OTN Product Series

Zero Wait
Zero Waste
Zero Downtime

With the WDM/OTN Bandwidth Cloud Solution

Enterprises continue to change the way they do business. Cloud computing, VoIP, video conferencing, data centers, and other advanced IT applications fuel demands for more and more bandwidth. Energy, government, finance, and education are just a few of the fields that require high-bandwidth services, though the need to expand bandwidth extends across all sectors and industries.

WDM, or wavelength-division multiplexing, is a core backbone technology that delivers bandwidth at high speeds with huge capacity and long-reach coverage. These inherent characteristics now make WDM the technology of choice for metro and access areas as well. Traditional WDM networks, however, have not kept pace with optical transport network (OTN) solutions in terms of service deployment, resource allocation, and network protection.

To bring the benefits of WDM to enterprise networks, Huawei has developed a customized solution to meet these critical needs:
- Rapid service delivery to meet market demand
- Reduced transmission costs with increased bandwidth
- Enhanced reliability for increasingly complex networks

The WDM/OTN Bandwidth Cloud solution from Huawei packages a dynamic, intelligent, and reliable shared network with ultra-large capacity into a single platform. And to keep the transition as smooth as possible, the WDM/OTN Bandwidth Cloud solution eliminates problems typically associated with planning and rolling out new networks with simplified OAM and quick deployment.

The WDM/OTN Bandwidth Cloud solution offers:
- 40 G/100 G technologies for structuring high-bandwidth channels plus a terabit OTN cross-connection that allows sharing of high-bandwidth channels network-wide
- ASON technology for automated resource and connection management to simplify network administration with added intelligence and reliability.
- OTN with PID technology that enables a simple network implementation without the need for additional signal modification: the network is DCM-free, amplifier-free, and OSNR-free.

WDM/OTN Bandwidth Cloud Solution Features

High-Capacity 10 G/40 G/100 G Shared Pipe Delivers 'Zero Waste' Bandwidth
- **100% utilization:** The ODUk/ODUflex matrix allows the cross-connection of any service to a 40 G/100 G line so that 40 G or 100 G bandwidth can be shared by the entire network.
- **Investment protection:** Any of the 10 G, 40 G, or 100 G line cards can be used in the same platform, so the existing network is easily upgraded to a 40 G/100 G system (maximum. line capacity is 10 G/40 G/100 G x 80-ch (0.8 T to 3.2 T to 8 T).

O&E Grooming Delivers 'Zero Wait' Provisioning
- **Non-blocking signal grooming:** Any combination of services can be cross-connected by the 2/4/9-Degree ROADM + 3.2/6.4 Terabit OTN matrix.
- **PID components:** Integrated photonic integrated device (PID) supports up to 20 channels in one port, enabling construction of stepped networks with 40 G, 80 G, 120 G, and 200 G transport without concern for wavelength assignment, Dispersion Compensation Module (DCM), Optical Signal-to-Noise Ratio (OSNR), and amplifiers — a simple PID line port connection activates the link.
- **Short Design Time:** Network planning is easy with no bandwidth reservation requirements or wavelength conflicts to resolve.

### Intelligent & Reliable ASON Delivers 'Zero Downtime' Service
- **Anti-Failure Connection Management:** The intelligent, Automatically Switched Optical Network (ASON) connection management function virtually eliminates connection failures — once a route is established, the connection stays active.
- **Fast Fault Localization:** Huawei's U2000 Unified Network Management System (NMS) provides unified management and visual O&M tools to help operators reduce O&M costs as well as manage network upgrades.

A Record of Success Makes Huawei the Smart Choice
- **Fast, flexible deployment:** Up to 4Q2013, over 200 operators globally have chose Huawei's 100G product to build their backbone network. According to Ovum 4Q13 report, Huawei has ranked No.1 in rolling 4Q in global 100G market (4Q13-1Q13).Huawei's 45% global market share in 40 G line cards and in-depth experience with 40 G commercial rollouts around the world ensures expert assistance when you are ready to roll out your network. Huawei's record of success in fast 40 G deployments includes submarine systems, G.653 fiber systems, and legacy fiber systems, which are particularly suited for 40 G solutions.
- **Standards Compliance:** As the Leading ASON provider to commercial operators, Huawei has accumulated years of experience in the OTN field; in fact, Huawei has led the innovation and development of OTN and Wavelength Switched Optical Network (WSON) standards. Always at the forefront of the global WDM market, Huawei was chosen to build nearly all WDM/OTN ASON networks worldwide.
- **Reliable Transmission:** Huawei maintains its 2013 record as the No.1 global provider for backbone networks. Huawei also holds the industry record for the longest 100 G transmission: 4,000 km for a terrestrial network and 10,000 km for a sub-sea network.
- **Ongoing support and development:** Huawei continues to innovate ultra-high-speed transport solutions and recently launched the industry's first end-to-end 400 G prototype using the advanced PDM-16QAM modulation format, enabling non-regeneration transmission over a distance of 1,000 km.

