The Alcatel-Lucent 1830 Photonic Service Switch (PSS)-1 and Alcatel-Lucent 1830 PSS-4 represent a new type of photonic-switching access platform for metro wavelength division multiplexing (WDM). Implementing Zero-Touch Photonics, they transform traditional WDM into a cost-effective, low-footprint and fully flexible transport layer with complete visibility and control of individual wavelengths. This transformation simplifies broadband service delivery, speeds time-to-revenue generation and facilitates bandwidth expansion in optical transport network (OTN)-based metro access networks. The 1830 PSS-1/PSS-4 are key members of the 1830 PSS portfolio serving applications that span access, metro/regional, and long-haul networks.

The Alcatel-Lucent 1830 PSS-1 is a compact, one rack unit (RU) customer premises equipment (CPE), hardened for outdoor deployment and available in different fixed configurations. The Alcatel-Lucent 1830 PSS-4 has a two RU chassis with four slots available for service cards, the same cards supported by the Alcatel-Lucent 1830 PSS-16 and the Alcatel-Lucent PSS-32 (see Figure 1).

### Applications

The Alcatel-Lucent 1830 PSS-1/PSS-4 supports the transport and delivery of multiple services in a variety of environments:

- Transport networks for service providers to aggregate SONET/SDH, IP/MPLS, Mobile, Broadband (xDSL, PON) traffic
- Metro network extension to the customer premises through cost-effective CWDM/DWDM technology up to 10G
- Campus networks for data center protection or data sharing for organizations such as universities, hospitals, banks and airports
- Multi-campus networks for cooperation among public and private companies and optimization of leased dark fiber
- Metropolitan or national research networks that can be combined with the Alcatel-Lucent 1830 PSS-16/PSS-32 to extend these networks to regional distances

### Key benefits

- Extension of the Alcatel-Lucent 1830 PSS product family to the customer premises
- Cost-effective, small footprint and low power consumption
- Deployment flexibility: compact and temperature-hardened for outdoor installation
- A variety of client interfaces with high port density to maximize wavelength efficiency
- Support for cost-effective multiplexing of any bit-rate services and transport over optical transport unit (OTU)-1/OTU-2
- Optical Data Unit (ODU)k switching capability
- Terminal, Fixed Optical Add Drop Multiplexer (FOADM) or In-Line Amplifier (ILA) applications
- Strong forward error correction (FEC) technology based upon OTN to improve system performance and optical link budgets
- Simplified network design, implementation and maintenance with auto power management and Wavelength Tracker

Figure 1. Alcatel-Lucent 1830 PSS-1/PSS-4 for metro WDM
Common features

Optical-layer intelligence
- Ring, bus and point-to-point network topologies support
- Single-fiber bidirectional line transmission (CWDM)

Scalability
- Pluggable client interfaces enable turning up interfaces based on traffic demand
- In-service network scalability without service disruption

Flexible protection options
- Diverse route protection
- E-SNCP within 50 ms

Integrated SLA support and monitoring
- Proactive service management for wavelength services
- G.709-compliant
- Flexible service-level alarms

Carrier-class availability
- 99.999 percent availability
- CE, CSA, NEBS Level 1 and VCCI compliant
- Redundant power supply
- Temperature-hardened operation

Storage area networks (SAN)
- Brocade certification

Network management
- Full-featured Operations, Administration, Maintenance & Provisioning (OAM&P) functionality
- Alcatel-Lucent 1350 Optical Management System (OMS)
- Alcatel-Lucent 1340

Integrated Network Controller (INC)
- Alcatel-Lucent 1354 Photonic Manager (RM-PhM)
- Alcatel-Lucent 5620 Service Aware Manager (SAM)
- Interfaces: Web graphical user interface (GUI) and command-line interface (CLI)
- Transaction Language 1 (TL1)
- Simple Network Management Protocol (SNMP)
- Ethernet port for local access
- Integrated remote management through General Communication Channel (GCC) and Optical Supervisory Channel (OSC)
- Selectable rates for OSC: 100 Mb/s or 155 Mb/s
- Auto node discovery
- Alcatel-Lucent Advanced Engineering Planning Tool simplifies network design and system installation

