucket: RFC 2698
 - IETF and MEF Metering, Policing and Marking
 - Color-blind and color-aware, based on Ethernet priority bits

Ethernet functionality

- Ethernet protocol: 802.3
- Ethernet Media Access Control (MAC) auto-learning and aging
- Ethernet-MAC static configuration
- Access Control List (ACL)
- Virtual LAN (VLAN) push, pop, swap: Service delimiting
- Ethernet provider bridging: 802.1ad
- Q in Q
- Rapid Spanning Tree Protocol (RSTP) and Multiple Spanning Tree Protocol (MSTP)
- Link aggregation
- Jumbo-frame management
- Y.1731/802.1ag Eth OA&M: Continuity check (CC), link trace (LT), loopback (LB)
- Y.1731 Eth OA&M AIS, RDI, proactive/on-demand one and two-way DM, proactive dual-ended Synth. LM

- 802.3ah OA&M: Ethernet in the first mile (EFM)
- Eight Quality of Service (QoS) classes
- Two levels Hierarchical QoS (H-QoS): Per class, per transport service
- Ethernet flow, Red/Green/Yellow (RGY) counters
- L2 control protocol filtering/tunneling
- MEF 9, 14 and 21 certified: Ethernet private line (EPL), Ethernet Virtual Private Line (EVPL) and Ethernet LAN (E-LAN)

Ethernet traffic classification

- Port
- Ethernet VLAN
- Ethernet priority bits
- IPv4 differentiated services code points (DSCP)
- EtherType
- MPLS Exp bits

Ethernet forwarding criteria

- Port
- Port plus MAC
- Port plus VLAN
- Port plus MAC plus VLAN
- Port plus MAC plus VLAN plus Prio bits
- Unicast traffic
- Multicast traffic
- Broadcast traffic
 - Synchronization
 - Sync-E
 - SSM support for timing redundancy
 - Full interworking between TDM and data synchronization

PWE3/TDM CES

- Encapsulation methods supported:
 - SAToP encapsulation method as per RFC 4553
 - CESoETH encapsulation method as per MEF-8
- RTP header supported as per RFC 3550
- E1 TDM client (2048 kb/s) for CES functionality in framed structure, as per ITU-T Rec. G.704
 - E1/DS1 pseudowires: Structure-Agnostic TDM over Packet (SAToP)
 - E-Line services
 - 1008xE1 per CES GW Card (2.5Gb/s processing capacity)
 - Equipment protection 1+1
 - Carrier Access Code (CAC) resource check
 - 1+1 multiplex section protection (MSP) for STM-1/STM-4/STM-16 interfaces

- TDM CES timing modes: TDM loop line, E-Line (SyncE and differential packet timing), external, free-running
- ITU-T G.705 Plesiochronous Digital Hierarchy (PDH) alarms and Performance Monitoring (PM) counters for E1 physical ports

T-MPLS/MPLS-TP functionality

- Data plane: MPLS-TP, T-MPLS, MPLS
- T-MPLS G.8114 OA&M: CV, automatic protection switching (APS), Forward Definition Indication (FDI), remote defect indicator (RDI), proactive/on-demand two-way delay measurement (DM), proactive dual-ended Synth. loss measurement (LM)
- MPLS-TP .bhh OA&M: CV, APS, FDI, RDI, proactive/on-demand two-way DM, proactive dual-ended Synth. LM
- Tunnel Linear Protection 1:1, triggers: LOS, CV, LM OA&M (degrade)
- Ethernet line (E-Line), E-LAN and Ethernet Tree (E-Tree)
- Transport MPLS (T-, -TP) profile management per NE and per tunnel
 - Transparency to 1588v2 for Time of Day (ToD), including fiber delay asymmetry configuration

SONET/SDH functionality

- Cross connection
- Termination
- Ethernet mapping over SDH
 - Generic framing procedure (GFP), G.7041)
- Virtual concatenation
- Link capacity adjustment scheme (LCAS)
- Performance monitoring
- HO and LO capabilities
- PDH drop shelf
 - Single TID with hosting 1850 TSS
 - Up to 6 x 63 x E1 ports (378)
 - 1+3 Equipment Protection Switching (EPS) redundancy
 - 75/120 Ohm option
 - Uplinks 1+1 protected

DWDM functionality

- Node configurations
 - Terminal
 - In-line amplifier (ILA)
 - OAM
- Network configurations
 - Point-to-point
 - Linear
 - Ring

Protection

- Ethernet network protection
 - RSTP: 802.1w
 - MSTP: 802.1s
 - Link aggregation
- T-MPLS/MPLS-TP network protection
 - Tunnel Linear Protection 1:1
 - PRC: with G-MPLS
- SDH network protection
 - Single- and dual-ended APS 1 + 1
 - Subnetwork Connection Protocol (SNCP)
 - Multiplex Section-Protection Ring (MSPRING) 2F bidirectional line switching ring
- Equipment protection
 - Power protection
 - Controller protection
 - Universal switch protection

Fault propagation

- Link pass through (LPT)
- Link loss carry forward (LLCF)
- Fault propagation tools: GFP CSF/SSF, Ethernet CSF

G-MPLS control plane

- T-MPLS/MPLS-TP tunnel and protection setup
- Source Based Restoration (SBR)
- PRC

Management

- Alcatel-Lucent 1350 Optical Management System (OMS)
- Zero-installation craft (ZIC) terminal, TL1 shell, command-line interface (CLI)
- Security:
 - Remote Access Dial-In User Server (RADIUS) user authentication support
 - Secure Shell (SSH), Secure Socket Layer (SSL) for: Hypertext Transfer Protocol Secure (HTTPS), Secure Shell File Transfer Protocol (SFTP), TL1, CLI
 - Simple Network Management Protocol (SNMP)v3 Message Digest 5 (MD5), Secure Hash Algorithm (SHA)
 - Security log
 - Port-based network access control as per IEEE 802.1x

Physical specifications – 1850 TSS-320 subrack

Dimensions

- Height: 624 mm (24.6 in.)
- Width: 532 mm (20.9 in.)
- Depth: 288 mm (11.3 in.)

- Designed to be installed in a standard ETSI rack
 - Height: 2.20 m (86.6 in.)
 - Width: 600 mm (23.6 in.)
 - Depth: 300 mm (11.8 in.)

Power and cooling

- Power supply: DC feed (-48-V DC nominal)
- Power supply: -65-V
- Power consumption: Up to 3500 W
- Cooling: Forced air

Environment

- Operating temperature: -5°C to +45°C (23°F to 113°F)
- Relative humidity: 0% to 90%, non-condensed

Physical specifications – 1850 TSS-160 subrack

Dimensions

- Height: 304 mm (12.0 in.)
- Width: 498 mm (19.6 in.)
- Depth: 290 mm (11.4 in.)
- Designed to be installed in a standard ETSI rack
 - Height: 2.20 m (7.2 ft)
 - Width: 600 mm (23.6 in.)
 - Depth: 300 mm (11.8 in.)

Power and cooling

- Power supply: DC feed (-48-V DC nominal)
- Power supply: -65-V
- Power consumption: up to 2000 W
- Cooling: Forced air

Environment

- Operating temperature: -5°C to +45°C (23°F to 113°F)
- Relative humidity: 0% to 90%, non-condensed

Regulatory compliance

- CE certification
- Operating conditions: ETS 300 019, Class 3.2
- Storage conditions: ETS 300 019, Class 1.2
- Transportation conditions: ETS 300 019, Class 2.2
- Electrostatic discharge (ESD)/electromagnetic compatibility (EMC): ETS 300 386 "Telecommunications Center"