U2000
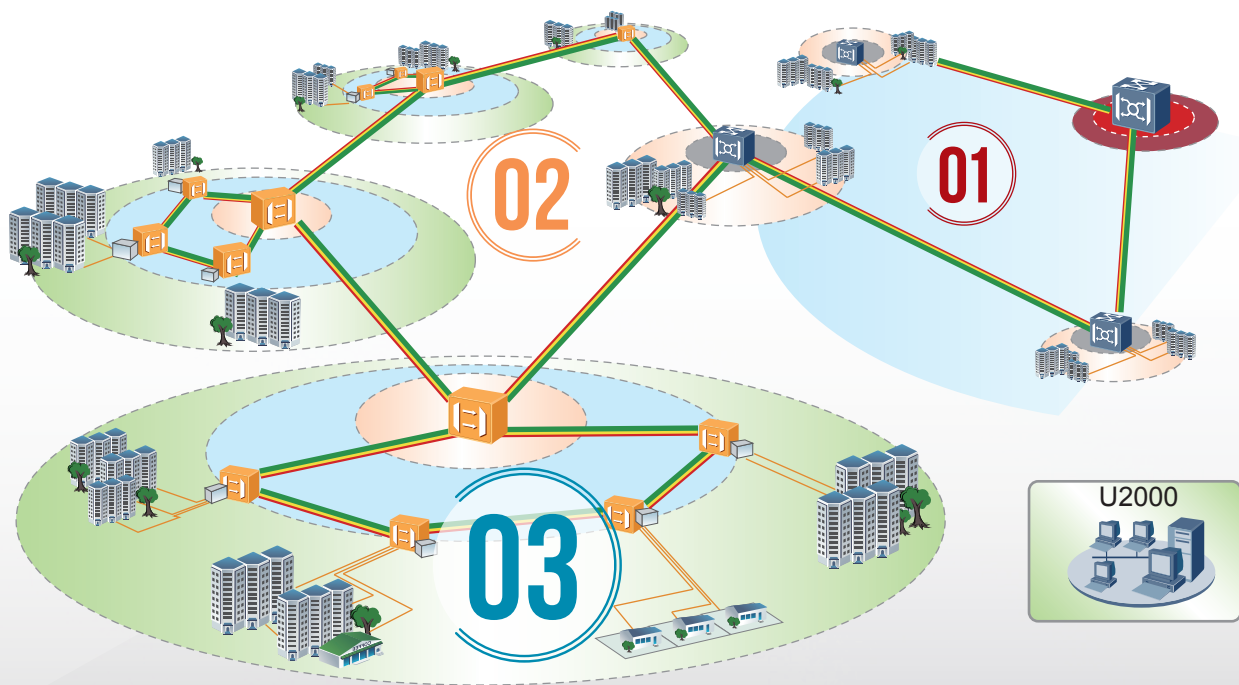
Core/Backbone OSN 8800 T32/T64, OSN 9800

- **40G/100G effective transport**
  Smooth upgrade to 40 G/100 G;
  > 4,000km ;
  Share the 40G/100G bandwidth via ODUk XC.

Metro/Aggregation OSN 8800 T16/UPS, 6800

- **Fast Provisioning, simple OAMConnect and play.**
  OTN and PID technologies simplify networking and eliminate the transport limitations that require DCM, OSNR, and amplifiers.

Edge/Access OSN 1800 I/II/V

- **Full service in single transmission:**
  Unified access transmission for all service from 2M to10G via ODUflex and ODU0 mapping technologies.

ASON

OSN 1800 I
OSN 1800 II

OSN 1800 V	OSN 6800	OSN 8800 UPS	OSN 8800 T16	OSN 8800 T32	OSN 8800 T64	OSN 9800 U32	OSN 9800 U64
01	02	03	04	05	06	07	08

