

# FSP 150-XG100Pro Series

10G programmable demarcation, aggregation and edge computing

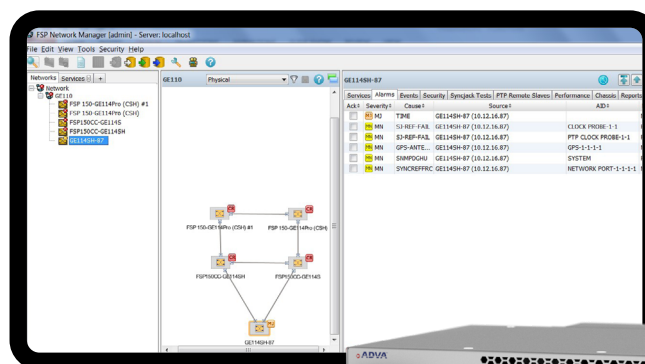
## Benefits

- **Member of the FSP 150 ProNID family**  
Comprehensive and compatible combination of features with a unique set of demarcation capabilities
- **Multi-technology edge device**  
Highly precise, assured distribution of time and frequency meeting LTE and emerging 5G requirements
- **Multi-layer technology**  
Extending Ethernet demarcation with forwarding, filtering and advanced monitoring capabilities for IP traffic
- **High port-density**  
Latest innovation in high-scale integration for high port number and compact design enabling seamless network growth
- **Multi-access edge compute**  
Pluggable server allows NFV hosting at the edge of the network for latency sensitive applications
- **Superior manageability**  
Ensemble network management and control with future-proof SDN control and open APIs.

## Overview





Connectivity networks are becoming exhausted as soaring backhaul bandwidth needs and the shift of appliances and data into the cloud use up more and more capacity. Service providers need edge and aggregation devices that enable a seamless transition from 1Gbit/s to 10Gbit/s service offerings and meet stringent requirements for cost, space and power consumption. What's more, emerging low-latency services demand data processing at the edge of the network.

Offering higher bandwidth services impacts technology installed on the customer premises and cell sites and creates the need for high-capacity aggregation switches. High-bandwidth demarcation and edge aggregation devices need to grow network capacity without exceeding space, power and cost requirements. That's why we built our FSP 150-XG100Pro Series. Part of our successful FSP 150 ProNID family, the FSP 150-XG100Pro Series combines 10Gbit/s MEF 3.0 Carrier Ethernet and IP services demarcation and aggregation with a rich set of programmability, synchronization and security features. A high-performance pluggable server module enables our FSP 150-XG100Pro Series to be upgraded in-service into a uCPE device.



