FSP 3000: secure optical transport

Open optical networking with certified Layer 1 encryption for the transport of classified data

Benefits

- **ConnectGuard™ encryption technology**
  Certified Layer 1 data encryption, approved by BSI for transport of classified data up to German "VS-V" or "NATO confidential" and FIPS 140-2 and CC EAL-2 certified

- **Scalable, terabit capacity**
  High-speed transport with up to 800Gbit/s per single-port line interface, 38.4Tbit/s duplex capacity per fiber pair and up to 3.6Tbit/s duplex capacity per 1RU chassis

- **Pay-as-you-grow design**
  Modular and scalable architecture that ensures both low initial cost and flexibility into the future

- **Open optical line system (OLS)**
  Enables the transport of FSP 3000 and alien wavelengths, as well as spectrum services

- **Open, programmable control**
  Open YANG-based APIs (OpenConfig) faciliate an easy integration into SDN-based environments

- **Flexible configuration and deployment**
  With multiple optical terminals, OLS configurations (FOADM, BOADM and ROADM-based), and chassis options to meet exact user requirements

Overview

With Adva Network Security encryption technology, the 3000 open optical transport platform provides security-certified optical transport solutions for critical infrastructure, governments, and enterprises with stringent security requirements. Adva Network Security's optical modules with built-in Layer 1 encryption technology protect data in motion against ever-increasing cyber threats. The high-capacity transport network solution has been certified by governmental security agencies and is approved for transporting classified data.

Today's optical transport demands are constantly changing. High-bandwidth services and cloud-based applications are booming, and software-defined networking is evolving into the domain of transport networks. The Adtran FSP 3000 is a scalable open optical transport solution designed to deal with this new environment efficiently, lowering complexity and minimizing both cost-per-bit and operational efforts. Incorporating the latest innovation in photonic networking and innovative ConnectGuard™ low-latency encryption technology from Adva Network Security, the Adtran FSP 3000 enables secure optical network solutions that can scale and accommodate today's and tomorrow's needs. With an open, scalable and modular design, the FSP 3000 supports a wide range of services and applications, from data center interconnect (DCI) to carrier-optimized infrastructure solutions from the edge to the core of the network. Moreover, with a compact and energy-efficient design, the FSP 3000 meets the most stringent sustainability requirements.

FSP 3000: SECURE OPTICAL TRANSPORT

High-level technical specifications

General information

- Up to 38.4Tbit/s duplex capacity per fiber pair
- Point-to-point, ring and mesh topologies with optional protection mechanisms
- Open optical line system (OLS)
- Flexgrid support
- Portfolio of optical terminals, coherent pluggable optics and OLS configurations
- Ensemble Controller network management system and domain control with T-API
- Open APIs for management and control

Services

- From 100Mbit/s to 425Gbit/s
- Ethernet up to 400GbE, RoCE, CE LR
- OTU-1/2/3/4, OTUCn
- SONET/SDH up to 10Gbit/s
- Fibre Channel up to 64GFC
- FICON, coupling link, Infiniband
- CPRI up to eCPRI

Terminals and pluggable optics

- Fixed line (<=100Gbit/s) and SW-defined (>=100Gbit/s)transponders/muxponders
- Up to 800Gbit/s per 1-slot card
- Up to 1.2Tbit/s per channel
- Up to 3.6Tbit/s per 1RU chassis
- 400/1200Gbit/s OTN switches
- Suite of 100 and 400Gbit/s ZR/ZR+ coherent pluggable optics
- 10Gbit/s QSFP-based service multiplexer (MicroMux™)