01
2 M to10 G Access
700 G ODUk/
PKT XC
40 G VC4
5 G VC3/VC12

02
O+E Grooming
360 G ODUk XC
4/9-D ROADM

03
19' WDM equipment
2/4/9-D ROADM
40 G/100 G 4,000km

04
1.6 T ODUk
800 G PKT
640 G VC4
20 G VC3 /VC12
PID 40 G-200 G
40 G/100 G
4,000km

05
3.2T ODUk
1.6T PKT
1.28T VC4
80G VC3 /VC12
PID 40G-200G
40G/100G
4,000km

06
6.4T ODUk
1.28T VC4
80G VC3 /VC12
PID 40G-200G
40G/100G
4,000km

07
6.4T/12.8T
Universal Switch
200G/400G
capacity per slot
40G/100G/
400Gbit/s

08
12.8T/25.6T
Universal Switch
200G/400G
capacity per slot
40G/100G/
400Gbit/s

Huawei OptiX OSN 9800

10 T+ Intelligent MS-OTN Platform

Backbone

OSN 9800 U64/U32

Regional Backbone

OSN 9800 U32/OS N8800 T64/T32

Metro

OSN 9800 U32/OSN 8800 T32/T16
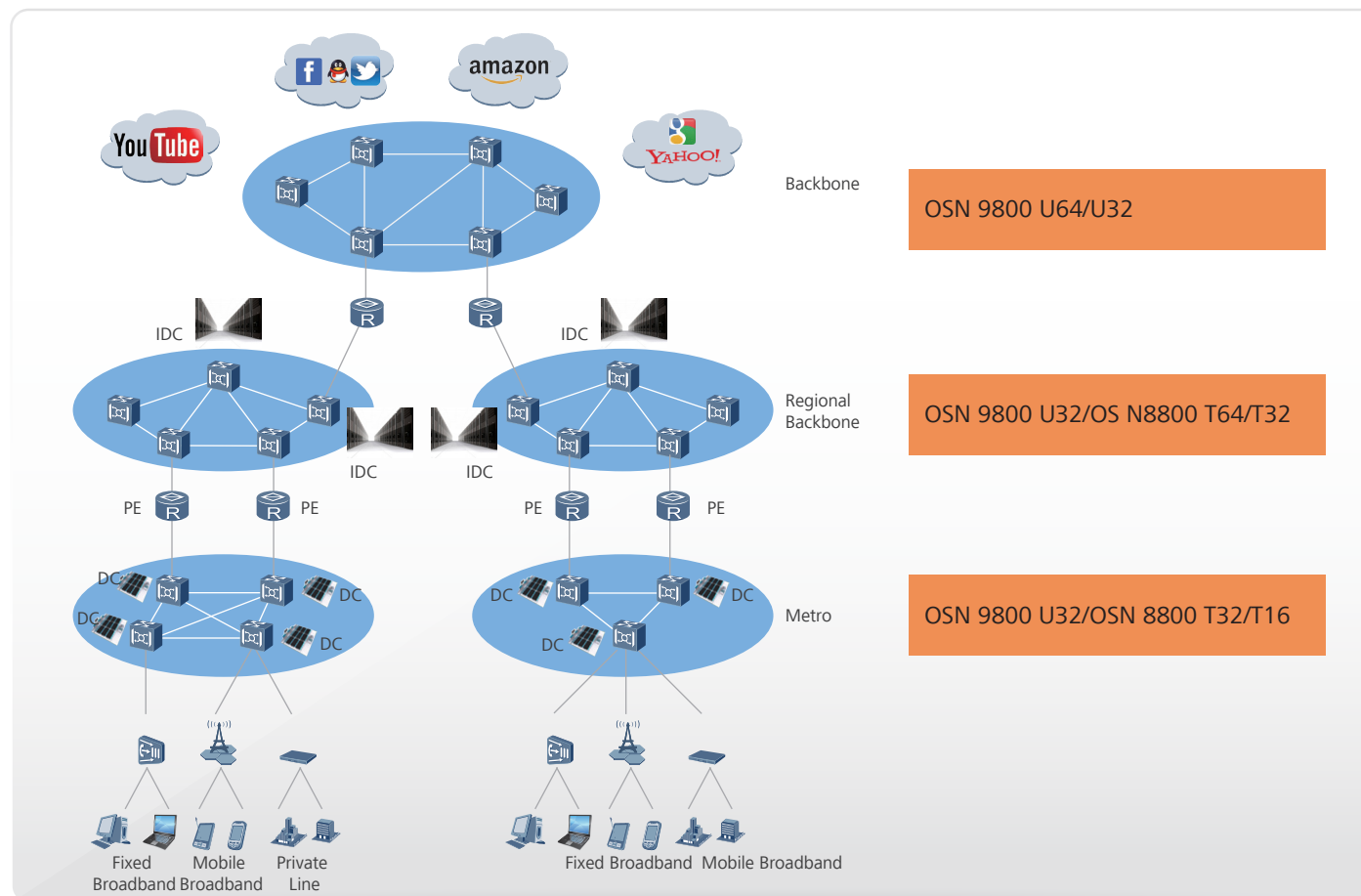
The OptiX OSN 9800 product series is Huawei's next-generation OTN platform for converged packet-optical, intelligent, and optimized networks. These high-performance switching engines offer up to 12.8T cross-connection capacity and feature a universal switching matrix for easy upgrades to 25.6T in a single chassis.

The OptiX OSN 9800 series includes a high-density, flexible architecture that supports any combination of carrier Ethernet, OTN, and SDH transport protocols. The integrated GMPLS (Generalized Multiprotocol Label Switching) control plane adds operations automation and resiliency for robust traffic engineering.

OptiX OSN 9800 Series Features

6.4 T/12.8 T Large-capacity OTN Platform delivers powerful switching with flexible grooming options

- **Powerful switching capacity:** The OptiX OSN 9800 series supports the industry's largest OTN cross-connection capacity with 6.4 T/12.8 T.
- **Easily upgraded:** The non-blocking switch matrix allows a 25.6 T upgrade, which can be extended to over 100 T for seamless conversion to cluster technology.
- **Optimized operations:** A large-capacity OTN+ 2/4/9-degree Reconfigurable Optical Add-Drop Multiplexer (ROADM) O&E hybrid switch provides wavelength-level and sub-wavelength-level cross-connection, enabling flexible and efficient service provisioning.
- **Scalable, high-density architecture:** The platform supports 200 Gbps per service slot and is equipped to support 400 Gbps per-service slot for 400 Gbps services or connections.
- **Efficient resource utilization:** Concentrated port density enables a 2 x 100 G, 1 x 200 G, 2/4 x 40 G, 16 x 10 G, or 30x multi-rate service port (125 Mbps to 4.25 G Gbps) on a single card and slot, minimizing floor space and power consumption.

Integrated MPLS-TP Features Provide Huge Gains in IP Transport Efficiency

- **Scalability and redundancy:** The universal switch fabric supports massive IP transport services while minimizing network capital expenditures on equipment, space, power, and spares.
- **Integrated MPLS-TP features:** These advanced features make the OptiX OSN 9800 especially suited for Ethernet Port Aggregation, IP Offloading, Integrated Layer 0/1/2 leased line transport, and Cloud-IDC interconnection.
- **Superior transmission efficiency:** High-density Ethernet cards and hybrid line cards bring superior transmission efficiency to IP and OTN traffic.

