Nokia 1830 PSS-8x/12x

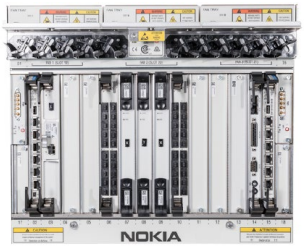
The 1830 Photonic Service Switch (PSS) portfolio consists of platforms optimized for various optical network deployment environments ranging from interconnecting data centers to efficiently scaling large metro, regional and long-haul multi-layer, multiservice optical networks. Each platform leverages common software, hardware, management and control to offer seamless operations across the portfolio.

The 1830 PSS-8x and 1830 PSS-12x provide a common platform that is optimized for both metro aggregation and metro core switching applications in optical transport networks (OTNs). It provides the flexibility and efficiency required to support an evolution to higher capacity services, enabling continued revenue streams as customers demand more bandwidth and enterprises move toward 10G and 100G connectivity.

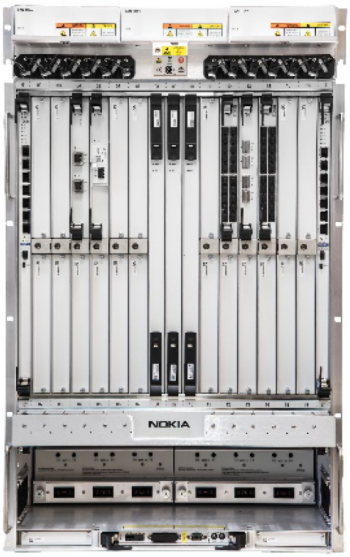
With initial support for 1.6 Tb/s of electrical switching capacity in a single 10RU shelf, 6.4 Tb/s per 300 mm rack the 1830 PSS-8x provides a small form factor high capacity metro aggregation point. With 4.8 Tb/s of electrical switching capacity in a 21RU shelf, 9.6 Tb/s per rack 1830 PSS-12x offers industry-leading switching scale in the metro core at 200G port densities, while also using less power per bit.

The platforms are designed to support a wide range of client interface types ranging from 100 Mb/s to 100 Gb/s, thus enabling a smooth transition from legacy networks to a modern services delivery platform.

This new level of switching scale is enabled by intelligent electrical fabric design coupled with transport wavelength cards powered by the Photonic Service Engine (PSE-2 and PSE-3) and services cards with high client port density. Designed to support 12.8 Tb/s (1830 PSS-8x) and 19.2 Tb/s (1830 PSS-12x) of electrical switching capacity in a single rack, together with 400G-capable card slots, the 1830 PSS-8x/12x platforms also offer a network evolution path to keep up with bandwidth demands and power savings.



1830 PSS-8x



1830 PSS-12x

Benefits

- Significantly and simultaneously scales network capacity, distance and density, making feasible the mass delivery of sub-10G, 10G, and 100G services
- Supports extremely efficient dense wavelength division multiplexing (DWDM) transport wavelengths:
  - Ability to provide flexible, rate-adaptive 100G/200G coherent DWDM lines
  - Spectral shaping for ultra-efficient multi-carrier superchannels
  - Optimized transport wavelength spectral efficiency for both capacity and distance, maximizing achievable fiber bandwidth without compromising wavelength availability
  - Metro-optimized, coherent, pluggable 100G/200G wavelength distances of 500 km to1,000 km
  - Pay-as-you-grow 100G DWDM pluggable line options
- Provides the flexibility to optimize networks along the dimensions of power, space, cost and spectral density
- Isolates line cards from client cards for investment and operational decoupling
- Delivers reliable, efficient, scalable multiservice transport:
  - Redundant control, power and timing
  - Efficient 2+1 electrical fabric protection optimizing service availability
  - Fast resilience using software-defined networking (SDN) centralized or distributed Generalized Multiprotocol Label Switching (GMPLS) control plane
  - Power consumption of less than 0.9 W/Gb
  - The ability to scale to 3.2 Tb per shelf and 12.8 Tb per rack for 1830 PSS-8x
  - The ability to scale to 9.6 Tb per shelf and 19.2 Tb per tack for 1830 PSS-12x
  - Multiservice Packet/OTN switching
  - Large-scale transport of sub-1G to 100G services with traffic segregation, bandwidth, loss, latency and availability guarantees
  - Direct multiplexing of low-speed clients to 100G/200G line interfaces
  - Simplified protection and spares inventory
- Efficient and reliable multi-layer networking:
  - Efficient bandwidth management capabilities at the 100G and sub-100G levels
  - ODUk switching from ODU0 to ODU4, including ODUflex
  - SDH/SONET transport over OTN
  - Ability to transport FC-100/200/400/800/1200 and FC-1600 mapped into ODUk/ODUflex according to ITU-T G.709
  - Efficient enhanced reconfigurable add-drop multiplexer (eROADM) in a single network element solution
  - Compatible with fixed grid and flex spectrum photonic infrastructures
  - Advanced wavelength frequency and high-speed phase recovery capabilities enable 50-ms protection.
  - Photonic protection schemes like Y-cable, OPSB and OPSflex
  - Ultra-fast wavelength, multi-layer protection and restoration
- Embedded multi-layer capability with multiplexing, grooming, and switching at Layer 0 (wavelength), Layer 1 (ODUk), and Layer 2 (packet).

