GIGALIGHT 2026 NEWS PAPER

GigaLight

2026 AI&DC Interconnect New Design

HYBRID AI&DC New Design

Innovative Products | Patent-Backed

Traditional Solutions	VS	HYBRID Solutions
Power Consumption		Lower Power Consumption 30%
Latency		Ultra-lower Latency 50%
Cost		Better Cost Performance 30%

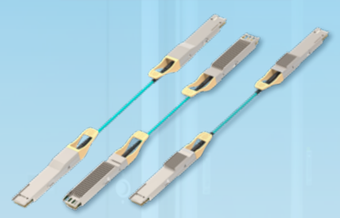
Hybrid Architecture Equivalent ACC

Active Copper Cable

- 800G OSFP HYBRID ACC+
- 1.6T OSFP224 HYBRID ACC+

Hybrid Architecture Equivalent AOC

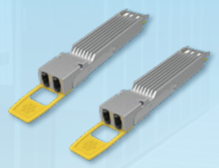
Active Optical Cable



- 400G QSFP-DD HYBRID VR8-AOC
- 800G OSFP HYBRID VR8-AOC
- 800G OSFP-HRO 2XDR4 TO 2X400G DR4 AOC- SiPh
- 1.6T OSFP224-HRO 2XDR4 TO 2X800G DR4 AOC- SiPh

HRO (Hybird Retimed Optics) Architecture SiPh Transceivers

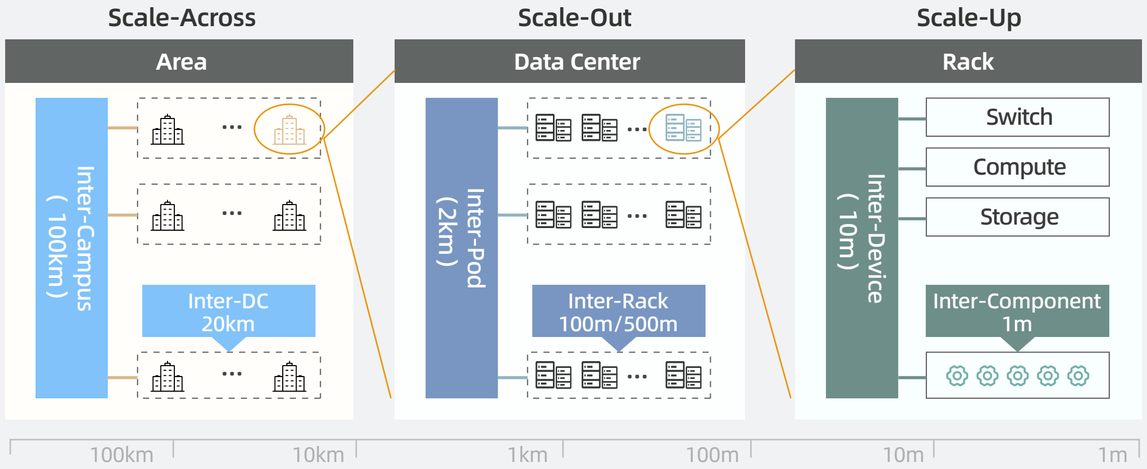
SiPh



- 800G OSFP-HRO 2xDR4
- 1.6T OSFP224-HRO 2xDR4

HYBRID SOLUTIONS

Evolution of GIGALIGHT AI Interconnection



Coherent & Pluggable Optical Transceiver	Optical Transceiver	ACC & AOC Interconnection
Non-Coherent O-Band DWDM Solutions	IMDD / PAM Modulation DSP-Based Pluggable Modules HYBRID Optical Modules	800G OSFP HYBRID ACC+ 1.6T OSFP224 HYBRID ACC+ 400G & 800G AOC

Heterogeneous Interconnection

800G OSFP112-HRO 2xDR4 to 2x400G DR4(QSFP112/OSFP-RHS)

- Transmission up to 500m SMF under KP4-FEC
- Power consumption < 12.5W, down 20% compared to traditional DSP solutions
- Latency down to 50%
- Excellent signal achieves BER E-10 Pre-FEC

800G OSFP112-HRO 2xDR4

2x400G DR4 (QSFP112/OSFP-RHS)

