

# FSP 3000

Open, secure and efficient terascale networking

## Benefits

- Scalability**  
 Up to 9.6THz bandwidth capacity per fiber (C+L band); Coherent pluggable optics up to 800Gbit/s
- Flexibility**  
 From complete turnkey systems, including all equipment necessary for end-to-end transport applications, to disaggregated solutions
- Pay-as-you-grow design**  
 Modular and scalable architecture, with hot-swappable modules and pluggable optics that ensures both low initial cost and flexibility into the future
- Fully open and programmable**  
 Open line system (OLS) architecture and YANG-based APIs (OpenConfig) for network disaggregation and easy integration into SDN-based environments
- Dynamic and scalable optical layer**  
 Fixed- (FOADM), broadcast- (BOADM), and flexgrid reconfigurable optical add/drop multiplexer nodes (ROADM) with multiple add/drop options
- Quantum-safe encryption technology**  
 Certified Layer 1 encryption with ultra-low latency and 100% throughput. PQC cryptography with hybrid key exchange system

## Overview

The FSP 3000 is an open and scalable optical transport solution that enables high-capacity, secure and cost-efficient networking solutions from the edge to the network's core. Today's optical transport demands are constantly changing. High-bandwidth services and cloud-based applications are booming and software-defined networking (SDN) is evolving to the domain of transport networks. These services and applications are essential for our daily lives and economies. Network operators and enterprises need a secure, flexible and future-proof optical transport solution that increases agility and automation, while keeping cost and footprint at a minimum.

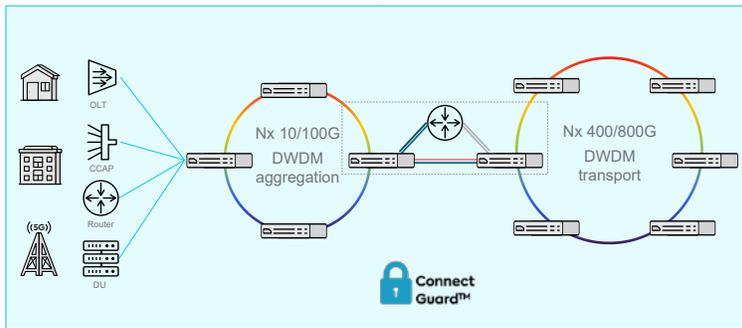
Our FSP 3000 has been designed to efficiently deal with this new environment, lowering its complexity and minimizing cost-per-bit and operational efforts. With an open and modular design, our FSP 3000 supports a wide range of services and applications, from data center interconnect (DCI) to carrier-optimized infrastructure solutions. Incorporating the latest innovation in photonic networking and innovative ConnectGuard™ low-latency encryption technology, our FSP 3000 enables secure optical network solutions that can scale and accommodate tomorrow's needs. As the first commercial post-quantum cryptography (PQC) optical transport solution, our FSP 3000 also protects data against cyberattacks from quantum computers. Moreover, with a high-density and energy-efficient design for minimal footprint and power consumption, our FSP 3000 meets the most stringent sustainability requirements.



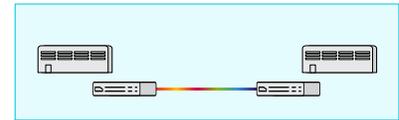
# FSP 3000

## Applications in your network

### Open optical transport network infrastructure from the edge to the core



### Small and hyperscale data center interconnect (DCI)



### Enterprise DCI for business continuity and disaster recovery



### End-to-end network infrastructure

- Open optical networking solutions for turnkey as well as disaggregated, multi-vendor use cases
- Tailor-made solutions for edge, metro and core optical network infrastructure
- Highly secure and reliable critical infrastructure

### DCI for AI, cloud and business continuity applications

- High-speed, secure and reliable connections between data centers spread across different geographical locations
- Purpose-built innovation for SAN-, Mainframe- and Ethernet-based DCI
- Open hardware architecture and YANG-based software (OpenConfig) modelling for easy integration into SDN-based environments

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## Product specifications

### Wavelength technologies

- DWDM:
  - Filter-based multiplexing with 50, 75, 100, 150, 200 and 400GHz spacing options
  - Flexgrid with down to 6.25 GHz channel width granularity
- CWDM:
  - Up to 16 wavelengths/20 nm according to ITU-T G.694.2

### Topologies

- Point-to-point
- Point-to-multipoint
- Linear add/drop
- Multiplexed add/drop (drop and continue)
- Ring (+ feeder + dual homing)
- Hubbed-ring
- Meshed

