Application note

Edge Networking Service Provider & DCI Solutions

Managed IP access & aggregation over DWDM

FUJITSU | ipinfusion™

Solution benefits

- Low-cost, high-capacity access and aggregation solutions
- Scale services from 1 to 400 Gbps and switching capacity up to 14.4 Tbps
- Increase utilization of dark fiber to lower TCO with coherent DWDM
- End-to-end management verified and tested for routers, pluggables, and OLS

Functional elements

- OcNOS S9510-series (access)
- OcNOS S9600-series (aggregation)
- 1FINITY™ L100-series ROADM on a blade for ring or mesh-based topology
- Passive Mux/Demux for P2P topology
- Pluggable and standalone EDFA options for longer distance spans
- Virtuora® Network Controller for multilayer management

AI models impacting your network?

Artificial Intelligence (AI) models, particularly deep learning models, require massive amounts of data transferring to and from data centers, which significantly increases bandwidth capacity usage. Distributed computing further increases this high-capacity data transfer where multiple data centers or cloud regions work together.

These AI models are increasing the demands on network infrastructure, necessitating more advanced and capable routers to handle the additional load at lower operating costs. This is causing network congestion and, in more severe instances, necessitating extensive upgrades across entire medium-scale Communication Service Provider (CSP), Cloud Infrastructure Provider (CIP), and Internet Service Provider (ISP) infrastructures. Overcoming bandwidth capacity challenges at the network edge is crucial for ensuring a positive customer experience.

Prepare for extreme capacity

Fujitsu IP-over-DWDM (IPoDWDM) Edge Networking solutions leverage the IP Infusion OcNOS router portfolio and optional 1FINITY L100-series or passive Mux/Demux line systems to meet high capacity demands, address diverse network architectures while efficiently controlling rising costs.

Key features

- Open and highly scalable standards-based solution with coherent support
- End-to-end management for routers, pluggable optics, and ROADM with programmable SDN support
- Advanced L2/L3 functionalities including VPLS/VPWS, EVPN, L3VPN, SR-MPLS
- High-precision class C synchronization fanout for mobility applications
- Quality EFI&T services

These packet and packet-optical solutions use cost optimized Telecom Infra Project (TIP) Gold-certified disaggregated routers with open operating systems and optics. They enable seamless integration with existing IP networking infrastructures or provide the option for complete end-to-end (E2E) network replacement. These solutions offer optimal performance with full end-to-end management capabilities.

Flexible, reliable, high-capacity IP networking

Edge Networking IPoDWDM solutions

The Fujitsu IPoDWDM Edge Networking disaggregated architecture provides hardware independence, expedites network roll-out, and reduces time to market.

The OcNOS portfolio, from our partner IP Infusion, offers carrier-grade, programmable broadband, hardened access, and Central Office (CO) based aggregation routers. Flexible open optics pluggables with 400G ZR/ZR+ and optional Erbium Doped Fiber Amplifiers (EDFAs) eliminate the need for an intermediate transponder, which enables direct connection to the line system for extended distance operation. Up to 800 Gbps capacity in access (1RU) and 14.4 Tbps in aggregation (2RU). Power options include DC or AC versions with redundant power and fans. These standards-based disaggregated solutions are fully compliant and tested with open protocols to ensure freedom from vendor lock-in. An advanced, open design resolves congestion and supports large-scale network upgrades for next-generation transport across various topologies.

A range of high-speed open coherent optics plus multiple EDFA solutions from pluggable to standalone systems can overcome span reach challenges. Open Optical Line Systems (OLS) options and low-cost passive Mux/Demux filters provide a flexible optical underlay. For fiber challenged applications in a ring or mesh topology, the 1FINITY L100-series ROADM offers a disaggregated ROADM-on-a-Blade (ROB) architecture. Point-to-point applications can utilize the economical passive 8 or 32 channel Mux/Demux line system with 400G ZR/ZR+ support.

Comprehensive end-to-end management with the Virtuora Network Controller provides a single pane of glass for multilayer visibility and control across OcNOS routers, optical pluggables, and the 1FINITY Optical Line System. This architecture offers a Total Cost of Ownership (TCO) savings through technology convergence, best of breed network elements, plus end-to-end management and control.