The OptiX OSN 9800 OTN Platform Leads the Industry in Intelligence, Reliability, and Agility

- **Highly resilient transport:** The GMPLS control plane provides field-tested electrical layer ODUk-level (k=0, 1, 2, 3, 4, flex) and optical layer λ-level protection and restoration features, as well as automated operations and rapid commissioning.
- **Efficient, dynamic traffic management:** The PCE (Path Computation Element)-based centralized intelligence feature offers exceptional support for multi-domain and multi-region networks.
- **Software-Defined OTN:** Designed for 400 G/1 T transmission, this feature enables bandwidth and distance to be easily adjusted in the software.
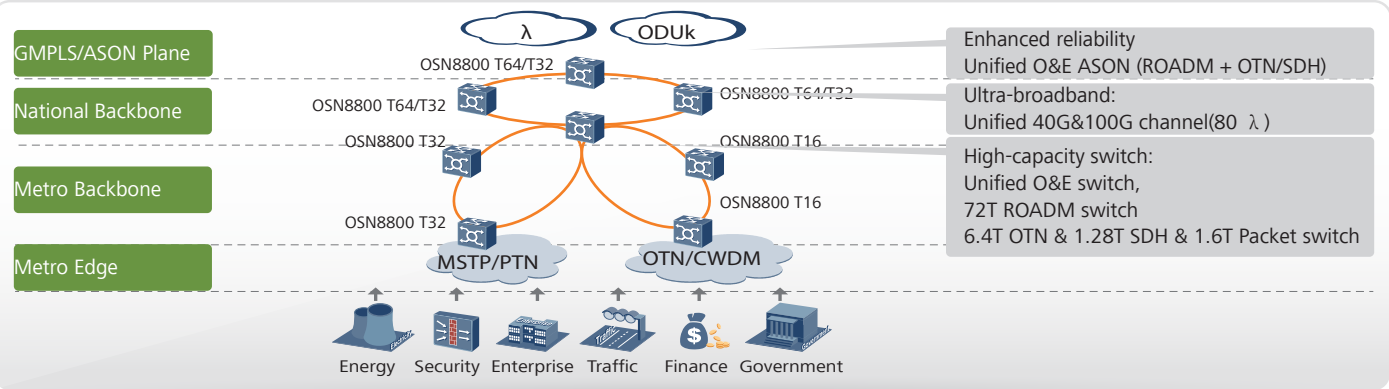
A Green Solution with Low OPEX

- **Energy-saving:** The OptiX OSN 9800 series incorporates precise, dynamic energy-saving routines, π-type cooling system, smaller chipsets, and optimized structure to significantly reduce power and cooling costs.
- **High efficiency:** A proprietary, online optical performance monitor executes optical Signal-to Noise Ratio (SNR) and optical power online monitoring on any wavelength (10 G/40 G/100 G) without test instruments, guaranteeing faster network provisioning, immediate fault diagnosis, and reduced operating costs
- **Simplified administration:** The Visualized Bandwidth Management Mode provides graphical displays for a wide range of service management and reporting functions to help build bandwidth pools, provision services, and enable ordered expansion of the network.

OptiX OSN 8800 T64 & T32

Intelligent Transport Platform for Integrated OTN/WDM/SDH

Plane/Layer		Description
GMPLS/ASON Plane	OSN8800 T64/T32	Enhanced reliability Unified O&E ASON (ROADM + OTN/SDH)
National Backbone	OSN8800 T64/T32 / OSN8800 T64/T32 / OSN8800 T32 / OSN8800 T16	Ultra-broadband: Unified 40G&100G channel(80 λ)
Metro Backbone		High-capacity switch: Unified O&E switch, 72T ROADM switch 6.4T OTN & 1.28T SDH & 1.6T Packet switch
Metro Edge	OSN8800 T32 / OSN8800 T16 / MSTP/PTN / OTN/CWDM	

Energy · Security · Enterprise · Traffic · Finance · Government

High-Capacity Distribution, Unified O&E Switching

- An integrated 3.2 T/6.4 T ODUk (k=0, 1, 2, 2e, 3, 4, flex) & 1.28 T VCx & 1.6 T Packet switch distributes traffic with full, flexible granularity at the electrical layer
- 9 x 8 T (80 x 100 G) Reconfigurable Optical Add-Drop Multiplexer (ROADM) switch supports dynamic optical wavelength transport
- O&E hybrid switch ensures complete end-to-end connection with services pass-through and selective wavelength channel add and drop
- Exclusive 64-slots-per-subrack design supports massive services access, switching, and transport, reducing space requirements by up to 80% and power consumption by up to 55%

Ultra-Broadband Transport, Unified 40 G/100 G Channel

- 100 M to 100 G services can be mapped into ODUk (k=0, 1, 2, 2e, 3, 4, flex), VCx, and packet granules; the 40 G/100 G channels are shared by different ODUk granules, guaranteeing 100% bandwidth utilization
- 4,000 km transport requires no electrical regeneration for 80 x 40 G/100 G bit/s
- Adaptive 40 G solution offers easy transition for long-haul, metro, and legacy fiber upgrades to a 100 G system
- As the global leader in the 100 G market sector, Huawei offers exceptional experience and support to help you design your network
- As the industry record-holder for the longest 100 G transmission (4,000 km for a terrestrial network and 10,000 km for a sub-sea network), Huawei delivers cost-effective, proven solutions

Enhanced Network Reliability, Unified O&E ASON

- The ASON provides alternate recovery routing to enhance network security, strengthen service availability, and lower maintenance cost
- SLA (Service Level Allocation) categories of Diamond, Gold, Silver, Copper, and Iron enable customized Quality of Service (QoS) options for client services delivery
- Built-in advanced planning tools provide network design and restoration simulation, enabling efficient network engineering
- Over 250 network deployments of ROADM+OTN+SDH ASON applications establish Huawei's expertise developing and supporting advanced switching technologies

Precise Clock Transport

- Both OTN and SDH networks support clock transport
- The platform supports a physical 2M clock as well as SyncE transport
- Enhanced network protection with an end-to-end network monitor ensures high clock reliability

Unique Optical Doctor, Optimizing Network Maintenance

- The platform supports OSNR and power monitoring of any wavelength at 10 Gbit/s, 40 Gbit/s, or 100 Gbit/s
- Proprietary on-line analysis software facilitates network maintenance by monitoring services and identifying faults at each service layer