# FSP 150-XG100PRO SERIES

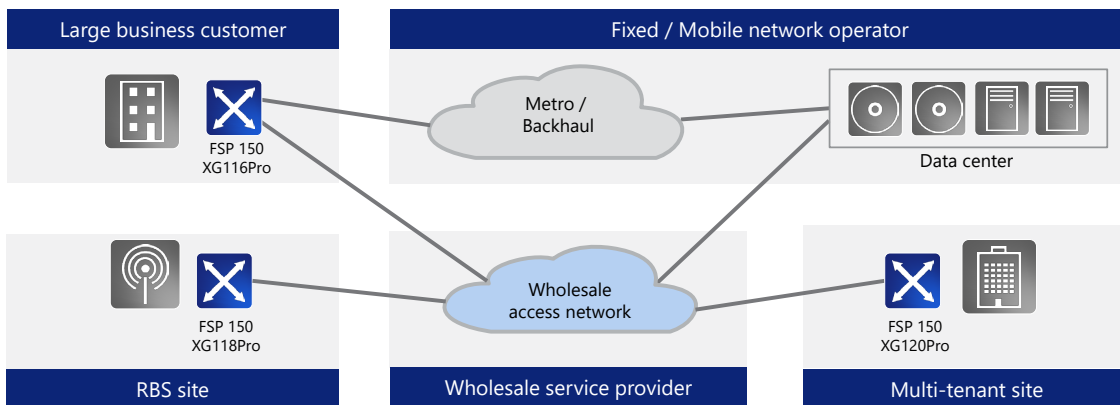
## FSP 150-XG100Pro Series at a glance

	Product	Key Application
	FSP 150-XG116Pro	Multi-tenant 10G demarcation device for business services, mobile backhaul and cloud access. Two variants available: a half-rack width unit featuring integrated power supply with DC and AC feeds and a full-rack width unit featuring dual, hot-swappable PSUs (AC or DC)
	FSP 150-XG120Pro	Multi-tenant 10G demarcation and aggregation device for business services, mobile backhaul and cloud access, featuring redundant power supply units (AC or DC)
	FSP 150-XG118Pro (SH)	10G programmable cell-site gateway with optional server blade. Two chassis versions (AC and DC) featuring hardware-based synchronization, clock I/O, redundant power supplies and I-temp
	FSP 150-XG120Pro (SH)	Multi-tenant 10G edge device with hardware-based synchronization, for business services, mobile backhaul and cloud access. Two chassis versions (AC and DC) featuring clock I/O, redundant power supplies and I-temp

## Applications in your network

### Cloud access, mobile backhaul and business services

- The perfect choice for high-bandwidth demarcation and aggregation in multi-technology Carrier Ethernet and IP connectivity networks
- Compact and temperature-hardened design featuring high port-density and a rich feature set for seamless migration from 1Gbit/s to 10Gbit/s edge services
- Hardware-based synchronization for delivery of precise timing
- Future-proof solution – a high-performance server ensures in-service upgradability to tackle future demands
- Agility and speed in service provisioning with central SDN control in combination with proven, highly reliable network management solution



## Product specifications

### FSP 150–XG100Pro series overview

	Traffic ports	Traffic plane	Operating temperature	Power supply	Size	Power consumption (typical)
FSP 150–XG116Pro	6 x 1/10GbE, 2 x 1GbE	62Gbit/s	–40°C to +65°C	Integrated, with DC and AC feeds	1RU (H), 220mm (W)	70W
FSP 150–XG116Pro (H)	6 x 1/10GbE, 2 x 1GbE	62Gbit/s	–40°C to +65°C	Modular, dual DC or dual AC	1RU (H), 443mm (W)	80W
FSP 150–XG120Pro	4 x 1/10GbE, 22 x 1GbE	62Gbit/s	–40°C to +65°C	Modular, dual DC or dual AC	1RU (H), 443mm (W)	85W
FSP 150–XG118Pro (SH)	8 x 1G/10GbE 2 x 10GbE to server	82Gbit/s	–40°C to +65°C	Modular, dual AC or dual DC	1RU (H), 445mm (W)	85W (w/o server)
FSP 150–XG120Pro (SH)	6 x 1G/10GbE 20 x 1GbE	82Gbit/s	–40°C to +65°C	Modular, dual AC or dual DC	1RU (H), 445mm (W)	85W

#### Traffic ports

- FSP 150–XG116Pro
  - Six 1/10GbE (SFP/SFP+) ports
  - Two 100/1000BaseX (SFP) ports
- FSP 150–XG116Pro (H)
  - Six 1/10GbE (SFP/SFP+) ports
  - Two 1GbE combo ports (10/100/1000BASE-T RJ-45 or 100/1000BaseX SFP)
- FSP 150–XG118Pro (SH)
  - Eight 1/10GbE (SFP/SFP+) ports
  - Two internal 10GbE ports to server slot
  - Flexible allocation of bandwidth to traffic ports and server ports
- FSP 150–XG120Pro
  - Four 1/10GbE (SFP/SFP+) ports
  - Fourteen 1000BaseX (SFP) ports
  - Eight 100/1000BaseX (SFP) ports
- FSP 150–XG120Pro (SH)
  - Six 1/10GbE (SFP/SFP+) ports
  - Twelve 1000BaseX (SFP) ports
  - Eight 100/1000BaseX (SFP) ports