Solution applications

The Edge Networking IP portfolio addresses a wide variety of transport use cases, providing carrier-class access and/or aggregation for the following applications:

- Fixed wireless access
- Mobile xHaul (front, mid, and back)
- Data Center Interconnect (DCI)
- ISP access
- Broadband aggregation
- Ethernet and cable internet

Cost-effective and scalable

Line rates can scale from 100G to 400G using the open pluggable optics without the need to replace the access/aggregation platform. As a result, this solution offers significant investment protection when scaling. In addition, the solution offers:

- EVPN active-active client option for resilient operation
- Layer 3 routing technology
- 1G, 10G, and 25G client services access

Management

Edge Networking IPoDWDM provides comprehensive management of OcNOS routers, pluggables, and 1FINITY OLS with the Virtuora Network Controller, supported by industry-standard Command Line Interfaces (CLIs) and Management Information Bases (MIBs).

Line topologies

Supported topologies are point-to-point, point-to-multipoint, ring, and mesh.

If high service availability is required, ring or mesh topology using the 1FINITY L100 ROADM-on-a-Blade (ROB) offers fiber relief and automatic protection switching resiliency using OcNOS S9000 series Bidirectional Forwarding Detection (BFD) failure detection and 50 ms protection switching.

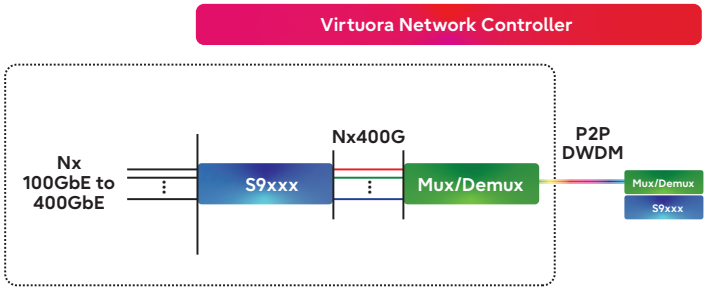

Figure 1: Point-to-point DCI topology

Best-of-breed products with multivendor services

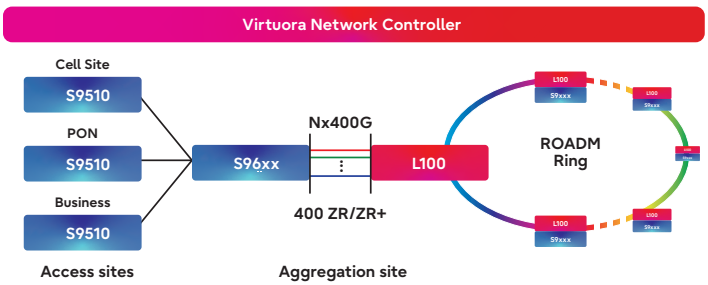

Figure 2: Point-to-multipoint topology

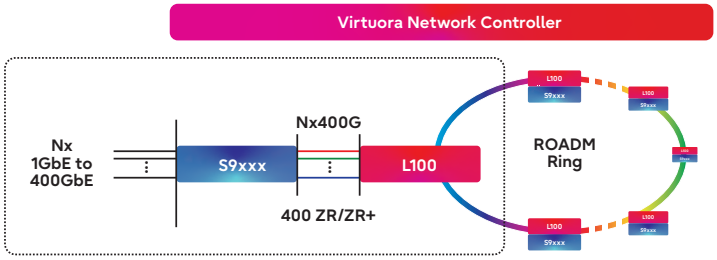

Figure 3: Ring topology with protection switching

Turnkey deployment services

Fujitsu combines best-of-breed products with multivendor services. We customize projects to meet requirements and manage all aspects of your project from start to finish with services including:

- Consultancy
- Design and engineering
- Installation, test, and turn-up
- Systems integration and traffic migration
- Network transformation and modernization

Maintenance and Support Program

A Fujitsu Maintenance and Support Program protects your quality of service with 24/7/365 Technical Assistance Center (TAC) access. Our Network Operations Center (NOC) provides network and device infrastructure monitoring and handles alarms, conditions, and alerts. NOC staff also help identify the root cause and notifies you if action is required.

Partner with Fujitsu

Fujitsu has a proven history of building long-lasting, trusted partnerships with its customers. We offer decades of experience in designing, integrating, and building multivendor networks, as well as operating and maintaining these networks on behalf of our customers. Our strong expertise in multivendor system integration is the foundation for the Fujitsu Edge Networking IP Solution.

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