1830 PSS-1 models
1830 PSS-1 MSAH
- Client ports: 21 x E1 (75 Ohm) plus 4 independent anyrate ports:
  - SONET: OC-3, OC-12 and OC-48
  - SDH: STM-1, STM-4 and STM-16
  - Fast Ethernet (FE), Gigabit Ethernet (GE)
  - 1G Fiber Channel (FC), 2G FC and 4G FC
  - 1G Fiber Connectivity (FICON) and 2G FICON
  - High-definition-serial digital interface (HD-SDI)
- Standard definition (SD)-SDI
- Line ports: 2 x OTU-1/STM-1
- Standard SDH/SONET mapping
  - E1, VC12, TUG2, TUG3, VC4, AU4
  - STM-16 and OC-48 to ODU1
  - Standard GE to ODU0
  - Alternative proprietary mapping option for more efficient sub-ODU1 client grooming
- Support for provisional flexible multiplexing (1:2, 1:3 and 1:4) and transparent transport of any bit-rate services over OTU-1
- Up to 8 CWDM wavelengths
- Data communication network (DCN) access through LAN port

1830 PSS-1 AHP
- High-power, high-gain C-band optical amplifier with 20-dBm output and variable gain setting from 13 to 33 dB
- Auto power mode: amplifier gain is adjusted automatically and dynamically
- Manual power mode
- Two stacked units serve as an ILA
- Stacked units can be managed by a single IP address
- OSC for remote management and auto node discovery
- Wavelength Tracker monitors and traces each wavelength

1830 PSS-1 GBEH
- Client ports: 12 x GE (SFP)
- Line ports: 2 x 10GE or 2 x OTU-2 (XFP)
- Integrated Layer 2 switching capability
- Supports full-rate and sub-rate Ethernet Virtual Private Line (EVPL) service with E-SNCP protection
- E-SNCP protection for intraboard traffic
- Committed Information Rate (CIR)/Excess Information Rate (EIR) Quality of Service (QoS) control based on MEF 6.1
- Up to 8 CWDM wavelengths
- Support for sub-rate CIR Ethernet

1830 PSS-1 MD4H
- Dual muxponder boards, each supporting 4 client ports and 2 line ports
- Client ports: 4 independent anyrate ports
  - OC-3, OC-12 and OC-48
  - STM-1, STM-4 and STM-16
  - FE, GE
  - 1G FC, 2G FC and 4G FC
  - 1G FICON and 2G FICON
  - HD-SDI and SD-SDI
- Line ports: 2 x OTU-1
- Up to 8 shelves managed as a single network element; Extension shelf support MD4H and MSAH mixture configuration
- Mapping:
  - Standard STM-16 and OC-48 to ODU1
  - Standard GE to ODU0
  - Alternative proprietary mapping option for more efficient sub-ODU1 client grooming
- Supports provisional flexible multiplexing (1:2, 1:3 and 1:4) and transparent transport of any bit-rate services over OTU-1
- Up to 8 CWDM wavelengths
- DCN access through LAN port
### 1830 PSS-4 Key Features

#### 1830 PSS-4
- 2 RU chassis, 4 full-slot (full-height)
- Support for field replaceable circuit packs
- Up to 60G slot capacity
- Support for:  
  - Standard mapping: GE, AU3, AU4 and ODU0/1/flex  
  - Alternative proprietary mapping option for more efficient sub-ODU1 client grooming
- Backplane add-drop multiplexer (ADM) and protection for adjacent service optical transponders (OTs)
- Temperature-hardened for outdoor deployment
- Supports up to 8 CWDM or 32 DWDM wavelengths in ITU-T grid
- Support for single-fiber bidirectional line transmission (CWDM)
- Wavelength Tracker monitors and traces each wavelength
- Alien wavelength management
- Cascaded shelves managed as single element
- Synchronous Ethernet support
- Optical-layer path tracing and power monitoring on a per-unique-wavelength service basis
- View of all wavelengths present on a selected fiber pair
- Integrated fault isolation and sectionalization at the optical layer
- Automated optical layer with dynamic power equalization
- Integrated fault correlation

#### Service Cards

**11DPE12 - Dual pluggable 12xGbE OT**
- Full-slot card (full-height)
- 12 x GE (SFP) client ports
- 2 x 10GE or 2 x OTU-2 (XFP) line ports
- Support for all-rate and sub-rate EVPL service with E-SNCP protection
- Support CIR/EIR provision range with 500Mbps step for the 10GE line port (Q-in-Q)
- Ethernet optical add-drop multiplexer (OAM): Y.1731/802.1ag FM/PM
- Cross-connection (ADM) between two mate 11DPE12 via backplane
- Temperature hardened

**11DPE12E - Dual pluggable 12xGbE enhanced OT**
- Supported all of the 11DPE12 features and additional new features are as below:
  - Full-slot card (Full-Height)
  - 12 x GE (SFP) client ports
  - 2 x 10GE or 2 x OTU-2 (XFP) line ports
  - Fast Ethernet support for electrical and optical
  - Up to 100 E-Line services per 10G line port (Q-in-Q)
  - Support rate provision (CIR/PIR) in flexible increments up to full port rates