Technologies

- Nokia-designed Transport Service Engine (TSE) switching technology:
  - Efficient and proven carrier-grade switching technology used throughout the Nokia PSS-X switching family
- Nokia-designed PSE-2c and PSE-3c electro-optics:
  - Adaptable to a wide range of fiber impairments for operation over extreme distances and challenging fiber environments
- Integrated Wavelength Tracker™ encoding, supporting unique and powerful wavelength operations, administration and maintenance (OAM)
- Multi-layer control plane capabilities
  - Multi-layer, multi-region networking support, including coordinated multi-layer protection and restoration
- Management/Transport SDN
  - Efficient control of functions and resources via Nokia Network Services Platform (NSP)
- Network design and planning
  - Integrated network planning tools for optimized multi-layer network planning/deployment

Applications

- Large metro-scale grooming of sub-1G to100G services onto efficient DWDM transport:
  - Business services
  - Wholesale services
  - Multiservice transport
- Metro aggregation, core and regional packet/OTN switching

Product description

1830 PSS-8x/12x

The 1830 PSS-8x and PSS-12x are designed to address multi-layer, multiservice optical network scale and efficiency by delivering an industry-leading level of switching in a compact 10RU/21RU footprint. By leveraging class-leading, in-house-designed silicon for both electrical switching and DWDM interface port density and capacity, the 1830 PSS-8x/12x provide efficient, non-blocking, high-capacity, any-rate switching regardless of traffic mix.

The 1830 PSS-8x/12x leverage the same proven technologies as those of the 1830 PSS portfolio including the PSE Digital Signal Processor (DSP) and the 1830 PSS-24x Transport Switching Engine (TSE) switching silicon. The 1830 PSS-8x/12x platforms are ideal for aggregating and grooming traffic from 1830 PSS-8 services access networks and switching metro traffic toward 1830 PSS-24x regional/long haul core networks.

Capable of supporting up to 12.8 Tb/s (1830 PSS-8x) and 19.2 Tb/s (1830 PSS-12x) of switching capacity in a single rack, 400G-capable card slots and low system power utilization, the 1830 PSS-8x/12x take packet/OTN grooming and protection capabilities to the next level of scale required for metro core network locations.

DWDM line card options

100G Metro Aggregation/Core uplink card

This PSE-2c Compact DSP-based card is ideal for addressing 100G metro routes. A typical deployment supports a 10G/100G services evolution for metro/regional networks.

Features:

- 1-slot card, 8 per PSS-8x shelf
- 1 flexible, pluggable CFP2-ACO line port
- Lines fully tunable across C-Band; Flexgrid-capable
- PSE-2c 100G QPSK transport wavelength
- Wavelength Tracker technology for operationally efficient end-to-end wavelength OAM

2x 100G/1x 200G Metro Aggregation/Core uplink card

This PSE-3c DSP-based card is ideal for addressing 200G metro routes or increasing port density for 100G metro routes.

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Features:

- 1-slot card, 8 per PSS-8x shelf, 24 per PSS-12x shelf
- 2 flexible, pluggable CFP4-ACO line ports
- Lines fully tunable across C-Band; Flexgrid-capable
- PSE-3c 2x 100G QPSK or 1x 200G 16QAM transport wavelength
- Wavelength Tracker technology for operationally efficient end-to-end wavelength OAM

Low speed uplink and "any client" card options

20-port sub-10G/10G multi-rate client card

This card provides scalable, pay-as-you-grow sub-10G and 10G multi-rate point-to-point client connectivity.