1.6T OSFP224-HRO 2xDR4 to 2x800G OSFP DR4

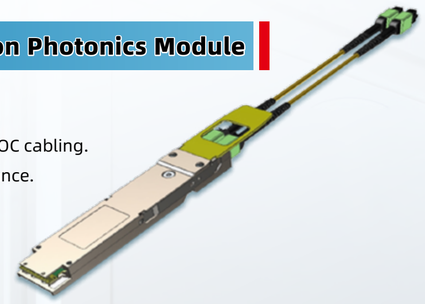
1.6T OSFP224-HRO 2xDR4 Pluggable HYBRID Optics

2x800G OSFP DR4

Dimension	Mainstream DPO Solutions	Pluggable Hybrid Optics Solution	Improvement
DSP Channel Usage	8 channels	4 channels (2:2 DSP)	Saves 50% of resources
Power Consumption	High (Thermal bottleneck)	LOW	Reduced by >30%
BOM Cost	High	LOW	Reduced by 30%
Signal Latency	Standard	LOW	Reduced by 50%

AI & DATA CENTER IMMERSION LIQUID-COOLING INTERCONNECT SOLUTION

Immersion Liquid-cooling 800G OSFP DR8 Silicon Photonics Module



- **Robust & Reliable:** Pressure-resistant sealed housing (>0.2 MPa) with patented design, ensuring superior heat dissipation and liquid-cooling adaptability.
- **Flexible Connectivity:** Pluggable Dual MPO12 pigtail, perfect for liquid-cooled modules and AOC cabling.
- **SiPh Advantages:** High integration, low power, cost efficiency, and ultra-high-speed performance.
- **Future-Proof:** Supports QSFP112, QSFP-DD, OSFP, OSFP RHS – scalable from 100G to 800G and ready for 1.6T.
- **Liquid Compatibility:** Works with fluorinated fluids, mineral oil, and silicone oil.

Single-Mode Silicon Photonics Liquid-Cooled Optical Module Series

Data Rate	Form Factor	States	Notes
400G DR4	QSFP112	samples	Inphi DSP + silicon solution
400G DR4	OSFP RHS	samples	Inphi DSP+ + silicon solution
800G DR8	OSFP	samples	Inphi DSP++ silicon solution

NEW Immersion Liquid-Cooled Extenders

- Multi-Form Factor: SFP, QSFP, QSFP-DD, OSFP
- Wide Speed Coverage: 10G–800G

- **High-Speed Design:** Supports up to 0.5m extension with patented fish-shaped design
- **Wide Compatibility:** Works with QSFP28, QSFP-DD, OSFP, SFP112; 25G–800G and future 1.6T
- **Efficient Cooling:** 1.5W silent fan ensures excellent heat dissipation
- **Smart Indicators:** Visual monitoring for frequent port use, prolonging port life

800G OSFP Liquid-Cooled Extender with Heat Sink

800G OSFP-RHS Liquid-Cooled Extender

800G QSFP-DD Liquid-Cooled Extender

100G SFP112 Liquid-Cooled Extender

400G QSFP-DD Liquid-Cooled Extender

200G QSFP56/100G QSFP28 Liquid-Cooled Extender

Immersion Liquid-Cooled DAC Product Line

25G/100G Liquid-Cooled DAC

- **Robust Design:** Shielded mesh and liquid-cooled DAC process, avoiding compatibility concerns with PVC-covered air-cooled DACs
- **Flexible Cabling:** Default 26AWG wires, other wire gauges supported

400G/800G Liquid-Cooled DAC/ACC

- **Durable Design:** Shielded mesh structure, compatible with both liquid-cooled and air-cooled environments
- **Tested Performance:** SI parameters verified under liquid-cooling conditions, ensuring reliable liquid-cooling application

NEXT-GEN 1.6T NPO INTERCONNECT SOLUTION

The 1600G NPO DR16 silicon photonics engine based on linear direct-drive technology is one of GIGALIGHT's innovative product lines designed for the next generation of optical networks. This 1600G linear NPO silicon photonics engine adopts a socket-based packaging and integrates LPO (Linear Pluggable Optics) linear direct-drive technology. By eliminating the DSP chip, the linear NPO silicon photonics engine significantly reduces system-level power consumption and overall cost, while improving system energy efficiency and reliability.

In addition, GIGALIGHT's 3.2T (16×200G PAM4) NPO silicon photonics solution is also under parallel development.