**11DP12M12 - Dual-port pluggable Multirate Mux 12-Client OT**
- Full-slot card (full-height)
- Client ports: 12 independent anyrate ports  
  - OC-3, OC-12 and OC-48  
  - STM-1, STM-4 and STM-16  
  - FE, GE  
  - 1G FC, 2G FC and 4G FC  
  - 1G and 2G FICON  
  - HD-SDI  
  - SD-SDI
- Line ports: 2 x OTU-2
- Support for both standard mapping (ODU0/1/flex) and proprietary mapping option for more efficient sub-ODU1 client grooming
- Code-transparent transport for GE and clock-transparent for GE, STM-1 and STM-4
- 40G embedded ODUk matrix: client/line/mate interconnection
- Client and line side protection (E-SNCP)
- ODUk SNCP

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**11QPA4/11QPA4A - 11G quad port tunable AnyRate 4-client OT**
- Full-slot card (Full-height)
- 4 independent multirate 10G channels
- Client ports  
  - 4 x STM-64 and OC-192  
  - 10 GE wide area network (WAN)/local area network(LAN) PHY  
  - OTU-2
  - 8G FC and 10G FC
- Line ports: 4 x OTU-2 with provisioning FEC (XFP)
- GCC0 support
- Operation Mode: Add/Drop, CrossReg, Drop Continue(10GE signal), Addonly(10GE signal)
- Protection: E-SNCP and Y-cable
- Drop and continue for

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**11DPM12 - Dual-port pluggable Multirate Mux 12-Client OT**
- Full-slot card (full-height)
- Client ports: 12 independent anyrate ports  
  - OC-3, OC-12 and OC-48  
  - STM-1, STM-4 and STM-16  
  - FE, GE  
  - 1G FC, 2G FC and 4G FC  
  - 1G and 2G FICON  
  - HD-SDI  
  - SD-SDI
- Line ports: 2 x OTU-2
- Support for both standard mapping (ODU0/1/flex) and proprietary mapping option for more efficient sub-ODU1 client grooming
- Code-transparent transport for GE and clock-transparent for GE, STM-1 and STM-4
- 40G embedded ODUk matrix: client/line/mate interconnection
- Client and line side protection (E-SNCP)
- ODUk SNCP
1830 PSS-4 key features

- 5Mbps steps from 10Mbps to 100Mbps
- 50Mbps steps from 100Mbps to 1Gbps

10GE service

- Each channel independently supports unidirectional and bidirectional operation mode
- Temperature hardened (11QPA4A)
- Temperature range from -5°C to +55°C (11QPA4)

4DPA4 - 4G dual-port pluggable AnyRate 4-client OT

- Half-slot card (half-height)

- Proprietary mapping for STM-1/OC-3 and STM-4/OC-12
- ADM on a blade implementation
- Flexible grooming
- Add/drop of services around the ring created with 12 x any Muxponder cards
- Drop and continue support for GbE and HD-SDI, SD-SDI
- Interworks with 4DPA4 Muxponder card for:
  - STM-1, STM-4 and STM-16
  - OC-3, OC-12 and OC-48 transparent services
  - GE
  - 1G FC and 2G FC
  - HD-SDI
- Pluggable Wavelength Tracker encoder and slow eVOA for automatic power adjustment
- Facility and terminal loopbacks
- Digital Performance Monitoring
  - SONET/SDH
  - ODU and OTU path and section
  - 8B CV and 10B CV
  - GE statistics
  - FEC-based PM for OTN client and line
- Temperature hardened
Facility生態卡
- 支持可插拔（XFP）
- 小型插拔式（SFP）
- 可插拔（XFP）
- 小型插拔式（SFP）
- 网络放大器卡

尺寸规格
1830 PSS-1
小型插拔式模块（SFP）支持
- FE: 100BASE-LX10, BX40U/D
- GE: 1000BASE-SX/LX/ZX/T, BX2U0/D, BX40U/D
- OC-3/STM-1: SS-1.1/ SL-1.1/ SL-1.2
- OC-12/STM-4: SS-4.1, SL-4.1
- OC-48/STM-16: SS-16.1A, Multirate ≤7.2 Gb/s; SL-16.1, SL-16.2
- 1G/2G FC/FICON, 4G FC: 4 FCSN-I and 4 FCLC-L
- CWDM 25G MR PIN: SS-16.2C
- CWDM 25G MR APD: SL-16.2C
- OTU-1: SL-16.1, SL-16.2D
- 4.55G CWDM: 4 FC-OC
- 4.55G DWDM: 4 FC-OD
- CWDM 25G MR PIN: SS-16.2C
- CWDM 25G MR APD: SL-16.2C
- eVGA SFP FAST: fVGA
- OSC SFP ultra long haul (ULH): SUL-1.2D
- OSC SFP eULH: SEU-1.2D