Features:

- 20-port sub-10G and 10G multi-rate client card
  - 16 ports support sub-10G client signal types
  - 4 ports support an integrated Wavelength Tracker encoding via a T-SFP+ module
- 1-slot card, 8 per PSS-8x shelf, 24 per PSS-12x shelf
- B&W, CWDM, DWDM SFP/SFP+ pluggables
- Flexible, multi-rate interface configuration - each port individually configurable for interface type and mappings
- Service type individually configurable per 4x 10G ports
  - 10GE mapped into ODU2, ODU2e and ODUflex
  - OTU2e, OTU2 including sub-structuring to ODUk/ODUflex
  - STM-64/OC-192 mapped into ODU2
- Service type individually configurable per each of 16 sub-10G ports
  - 1GE mapped into ODU0
  - OTU1 including sub-structuring to ODU0/1 (future)
  - STM-1/-4/OC-3/-12 mapped into ODU0
  - STM-16/OC-48 mapped into ODU1
  - FE mapped into ODU0

20-port 10G any client card

This card provides scalable, pay-as-you-grow 10G any service point-to-point client connectivity.

Features:

- 20-port 10G any client card
  - 8 ports support an integrated Wavelength Tracker encoding via a T-SFP+ module
- 1-slot card, 8 per PSS-8x shelf, 24 per PSS-12x shelf
- B&W, CWDM, DWDM SFP+ pluggables
- Service type individually configurable per port
  - 10GE mapped into ODU2, ODU2e and ODUflex
  - OTU2e, OTU2 including sub-structuring to ODUk/ODUflex
  - STM-64/OC-192 mapped into ODU2

2-port 100G/4-port 100G/40G any client card

This card provides scalable, pay-as-you-grow 100G any service point-to-point client connectivity.

Features:

- 4-port 100G/40G any client card
  - 2 ports support 100G
  - 4 ports support 40G (future)
  - combination of 40G and 100G Interfaces
- 1-slot card, 8 per PSS-8x shelf, 24 per PSS-12x shelf
- B&W, CWDM, DWDM QSFP28 pluggables
- Service type individually configurable per port
  - 100GE mapped into ODU4
  - OTU4 including sub-structuring to ODUk/ODUflex
  - 40GE mapped into ODU3 (future)
  - OTU3 including sub-structuring to ODUk/ODUflex (future)

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Related Nokia products

- 1830 Photonic Service Switch (PSS)-24x
- 1830 Photonic Service Switch (PSS)-4, PSS-8, PSS-16 and PSS-32
- 1830 Photonic Service Switch (PSS)-36, PSS-64
- 1390 Network Planning Tool (NPT)
- Network Service Platform (NSP) IP/Optical SDN controller
- IP/Optical Integration with 7750 Service Router (SR) and 7950 Extensible Routing System (XRS)

Technical specifications

Table 1. Overview

Specifications	1830 PSS-8x	1830 PSS-12x
Capacity and performance	1.6 Tb per shelf, 6.4 Tb per rack, scalable to 3.2 Tb per shelf, 12.8 Tb rack	4.8Tb per shelf, 9.6 Tb per rack, scalable to 9.6 Tb per shelf, 19.2 Tb per rack
Interface card slots	8 x 200G/400G-capable slots	24 x 200G/400G-capable slots
Dimensions	• Height: 500 mm (19.68 in) • Width: 450 mm (17.714 in); (19", 21" and 23" racks) • Depth: 300 mm (11.8 in)	• Height: 950 mm (37.40 in) • Width: 500mm (19.68 in); (21" and 23" racks) • Depth: 300 mm (11.8 in)
Weight 1830 PSS-8x	9.2 kg (20.3 lb)	22.3 kg (49.2 lb)
Switch fabric options	2+1 protected, centralized fabric	2+1 protected, centralized fabric
Controller card slots	2 protected	2 protected
Power modules	Redundant power, modular, scalable power architecture	Redundant power, modular, scalable power architecture
Power options	-48 V DC/-60 V DC	-48 V DC/-60 V DC
Power requirements	Typically less than 0.9 W/Gb	Typically less than 0.9 W/Gb
Operating temperature	5°C to 40°C (41°F to 104°F) -5° C to +50° C (+23° F to +122° F) short term	5°C to 40°C (41°F to 104°F) -5° C to +50° C (+23° F to +122° F) short term
Humidity	5% to 85% non-condensing	5% to 85% non-condensing
Multi-shelf management	Cluster configuration	Cluster configuration

Table 2. Interface cards*

Card ID	Card description	Notes
1UX100	• 100G Metro Aggregation/Core uplink card • Full slot card	• 100G PDM-QPSK with U-SD-FEC or HD-FEC • Full flexible OTH multiplexing • CFP2 ACO pluggable
2UX200	• 100G/200G Metro Aggregation/Core uplink card • Full slot card	• 100G PDM-QPSK or 200G PDM-16QAM with U-SD-FEC or ACC-FEC • Full flexible OTH multiplexing • CFP4 ACO pluggable