1.6T NPO DR16 Silicon Photonic Engine

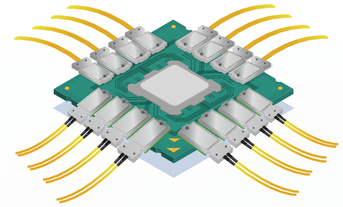
- 16×100G PAM4
- Up to 500m transmission
- Power <11W

1.6T NPO DR16 | EL-OSFP external light source | ELSFP external light source

EL-OSFP External Light Source

- Front-facing optical ports
- Supports 8-channel high-power CWL light sources

Application



ELSFP / DWDM ELSFP

ELSFP External Light Source Module	Light Source Type	Number of channels	Wavelength	Max Tx power per lane
DWDM8 ELSFP	CW-LD, O-BAND DWDM	8X	O-BAND DWDM	20dBm
DWDM4 ELSFP	CW-LD, O-BAND DWDM	4X	O-BAND DWDM	20dBm
PSM8 ELSFP	CW-LD, 1310nm	8X	1310nm	20dBm

400G/800G/1.6T NPO

Product Name	Modulator type	Number of channels	Reach	Wavelength	Max. power consumption
XT-400G-DR4 NPO	Silicon photonic modulator	4x100G PAM4	100m	1310nm	6W
XT-800G-DR8 NPO	Silicon photonic modulator	8x100G PAM4	100m	1310nm	6W
XT-1.6T-DR16 NPO	Silicon photonic modulator	16x100G PAM4	500m	1310nm	11W
1.6T 4xPSM DWDM4 NPO	Silicon photonic modulator	16x100G PAM4	500m	O-BAND DWDM	11W

VISUAL TOUCHSCREEN 800G/1600G CHECKER

Features

- All-in-one touchscreen display – eliminate the need for a laptop and test equipment
- Dual ports support mainstream form factors for comprehensive testing
- Detachable battery and shoulder strap for flexible field testing
- Industrial-grade reliability for demanding environments

800G CHECKER

1600G CHECKER

Product Name	Display	Interfaces	Speed
800G OSFP224 CHECKER	Host 10.1" FHD Touchscreen All-in-One	QSFP-DD + OSFP	800G/400G
1.6T OSFP224 CHECKER	Host 10.1" FHD Touchscreen All-in-One	OSFP224	1600G/800G

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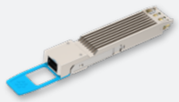
O-BAND INNOVATIVE NON-COHERENT AND COHERENT SOLUTIONS

O-Band DWDM Optical Transceivers and Subsystems

Preliminary

800G OSFP112 2X PSM DWDM4

- 8x100G PAM4 silicon photonic MZ modulation technology
- MPO Connector



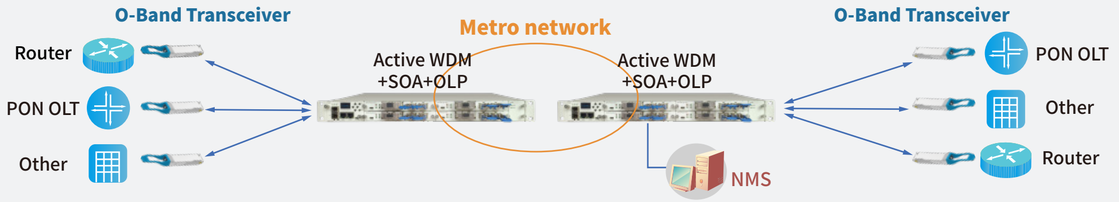
Color X 400G QSFP-DD PSM DWDM4 O-Band

- 30-wavelength O-BAND DWDM,
- 200 GHz spacing
- Up to 15 km
- Power comsuption <12.75W

Color X 100G QSFP28 DWDM1 O-BAND

- 30-wavelength O-BAND DWDM,
- 200 GHz spacing
- Up to 15 km
- Power comsuption <12.75W