Photonic layer architectures

- DWDM: up to 128 channels
- CWDM up to 16 channels
- Hybrid CWDM + DWDM
- Wide variety of FOADM, BOADM and ROADM options up to 32 degree
- Application-optimized OLS configurations for edge, metro and core networks, and for 400G ZR-based data center connectivity
- Optical time channel (OTC) and OTDR port (for Adtran ALM)
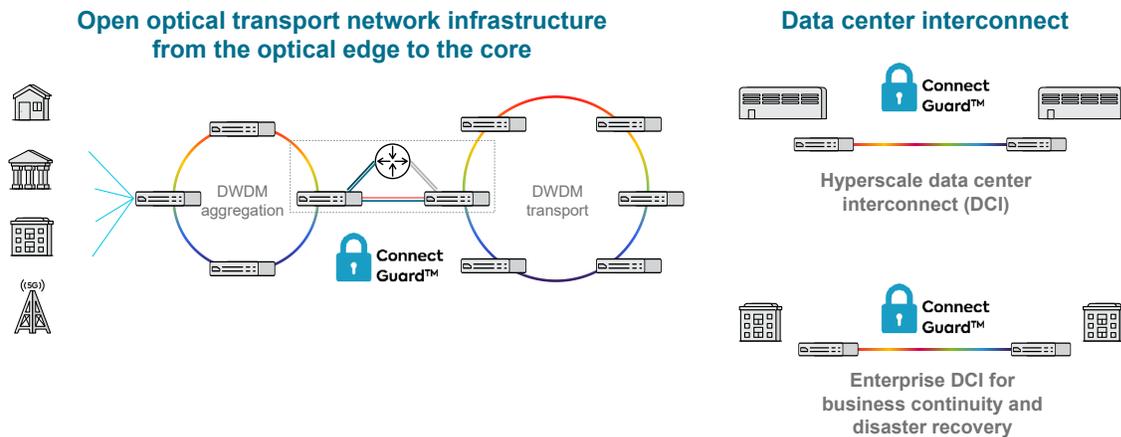
ConnectGuard™ encryption

- Layer 1 AES256 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 through post-quantum cryptography (PQC) or by attaching third-party quantum key distribution (QKD) devices

Power and environmental

- Highest energy efficiency, TEER-proven eco-design
- Redundant power supplies for -48VDC or 100-240VAC PSUs
- Variety of active and passive chassis from 1RU to 12RU; 19in/ETSI/NEBS rack mounting.
- Extended temperature options

Applications in your network

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

Data center interconnect

DWDM
aggregation

DWDM
transport

Connect
Guard™

Connect
Guard™

**Hyperscale data center
interconnect (DCI)**

Connect
Guard™

**Enterprise DCI for
business continuity and
disaster recovery**

Secure end-to-end network infrastructure

- Scalable system architecture for cost-effective access, metro and backbone optical network infrastructure
- Quantum-safe encryption, approved for transport of classified data
- Cost-effective solutions for the edge enabling a smooth data rate migration. Versatile deployment, indoor and outdoor
- High-capacity and ultra-flexible transport network infrastructure from the metro to the core of the network. Smooth service evolution and network scalability
- Built-in access for optical timing channel (OTC) and OTDR (ALM)

Protected data center interconnect (DCI) for cloud and business continuity applications

- Terascale data center connectivity
- Quantum-safe encryption, approved for transport of classified data
- Open hardware architecture and YANG-based software (OpenConfig) modeling for easy integration into SDN-based environments

FSP 3000: SECURE OPTICAL TRANSPORT

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 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
- 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 regional/long-haul infrastructure, and for 400ZR-based DCI
- Optical timing channel (OTC)
- Fiber monitoring (OTDR)

Common equipment

- 1RU, 2RU, 3RU, 4RU, 7RU, 9RU and 12RU shelf 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

Equipment and network management

- Embedded CRAFT/CLI
- Embedded web-based graphical user interface with "point and click" provisioning via HTTPS
- Full support of SNMP, TL1, 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
- Ensemble Controller network management system and domain control with T-API

Laser safety

- Class1M laser product with hazard Level 1M

Environmental

- Standard temperature (operating): +5ºC to +40ºC
- Extended temperature active (operating): -40ºC to +65ºC
- Extended temperature passive: -40ºC to 85ºC
- 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 (-40ºC to max +65C) 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