Card ID	Card description	Notes
20MX80	• 20 x sub-10G/10G multi-rate client card • Full slot card	Flexible multi-rate interface configuration, each port individually configurable for interface type and mapping. • 16 x sub-10G interfaces • 4 x 10G interfaces • Wavelength Tracker support on all 4 10G ports SFP/SFP+ pluggables: • B&W • CWDM • DWDM
20AX200	• 20 x 10G any rate client card • Full slot card	Flexible interface configuration, each port individually configurable for interface type and mapping • Wavelength Tracker support on 8 ports • Service type individually configurable per port • OTH multiplexing in OTM-0.2 mode SFP/SFP+ pluggables • B&W • CWDM • DWDM
4MX200	• 2 x 100G / 4 x 40G any rate client card • Full slot card	Flexible multi-rate interface configuration, each port individually configurable for interface type and mapping. • 2 x 100G interfaces • 4 x 40G interfaces (future) QSFP28 or QSFP+ pluggables

*Note: Support for interface cards and related features depends on the software release. Please refer to release notes and user documentation for additional details

Table 3. Interface types

Specifications	
SDH: STM-1/-4/-16/-64	X
SONET: OC-3/-12/-48/-192	X
OTN: OTU-(1)/2/2e/4	X
Ethernet:	
FE	X
GE	X
10GE LAN and WAN	X
100GE	X
Pluggable interfaces:	
B&W, CWDM, DWDM SFP/SFP+	X
B&W, CWDM, DWDM QSFP28 (QSFP+)	X
CFP2-ACO	X
CFP4-ACO	X

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Table 4. SDN

Capabilities	
Controllable via Nokia Network Services Platform (NSP) SDN controller	X

Table 5. Management

Capabilities	
Web GUI and CLI	X
SNMPv3 (AES-256)	X
TL1	X
CFM framework (MD, MEL, MEG, up/down MEP, MIP configuration)	X
Fault propagation/LPT	X
Ethernet port for local access	X
Integrated remote management via GCC/OSC	X
Nokia Network Services Platform (NSP)	X

Table 6. Regulatory and standards compliance

Specifications	ANSI	ETSI
EMC	• EMC level: Class A • CES-003, Issue 4, February 2004, Class A (Canada) • Telcordia GR-1089-CORE, Issue 6, May 2011 (NEBS Level 3) • Telcordia Special Report SR-3580, Issue 3, January 2007 • FCC 47 CFR15, Class A Part B (2006)	• EMC level: Class A • EN 300 386 v1.6.1 (2012-4) (CE) • CISPR 32 – (2008) Class A. (1G ~ 6 GHz) • CISPR 24 – First edition (1997-09), Amendment 1 (2001-07) and Amendment 2 (2002-10) • EN 55032: Ed2006 + A1:2007: Class A • EN 55024:1998 – CENELEC Amendment A1:2001 and Amendment A2:2003 • EU Directive 2014/30/EU • EC Directive 93/465/EEC • ES 201468 (1.3.1), ITC (Class A)
Supported countries	• Canada • United States	• Europe • Latin America • Asia Pacific • Middle East and Africa
Safety	• UL/CSA 60950 - 1 • Telcordia GR-1089-CORE, Issue 6 • Telcordia GR-63-CORE (NEBS Requirements: Physical Protection) • FDA 21 CFR 1040, Laser Notice No. 50 to CDRH • ITU-T G.664 (2006) - G.783 (ALS/APR)	• IEC 60950-1:2005 (2nd Edition); Am 1:2009 • EN 60950-1-1:2006 + A11:2009 • EN 60825-1, Edition 2.0, 2007-03 • EN 60825-2, Third Edition, 2010-09

Specifications	ANSI	ETSI
Environmental	Telcordia GR-63-CORE, Issue 4	• EN 300 019-1-1 (Storage, Class 1.2) • EN 300 019-1-2 (Transportation, Class 2.3) • EN 300 019-1-3 (Operational, Class 3.1) • EU WEEE directive 2002/96/EC • EU RoHS6: RoHS2.0 Directive 2011/65/EC • China RoHS regulation
Power and grounding	• Telcordia GR-1089-CORE, Issue 6, section 10 (DC) • ATIS 0600 315	• ETS 300 132-2 (DC) • ETS 300 253
Acoustic noise	Telcordia GR-63-CORE (78 dB at 27 C ambient temperature)	EN 300 753
Miscellaneous	• Mechanical Shock and Bumps • Telcordia GR-63 Zone-4 (earthquake) • Country-specific requirements: • AS/NZS 60950.1:2003: Information technology equipment - Safety- General requirements	• Mechanical Shock and Bumps • Telcordia GR-63 Zone-4 (earthquake)

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Nokia Oyj
Karaportti 3
FI-02610 Espoo, Finland
Tel. +358 (0) 10 44 88 000

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