Specifications			OptiX OSN 8800 T32	OptiX OSN 8800 T64
Dimensions (mm)			900 (H) x 498 (W) x 295 (D)	900 (H) x 498 (W) x 580 (D)
Number of card slots			32	64
Switch	Optical		2/4/9-degree ROADM	
	Electrical		3.2 T ODUk (k=0, 1, 2, 2e, 3, 4, flex), 1.28 T VC4 & 80 G VC3 & VC12, 1.6 T Packet	6.4 T ODUk (k=0, 1, 2, 2e, 3, 4, flex), 1.28 T VC4 & 80 G VC3 & VC12
Number of Wavelengths			40/80	
Wavelength Range			192.1 THz to 196.05 THz (Band-C, ITU-T G.694.1)	
Max Rate per Channel			100 G (OTU4)	
Reach			Maximum 350 km (81dB)	
Client Interface	Type		STM-1/4/16/64/256	
			OC-3/12/48/192/768	
			OTU1/OTU2/OTU3/OTU4	
			Any service at rates ranging from 100 Mbit/s to 100 Gbit/s	
			FE/GE/10 GE/40 GE/100 GE	
			ESCON/FICON/FICONExpress/FC100/FC200/FC400/FC1200/HDTV/ DVB-ASI/DVB-SDI/SDI/ FDDI	
	Fiber		G.652, G.653, G.654, G.655	
	Connector		SFP/XFP, LC/PC	
Line Interface	Type		OTU1/OTU2/OTU3/OTU4	
	Fiber		G.652	
	Connector		SFP/XFP	
Topology Point-to-Point			Chain	
SyncE Synchronization			2 Mbit/s	
Protection Mechanisms Protocol	Hardware		Cross-connect 1+1 backup, control board 1+1 backup and power 1+1 backup, clock 1+1 backup	
	Protocol		OTN network level protection: optical line protect, optical channel protect, ODUk (k=0, 1, 2, 2e, 3, 4) SNCP protection, ODUk (k=0, 1, 2, 2e, 3, 4) SPRing protection, Optical Wavelength Shared Protection (OWSP), ASON	
			SDH network level protection: linear 1+1/1:N/ring MSP, SNCP, TOA, DNI, DLAG & LAG and Fiber Shared-Virtual Path Protection, ASON	
ASON			Optical intelligent platform	
			Electrical intelligent platform (ODUk & VCx)	
			End-to-end service configuration	
			MESH networking protection and restoration	
			Multiple classes of service for different client SLA QoS, including the diamond services, golden services, silver services, and copper services	
			Services optimization, migration, and restoration	
			Service equilibrium and Shared-Risk Link Group (SRLG)	
Mount Method			ETSI 300/600 cabinet, 23-inch rack	
Operating Temperature			-5°C to 45°C	
Cooling			Fan Cooling	
Humidity			10 to 90%	
Power Input			DC: –48/–60V	

OptiX OSN 8800-T16/UPS and OSN 6800

When huge bandwidth is needed to transmit enterprise data, make custom-built OTN/WDM your first choice

- Industry needs increasing information management, more services, bigger data centers — and more transport capacity. To upgrade metro networks to meet your needs, OTN/WDM is the obvious selection.
- Core requirements of an enterprise network include simple network planning, rapid service deployment, easy bandwidth upgrades, and convenient Operations Administration and Maintenance (OAM). Huawei's "OTN Bandwidth Cloud" solution meets these needs by providing customized networks and solutions.
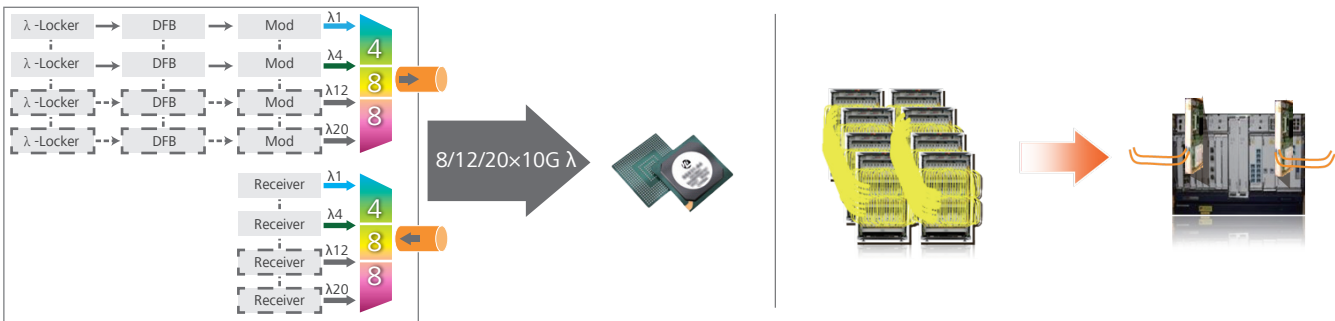
Digital OTN: Enables Efficient Construction; PID+OTN: Matches Metro Transport Requirements

Traditional metro network problems include: lack of fiber-optic links, complex maintenance, and low reliability. OTN can solve these problems perfectly.

- OEO repeaters are costly. Traditional WDM construction with optical regenerators is less expensive, but analog limitations have to be considered. This creates complex design and maintenance issues.
- Huawei combines Photonic Integration Device (PID) with OTN to provide a big "pipe" and flexible, all-service traffic grooming with non-analog network construction methods.
- PID integrates key components in a single chip to enable a high maximum capacity 200G OTN system, which lowers costs and makes it possible to configure OEO repeaters at each site.
- OTN delivers flexible grooming and digital maintenance capabilities to easily provide digital service ADM.

"Thanks to its high integration features, the PID now requires less fiber connections and reduces concerns with photonic parameters. Maintenance becomes much easier and power consumption has been lowered. This is just the OTN I want!"