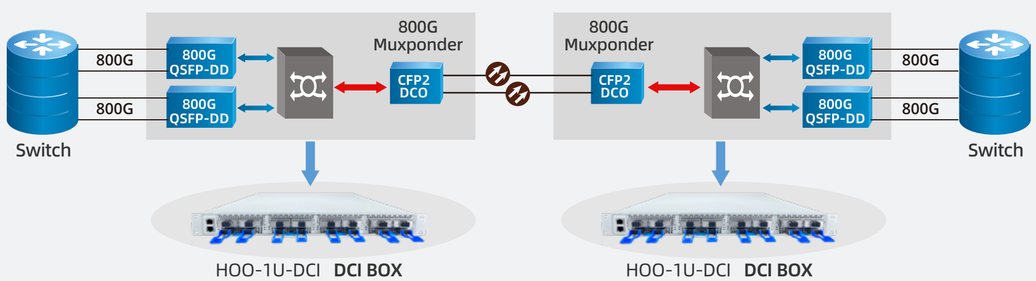
Color X O-Band DWDM Subsystem



Single-wavelength 800G DCI Coherent Solution

- DWDM Support: Enables wavelength conversion and DWDM transmission.
- High Capacity: Features a flexible architecture based on 800G CFP2-DCO technology.
- Throughput: Single card supports 2x 800G channels (Uni/Bi-directional).
- Line Interface: Accepts 2x 800G CFP2-DCO modules; supports OFEC.
- Client Interface: Supports 800G QSFP-DD (SR8, FR8, DR8, DR8+).
- Standardization: Uses Standard MSA pluggable modules.
- Reach:800G: Metro applications up to 200km.400G: Long-haul applications up to 1000km.

Parameter	Mode	Typ	Max	Unit
OSNR Tolerance	800G DP-16QAM	24.5	26	dB/0.1nm
	400G QPSK	17	18	dB/0.1nm
	400G PS-16QAM	18	19	dB/0.1nm
Power Consumption	800G PS-16QAM	26	40	W
	400G QPSK	30	40	W
	400G PS-16QAM	30	40	W

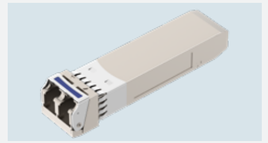


SDI WDM AND PARALLEL SOLUTIONS

WDM Module（3G\12G\O-BAND DWDM）

O-BAND DWDM 16-Wavelength 12G SDI 100 GHz

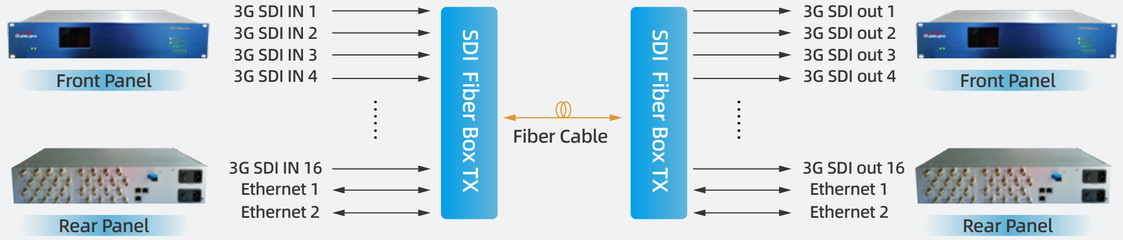
- Available in 16 product variants
- Supports 30 km transmission (APD at Receiver)
- Especially suitable for long-distance broadcast and media scenarios



16X3G SDI Extender

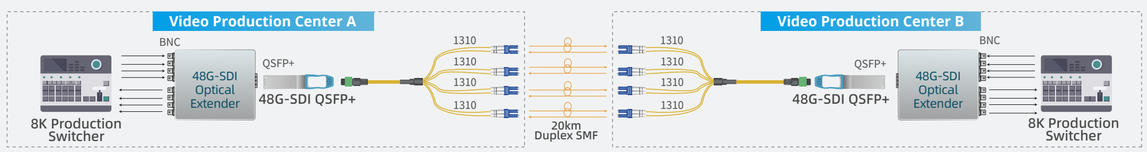
16CH × 3G-SDI + 2-Port Gigabit + Network management Video Optical Extender Solution

- The SDI-E-16 × 3G Fiber Optic Extender can transmit 16 channels of 3G-SDI (bit rate 2,970 Mbps) and 2 independent 1,000M IP signals.
- Supports web-based network management and monitoring.
- Fully compliant with the CE standard.
- Supports SMPTE 178 standard and has passed the SDI pathological frame testing.



48G (4X12G) QSFP PSM4 Module

SDI 3G/12G /48G Uncompressed Transmission of Ultra-High-Definition Video



Passive xWDM MUX/DEMUX

- 4CH-16CH CWDM MUX/DEMUX from 1270nm-1610nm skip
- 1390nm&1410nm) w/ EXP
- 4CH-48CH DWDM MUX/DEMUX from 100GHz O-Band or C-Band

NETWORKING TECHNOLOGIES FOR TOOL INTELLIGENCE AND NATIONAL COMPUTING NETWORKS

Building Low-Latency and Low-Power Data Center Interconnect Networks with NRZ Modulation and Half-DSP Technologies

NRZ Modulation: Mature, Reliable, and Optimized for Ultra-Low Latency

NRZ is a traditional binary modulation technology where each symbol carries one bit of information. In short-distance interconnect applications, its simple physical-layer characteristics make it a preferred solution for latency-sensitive networks.