10 Gb/s Form Factor Pluggable (XFP) support
- 10 GE XI-64.1 and XS-64.2b
- 10 GE ZR:10GB-ZR
- 10G CWDM PIN: XS-64.2C
- CWDM anary up to 11G APD: XL-64.2C
- WDWM anary up to 11G: XL-64.2D

物理尺寸
1 RU
- 高度: 43.5 mm (1.71 in.)
- 宽度: 443.9 mm (17.48 in.)
- 深度: 278.5 mm (10.94 in.)

操作环境
- 电源: -48V DC or 110/220V AC

1830 PSS-4
最大客户接口数
- 支持SFp和XFPs和1830 PSS-1相同
- 客户接口
  - FE: 24
  - GE: 24
  - OC-3/STM-1: 24
  - OC-12/STM-4: 24
  - OC-48/STM-16: 16
  - OC-192/STM

技术规格
- 支持SFp和XFPs和1830 PSS-1相同
- 客户接口
  - FE: 24
  - GE: 24
  - OC-3/STM-1: 24
  - OC-12/STM-4: 24
  - OC-48/STM-16: 16
  - OC-192/STM

- 电源: -48V DC或+24V DC或110/220V AC
- 最大功率消耗: 328 W
- 典型功率消耗: 230 W
- 操作温度:-40°C to +65°C (-40°F to +149°F)
- 湿度:
  - CO环境
  - 95 percent long term
  - 85 percent short term
  - ETSI
  - 95 percent long term
  - Hardened environment
  - 100 percent long term

- FCC Part 15 Class A
- UL Certification: UL 1950 and UL 60950
- CE mark: EN 300 386
- IEC Safety: IEC 60950 and IEC 60825-1/2
- CSA-22.2-No.25-M90
- ETSI ETS 300 019
- Storage: Hazard level 1.2
- Transportation: Hazard level 2.2
- Operational: Hazard level 3.2
- ETSI EN 300 019
- Storage: Class 1.2
- Transportation: Class T2.3 and Class 3.2
- ETSI EMC: EN 300 386 v.1.3.2
- ETSI ES 201 468 v1.2.1
- EMC directive 89/336 LV
- ETS 300 753
- ANSI TL.308
- RoHS-5
- GR-383-CORE

- 95 percent long term
- 95 percent short term
- ETSI
- 95 percent long term
- Hardened environment
- 100 percent long term
- FCC Part 15 Class A
- UL Certification: UL 1950 and UL 60950
- CE mark: EN 300 386
- IEC Safety: IEC 60950 and IEC 60825-1/2
- CSA-22.2-No.25-M90
- ETSI ETS 300 019
- Storage: Hazard level 1.2
- Transportation: Hazard level 2.2
- Operational: Hazard level 3.2
- ETSI EN 300 019
- Storage: Class 1.2
- Transportation: Class T2.3 and Class 3.2
- ETSI EMC: EN 300 386 v.1.3.2
- ETSI ES 201 468 v1.2.1
- EMC directive 89/336 LV
- ETS 300 753
- ANSI TL.308
- RoHS-5
- GR-383-CORE

- 95 percent long term
- 95 percent short term
- ETSI
- 95 percent long term
Regulatory and standards compliance

- Telcordia GR-3108-CORE Class 2
- Telcordia NEBS level 1, GR-63-CORE and GR-1089-CORE
- FCC Part 15 Class A
- UL Certification: UL 1950 and UL 60950
- CE mark: EN 300 386
- IEC Safety: IEC 60950 and IEC 60825-1/2
- CSA-22.2-No.25-M90
- ETSI ETS 300 019
- Storage: Hazard level 1.2
- Transportation: Hazard level 2.2
- Operational: Hazard level 3.2
- ETSI EN 300 019
- Storage: Class 1.2
- Transportation: Class T2.3 and Class 3.2
- ETSI EMC
- EN 300 386 v1.3.2
- ES 201 468 v1.2.1
- EMC directive 89/336 LV
- ETS 300 753
- ANSI T1.308
- RoHS-5
- GR-383-CORE
- VCCI