— A high-ranking telecommunications operator.

Digital OTN value

- Eliminates complex photonic configuration (DCM/OA). A network needs only one PID module for easy design and construction.
- PID has 20 times the capacity of SDH and inherits its efficient maintenance and mature protection mechanism. Plus SDH maintenance personnel easily can make the shift to OTN.
- The PID is a highly integrated system, reducing the typical traditional configuration of 3 sub-racks down to 1 sub-rack, saving 70% on space.

Specifications	OSN 8800 UPS	OSN 6800	OSN 8800 T16
Dimensions (H x W x D)	410 mm x 448 mm x 295 mm	400 mm (9U) x 487 mm x 295 mm	450 mm (10U) x 447 mm x 295 mm
Mount method	ETSI 300/600 cabinet, 19-inch to 23-inch rack	ETSI 300/600 cabinet, 23-inch rack	
Transport technology	DWDM (G.694.1), CWDM (G.694.2)		
	2.5G, 5G, 10G, 40G, and 100G line speed		
	OA: EDFA, RAMAN		
	5,000 km at 10G; 4,000 km at 40G/100G without regeneration		
Electric cross- connect		GE/ODU1/2/Any, L2 switch on VLAN, Stack VLAN	1.6T ODUk (k=0, 1, 2, 2e, 3 ,4, flex); 640 G VC4 & 20 G VC3 & VC12, 800 G Packet
Optical cross connect	ROADM: WSS at 40/80 λ, 4 to 9 degrees		
	FOADM : 80 λ MUX/DMUX, 2/4/8 λ DWDM OADM, 1/2/4 λ CWDM OADM		
Capacity	80 DWDM λ /8 CWDM λ		
Services	STM-1/4/16/64/256		
	OC-3/12/48/192/768		
	OTU1/OTU2/OTU3/OTU4		
	Any service at a rate ranging from 100 Mbit/s to 100 Gbit/s		
	FE/GE/10 GE/40 GE/100 GE		
	ESCON/FICON/FICONExpress/FC100/FC200/FC400/FC1200/HDTV/ DVB-ASI/DVB-SDI/SDI/ FDDI		
Protection	• Optical line 1+1 protection (1+1 OMSP) • Intra-card dual feeding/OLP dual feeding (O-UPSR) • OTU client side 1+1 protection • SCC/XCS/PIU 1+1 protection, secondary power 1:N protection	• Optical line 1+1 protection (1+1 OMSP) • Intra-card dual feeding /OLP dual feeding (O-UPSR) • ODU1/ODU2 SNCP & tributary SNCP protection • ODU1/ODU2 SPRing protection • Optical Wavelength Shared Protection (OWSP) • GE/ANY service SW SNCP • OTU client side 1+1 protection • VLAN SNCP • BPS, DBPS, DLAG & MS SNCP • SCC/XCS/PIU 1+1 protection, secondary power 1:N protection	• OTN network level protection: optical line protect, optical channel protect, ODUk (k=0, 1, 2, 2e, 3, 4) SNCP protection, • ODUk (k=0, 1, 2, 2e, 3, 4) SPRing protection, Optical Wavelength Shared Protection (OWSP), ASON • SDH network level protection: linear 1+1/1:N/ ring MSP, SNCP, TOA, DNI, DLAG & LAG and Fiber Shared Virtual Path Protection, ASON • Cross-connect 1+1 backup, control board 1+1 backup and power 1+1 backup, clock 1+1 backup
Network topology	Point-to-point, Chain, Ring, and Mesh		
Power	AC: 110V to 220 V DC: -48 to -60 V	1+1 −48 V to−60 V DC input	

OptiX OSN 1800 —
Mini-Size, Full Service Access

The OptiX OSN 1800 is a compact multi-service optical transport platform designed for the metropolitan network edge. It provides a green, cost-efficient, high-broadband solution for enterprises in industries such as energy, government, finance, and education.

OptiX OSN 1800 Features

- **Full service access:** all types of service access from 2 Mbit/s to 10 Gbit/s
- **Space-saving installation:** 1/2U box can be mounted on racks, outside of cabinets, on walls or poles; 1U, 2U and 5U are available with 19-inch to 23-inch rack
- **Power supply with protection:** 220 V AC and -48 V DC power supply with 1+1 protection
- **Large capacity:** system capacity can be expanded from 8x wave CWDM to 40x wave DWDM. OSN 1800 V chassis permits a maximum of 700 Gbit/s OTN cross-connections and 700 Gbit/s packet switching capacity, plus 40G SDH higher-order and 5G SDH lower-order cross-connections. It has 14 service slots.
- **Ultra-long transmission distance:** 2.5G service transport over maximum of 120 km; 10G transport up to 140 km
- **Powerful protection capability:** all boards operating at a rate of 10G or lower benefit from embedded 1+1 optical line protection
- **Convenient maintenance:** no on-site management is required after installation; supports remote in-band G.709 management

Redundant Data Center Solutions – Reliable and Flexible with High Bandwidth

Application:
Storage networks for banks or enterprises absolutely require data redundancy for secure, efficient operation. Data backup at different sites is optimal, but requires networks that can transport huge bandwidth over few optical fibers. Wavelength-Division Multiplexing (WDM) networks meet the needs of these private networks in three key ways:

- Improve reliability over public networks
- Effectively transmit high-rate SAN FC service over a WDM pipe
- Provide a flexible system architecture for ever-increasing bandwidth


OSN 1800 Solution:
- **All-service access types:** supports interfaces for almost all IP SAN services
- **Large-scale redundancy:** requirements for large capacity at physical redundancy sites are satisfied with transport distances of over 140 km
- **Professional certification:** fully certified by top authorities, including EMC, HP, IBM, Sun, McDATA, and Brocade. All SAN application solutions are achieved in cooperation with IBM.