- **Ultra-Low Latency:** NRZ avoids complex DSP for signal equalization and error correction. E/O conversion brings nearly no extra processing latency.
- **Low Power Consumption:** Thanks to simpler circuits and no high DSP power overhead, NRZ optical modules feature low power, typically within several watts.
- **High Signal-to-Noise Ratio Tolerance:** For fiber transmission with low channel loss, 2-level NRZ signals deliver strong anti-interference capability and good signal integrity.

"Half-DSP" Modulation Solutions: LPO and Hybrid Technologies

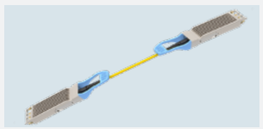
"Half-DSP" is not a formal industry standard term. It generally refers to reduced-DSP or DSP-free optical architectures, including: LPO (Linear Pluggable Optics), Hybrid / LRO (Linear Receive Only).

- **LPO (Linear Pluggable Optics)**
- **Hybrid（Half Retimed & half LRO）/ LRO (Linear Receive Only)**

LPO (Linear Pluggable Optics)	Technical Principle	Latency Performance	Power Advantage
LPO (Linear Pluggable Optics)	Completely removes the DSP chip and uses linear drivers to directly drive optical components	Ultra-low latency (no DSP processing delay)	Highest power efficiency (significant power reduction)
Hybrid / LRO	Retains partial DSP functionality or simplified DSP algorithms combined with linear-drive technology	Ultra-low latency (DSP functions reduced, processing latency significantly reduced)	Significant reduction compared with full DSP)
Full DSP	Uses complete DSP processing for complex equalization and error correction	Higher latency due to digital processing	Higher power consumption (DSP accounts for a significant portion of module power)

HYBRID Single-Mode Optical Modules/HYBRID Multimode and Single-Mode AOC

Product	Wavelength	LD	PD	Reach	Optical Interface	Maximum Power
HYBRID Single-Mode Optical Modules						
800G OSFP-HRO 2xDR4 Optical Module	1310nm	SiPh	PIN	500m	Dual MPO	13W
1.6T OSFP224-HRO 2xDR4 Optical Module	1310nm	SiPh	PIN	500m	Dual MPO	21W
HYBRID Multimode and Single-Mode AOC						
400G QSFP-DD Hybrid VR8 AOC	850nm	VCSEL	PIN	50m	AOC	6.6W
800G OSFP Hybrid VR8 AOC	850nm	VCSEL	PIN	50m	AOC	9W
800G OSFP Hybrid PSM8 AOC	1310nm	SiPh	PIN	500m	AOC	12.5W
1.6T OSFP224 Hybrid PSM8 AOC	1310nm	SiPh	PIN	500m	AOC	21W



HYBRID ACC

Product	Wavelength	LD	PD	Reach	Optical Interface	Maximum Power
800G OSFP Hybrid ACC+	N/A	N/A	N/A	6m+	N/A	7W
1.6T OSFP224 Hybrid ACC+	N/A	N/A	N/A	4m	N/A	13W

O-Band Non-Coherent DWDM: Cost-Effective Low-Latency Medium-Reach DCI Complement to Coherent Communication

- **Low Latency:** Removes heavy DSP-based dispersion compensation to cut link latency, ideal for latency-sensitive scenarios like AI training and real-time computing resource scheduling.
- **Low Power Consumption:** Uses silicon photonics integration and PAM4 modulation, delivering much lower power than conventional coherent optical modules.
- **Cost Efficiency:** Eliminates costly coherent components, DCM modules and complex optical line systems, lowering CAPEX, deployment and O&M costs.
- **High-Density Deployment:** Supports high-density form-factors including QSFP-DD and OSFP for next-gen large-scale data center deployments.
- **Open and Flexible Architecture:** Compatible with open optical networking, white-box switches and open optical line systems to boost network flexibility and deployment efficiency.

100G QSFP28 DWDM1

200G QSFP-DD DWDM4

400G QSFP-DD DWDM4

800G OSFP
2XPSM DWDM4

Three Flexible Solutions for 1.6T AI & Data Center Interconnect

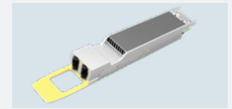
Booming AI demands push DCI bandwidth from 400G/800G to 1.6T.
Three 1.6T optical-interconnect solutions target different cost, power and scalability requirements for various deployments.