### Services

- From 100Mbit/s to 850Gbit/s
- Ethernet: FE, GbE, 10GbE (LAN and WAN), 25GbE, 40GbE, 100GbE, 400GbE and 800GbE, 10G and 25G RoCE, CE LR
- Fibre Channel/FICON up to 64Gbit/s
- InfiniBand 5G and 10G
- STM-1, -4, -16, -64 / OC-3, -12, -48, -192
- OTU-1, -2, -3 and -4, OTUCn
- CPRI up to 25Gbit/s speeds (eCPRI)

### Service protection and restoration

- Options based on
  - ROADM-based optical layer restoration
  - Optical switches
  - Redundant cards
  - OTN path protection

### Optical terminals

- Suite of
  - Coherent pluggable optics
  - Multi-rate, multi protocol trans-/muxponders
  - Multi-rate, multi protocol trans-/muxponders with integrated low-speed OTN switching
- Coherent optics based solutions
- Line speeds up to 800Gbit/s
- Variants with built-in ConnectGuard™ layer 1 encryption technology
- 10Gbit/s QSFP-based service multiplexer

### ConnectGuard™ encryption

- Layer 1 AES-256 encryption with ultra-low latency and 100% throughput
- Dynamic key exchange <=4096 bit keys every minute
- FIPS 140-2 and CC EAL-2 certified
- Germany's Federal Office for Information Security (BSI) approval for transport of classified data up to German "VS-V" or "NATO confidential"
- Quantum-safe encryption via post-quantum cryptography (PQC) or third-party quantum key distribution attach (QKD)

### Optical layer

- 9.6THz spectrum bandwidth (C+L bands)
- Filter-based multiplexing with 50, 75, 100, 150, 200 and 400GHz spacing options
- Flexgrid reconfigurable optical add/drop modules (ROADM) from 1 to 32 degrees with multiple fixed, colorless, directionless and contentionless add/drop structures
- Broadcast optical add/drop modules (BOADM) optimized for next-gen optical edge networks
- Optical amplification options using Erbium fiber (EDFA) and integrated EDFA+Raman amplifiers
- Automated optical layer with channel equalization and span loss equalization
- Optical supervisory functions like optical channel monitoring with full support of third-party wavelengths
- Tailored solutions for access, metro and long-haul infrastructure, and for ZR-based interconnects
- Optical timing channel (OTC)
- Fiber monitoring (OTDR)

### Common equipment

- Variety of active chassis from 1RU to 12RU; 300mm and 600mm depth variants
- 19in/ETSI/NEBS rack mounting
- Hardened ETSI-compliant 1RU shelf suitable for outdoor deployments, such as street cabinets
- Fully redundant power supply modules; AC, DC, and mixed AC/DC options
- Hot-swappable (non traffic affecting) controller modules

# FSP 3000

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## Equipment and network management

- Embedded CRAFT/CLI
- Embedded web-based graphical user interface with “point and click” provisioning via HTTPS
- Full support of SNMP, TLI, REST, NETCONF (OpenConfig)
- Streaming telemetry (gRPC)
- Full support of FTP, SFTP, SCP, SSH, TELNET
- Remote authentication via RADIUS or TACACS+
- Equipment management using DCN or in-band management tunnels
- Enhanced user management with multiple security options
- Zero-touch provisioning methods using automated set-up, scripting environment like Ansible and network-wide profile management
- Guided installation and fault identification
- Mosaic Network Controller network management system and domain control with T-API

## Laser safety

- Class 1M laser product with hazard Level 1M

## Environmental

- Standard temperature (operating): +5°C to +40°C
- Extended temperature active (operating): -40°C to +65°C
- Extended temperature passive: -40°C to 85°C
- Relative humidity (non-condensing): 5% to 85% (operating) / 5% to 90% (short-term)
- Outdoor enclosures for passive components

## Regulatory compliance

- ETSI EN 300 019-1-1 V2.2.1 Storage class 1.2
- ETSI EN 300 019-1-2 V2.2.1 Transportation class 2.2
- ETSI EN 300 019-1-3 V2.4.1 Stationary use at weather protected locations class 3.1
- ETSI EN 300 019-2-3 V2.4.1 Non- temperature controlled, weather protected locations Class 3.3E (-40°C to max +65°C) for extended temperature shelf configurations
- NEBS level 3
- Laser safety: IEC 60825-1, IEC 60825-2, ITU-T G.664-2012
- EMC: CISPR 22, CISPR 24 / CISPR 32, CISPR 35
- Product safety: IEC 60950-1, IEC 62368-1:2014
- Directive 2011/65/EU (RoHS II) and 2015/863/EU (RoHS III)
- WEEE: directive 2012 / 19 / EU, EN 50419:2006
- IP20. Use in a pollution degree 2 environment and indoor controlled office environments only
- CE declaration of conformity
- FCC supplier's declaration of conformity
- WCAG 2.0 certification for embedded web GUI