Success Story: Redundancy Solution for ShengJing Bank

Diagram: 1+1 Cold Redundancy. [Solution] Full Network Protection
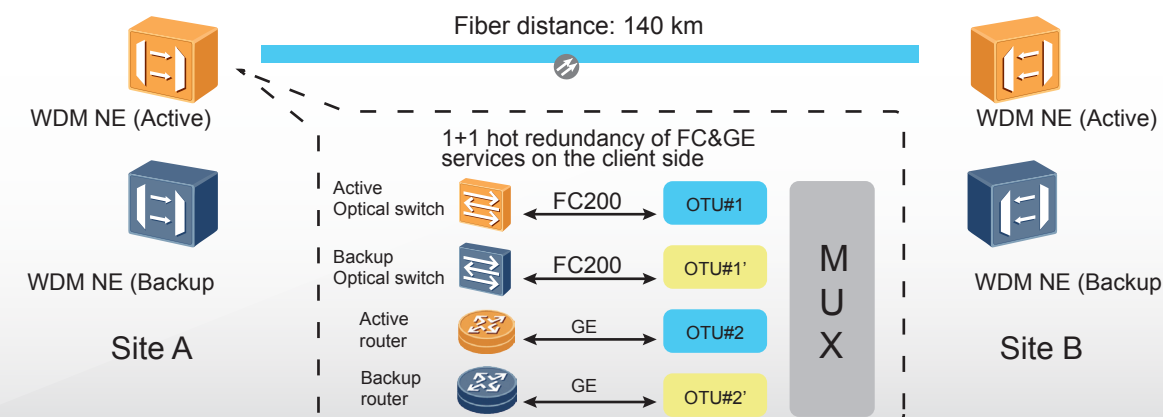
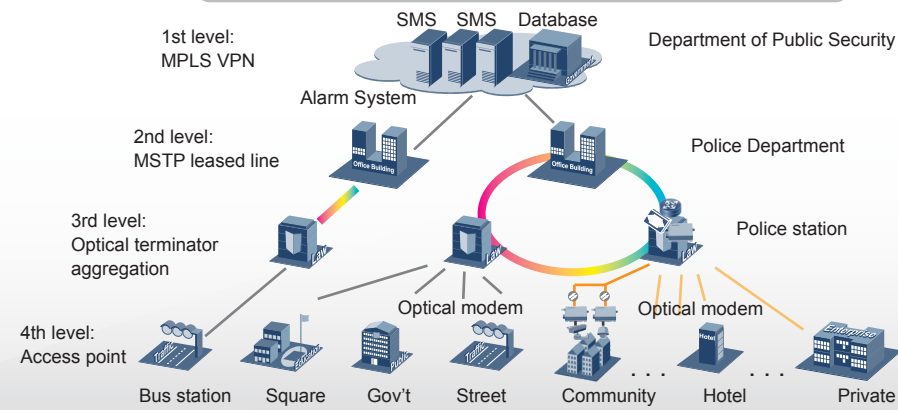## Efficient Video Transmission

Application:
A large amount of video monitoring information needs to be transmitted and shared between government offices. Applying the OptiX OSN1800 as a WDM system at the access layer is a cost-effective, high-speed broadband method that solves the lack of fiber resources.

OSN 1800 Solution:
- 8 GE DWDM (ELOM board): service at each access site > 4 GE
- 4 GE CWDM (LQG board, 70 km line SFP): service at each access site is 3 - 4 GE, and the total distance is < 70 km
- 2 GE CWDM (LDGF board): service at each access site ≤ 2 GE

Video transmission solution for police department

1st level: MPLS VPN

SMS SMS Database — Department of Public Security

Alarm System

2nd level: MSTP leased line

Police Department

3rd level: Optical terminator aggregation

Police station

Optical modem   Optical modem

4th level: Access point

Bus station   Square   Gov't   Street   Community   Hotel   Private

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Success Story: Police/Transportation Video Transmission Solution for Yinchuan City
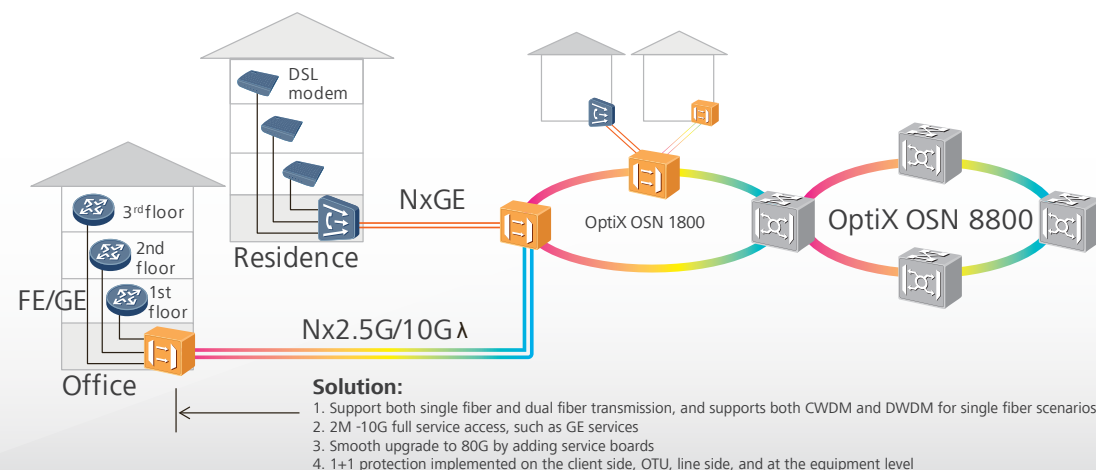
Customer benefits:

- **Ample bandwidth:** 4 GE video can be transmitted from a sub-bureau to each police station, satisfying high-quality monitoring requirements
- **Small space:** only 1U rack space is required for equipment at each police station, minimizing space requirements
- **Highly reliable service transmission:** switching time is less than 50 ms for Intra-Board 1+1 protection

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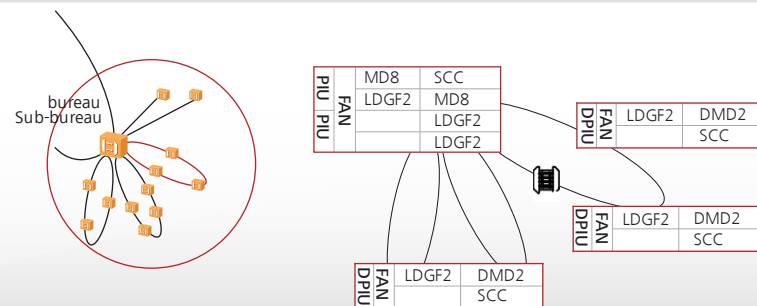
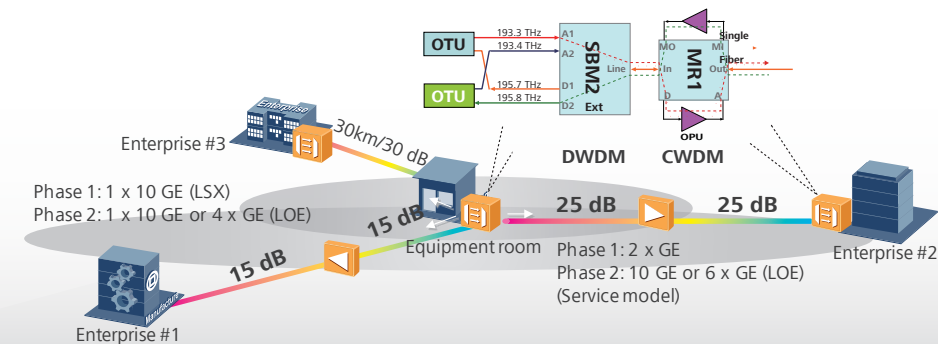# Single-Fiber Bidirectional Leased Lines

Application:

Many enterprise IT parks or university branch campuses use leased optical fibers because they do not have their own. As their demand for larger bandwidth increases, so does the need for more leased fibers in their private WDM networks. Huawei proposes a large-capacity single-fiber bidirectional WDM solution that significantly reduces construction costs.

Solution:
1. Support both single fiber and dual fiber transmission, and supports both CWDM and DWDM for single fiber scenarios
2. 2M -10G full service access, such as GE services
3. Smooth upgrade to 80G by adding service boards
4. 1+1 protection implemented on the client side, OTU, line side, and at the equipment level

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Customer benefits:

- Transmission of 10 GE services over a single-fiber system
- Easy network expansion to support leased-line services such as FE, GE, 155 Mbit/s, and 10 GE

	OptiX OSN 1800 I (1U)	OptiX OSN 1800 II (2U)	OSN 1800 V
Appearance			
Dimensions (H x W x D)	44 mm × 435 mm × 220 mm	88 mm × 435 mm × 220 mm	221 mm × 442 mm x 224 mm
Number of Slots	4	8	DC Case: 14 AC Case: 12
Switch/Access Capacity	60G	60G packet switch + 20G TDM (20G HO + 5G LO)	OTN/PKT XC: 700G SDH XC: 40G HO + 5G LO
System Capacity	CWDM: 8-channel (max), 1471 nm to 1611 nm (Band S+C+L, ITU-T G.694.2)		
	DWDM: 40-channel (max), 192.1 THz to 196.0 THz (Band-C, ITU-T G.694.1)		
Fiber Type	ITU-T G.652/G.653/G.655		
Reach	Single reach: Max. 140 km (39 dB)		
Service	2 Mbit/s to 10 Gbit/s full rates, including E1/T1, STM-1/4/16/64, OC-3/12/48/192, FE, GE, 10 GE, FC 100/200/400/800/1200, FICON, ESCON, DVB-ASI, HDTV, HD SDI, SD SDI, 3G SDI, EPON, GPON, and CPRI 2/3/6/7		
WDM-Side Interface	OTU-1/OTU-2/OTU-2e/OTU5G		
Any Service Board	LQM2: 8 x Any ≥ 2.5G; ELOM: 8 x Any ≥ 10G		
	LSX: 10G Any ≥ 10G; LDX: 2 x 10G Any ≥ 10G		
Pluggable Module	SFP/SFP+/XFP; tunable XFP		
Topology	Point-to-point, chain, star, and ring		
Synchronization	2 Mbit/s or 2 MHz, SSM protocol		
	Synchronous Ethernet, IEEE 1588v2		
Protection	Build-in Line side 1+1		
	OCh SNCP; ODUk SNCP		
Installation	19-inch or 23-inch rack, ETSI 300 mm or 600 mm rack		
	Mobile or FTTx outdoor cabinet, wall- or pole-mount		
Operating Temperature	−5° C to 55° C		
Temperature-Hardened	−40° C to 65° C [a]		
Relative Humidity	5% to 95%		
Power Supply	AC: 110 V to 220 V or DC: −48 V or −60 V		
	1+1 protection for power supply		
Power Consumption	50 W (typical)	150 W (typical)	800 W (typical)