Comparison of Three 1.6T Solutions

Comparison Dimension	Standard 1.6T Pluggable Module	External Light Source 1.6T Pluggable Module	External Light Source 1.6T NPO Solution
Light Source Location	Integrated inside module	Rack-level /board-level external	Rack-level / board-level external
Optical Engine Location	Inside module	Inside module	Outside ASIC package
Power Efficiency (pJ/bit)	Higher	Medium	Lowest (best efficiency)
Port Density	Medium	Medium	High
Compatibility with Existing Infrastructure	High (plug-and-play)	High (plug-and-play)	Low (requires motherboard/rack redesign)
Maintenance and Replacement	Best	Good	Complex (requires specialized operation)
Thermal Management	High (module self-heating)	Medium (centralized light source management)	Low (heat separation and high efficiency)
Transmission Distance	Medium/short distance (≤2km)	Medium/short distance (≤2km)	500m to 2km
System Architecture Complexity	Low	Medium	High
Standardization Maturity	Mature (defined by OIF/IEEE)	Under development	Mature (defined by OIF/IEEE)

Three deployment strategies

- **Near Term:** Standard pluggable modules dominate for seamless data-center upgrades.
- **Mid Term:** External-light-source pluggable designs widely deployed in large AI clusters.
- **Long Term:** Mature silicon photonics drives NPO as key AI supercomputing interconnect for 3.2T/6.4T evolution.



Ultra-Low-Latency All-Optical Switching via AWGR+EDFA / AWGR+SOA Architectures

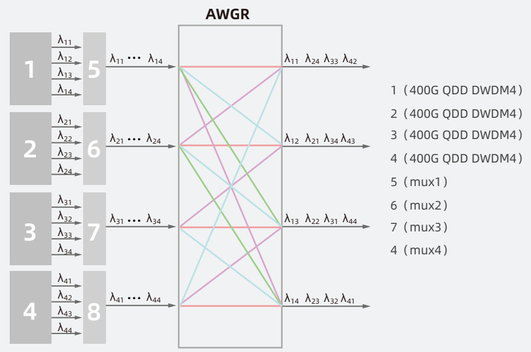
AWGR（Arrayed Waveguide Grating Router）

AWGR is a passive wavelength routing engine that utilizes its cyclic wavelength routing characteristics to deterministically map different optical wavelengths within a WDM signal to corresponding output ports.

- **The signal maintains an optical domain form throughout the entire process, and the single-stage switching latency is only in the nanosecond range.**
- **It reduces latency by 2 to 3 orders of magnitude compared to the traditional OEO architecture, and the latency jitter is extremely small.**
- **It features high determinism can meet the business requirements of low-latency switching and routing for computing power.**

AWGR+EDFA Optical Switching for AI Clusters

AWGR+SOA Optical Switching for AI Clusters



Technical Parameter Comparison

Parameter	Traditional OEO Electrical Switch	AWGR+EDFA All-Optical Switch
Switching Latency	500ns ~ several μs	<10ns (single stage)
Latency Jitter	Several μs ~ ms (queue variation)	<1ps (after thermal control)
O-E-O Conversion	1-2 conversions per port	0 (fully optical domain)
Per-Port Power(100G)	15~25W / 100G	0.1-0.5W / 100G (EDFA shared)
1000-Port Power	15~25 kW	~455W (80-channel example)
Protocol Support	Needs IP/MPLS header processing	Fully transparent, protocol-agnostic
Buffer Queuing	Present, causes variable latency	None, wavelength-based routing
Signal Format Transparency	Not transparent, format dependent	Transparent (OOK/QPSK/QAM)

Key Node Selection Recommendations

Dimension	AWGR + EDFA	AWGR + SOA
Application Scenario	Backbone network core hubs, large-scale intelligent computing centers, long-distance rack interconnect	Data center internal networks, high-frequency trading, AI cluster short-distance low-latency interconnect
Switching Granularity	Wavelength-level (coarse granularity), microsecond-level switching	Wavelength/time-slot level (fine granularity), sub-nanosecond switching
Latency Performance	Fixed physical latency + microsecond-level econfiguration overhead	Fixed physical latency + sub-nanosecond reconfiguration overhead
Signal Quality	High (low noise, suitable for long-distance transmission)	Medium (requires consideration of nonlinear effects and noise accumulation)