#### Traffic capacity

- 62Gbit/s full-duplex, non-blocking
- 82Gbit/s only for XG118Pro (SH) and XG120Pro (SH)

#### Traffic protection

- IEEE 802.1AX link aggregation – active/standby or load balancing
- ITU-T G.8032 Ethernet ring protection
- ITU-T G.8031 Ethernet linear protection switching

#### VLAN support

- 4096 VLANs (IEEE 802.1Q customer-tagged) and stacked VLANs (Q-in-Q service provider tagged)
- 2-tag management (push/pop/swap) for c-tag and s-tag
- IEEE 802.1ad provider bridging (c-tag, s-tag)
- Ethertype translation
- Point-to-point, multipoint and rooted-multipoint Ethernet virtual circuits (EVC)
- 9612 byte-per-frame MTU transparency
- EoMPLS encapsulation

XG118Pro (SH) Server Card	Processor	Cores	DDR4	SSD	Temperature Range
F150/VME/SRV/X8/32	Intel D-1539	8	32GB	256 – 512GB	I-Temp
F150/VME/SRV/X12/32	Intel D-1559	12	32GB	256 – 512GB	I-Temp
F150/VME/SRV/X16/64	Intel D-1577	16	64GB	256GB – 1TB	C-Temp

# FSP 150–XG100PRO SERIES

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## Server capability (FSP 150–XG118Pro(SH) only)

- Fully open architecture supporting Ensemble Connector or other VNFs
- Hot pluggable server option
- High-performance Xeon-D x86 CPU. Up to 16 cores
- Up to 64 GBytes DDR4 SDRAM, up to 1TB of SSD
- Independent supervision processor installs and monitors server software and status
- Expandable via eSATA and USB interfaces

## Synchronization (FSP 150–XG118Pro(SH) and FSP 150–XG120(SH))

- ITU-T G.8261 / G.8262 / G.8264 Synchronous Ethernet on all traffic interfaces
- Sync status message support
- IEEE 1588v2 Precision Time Protocol with hardware time-stamping
- ITU-T G.8265.1 and G.8275.1 PTP telecom profiles
- G.8265.1 telecom slave
- G.8273.2 telecom boundary clock
- BITS-in and BITS-out with sync status messaging
- Combined IPPS and TOD clock output
- Internal Stratum-3E clock with holdover

## Layer 2 traffic management

- Acceptable client frame policy: tagged or untagged
- Service classification based on IEEE 802.1p, 802.1Q and IP-TOS/DSCP
- VLAN tag priority mapping (IEEE 802.1ad PCP encoding)
- MEF-compliant policing (CIR/CBS/EIR/EBS) with three-color marking and eight classes of service
- Port shaping on transmit
- MEF 10.3 hierarchical policing with token-share envelopes
- DiffServ supporting WFQ/SP mix
- Elephant flows management

## Layer 3 traffic management

- L2–L4 access control lists (ACL) for classification
- VRF-lite virtual routing and forwarding
- BGP and OSPF dynamic routing
- DHCP relay agent
- DSCP remarking

## Operation, administration and maintenance (OAM)

- IEEE 802.3ah EFM–OAM link management
- IEEE 802.1ag connectivity fault management (CFM) with hardware assistance
- ITU-T Y.1731 performance monitoring
- ITU-T Y.1564 service activation testing
- Terminal and facility loopbacks on port- and EVC-level for all interfaces
- Embedded RFC 2544 test generator and analyzer (ECPA)
- MEF-compliant Layer 2 control protocol disposition and extensive filter options for Layer 2 packet types
- Link loss forwarding to signal local link and network path failures
- Dying gasp message for power failure alarm (EFM–OAM and SNMP trap option)

## Performance monitoring

- RFC 2819 RMON Etherstats on a per-port and per-service basis
- 15-minute and 1-day performance data bins
- IEEE 802.3ah/ITU-T G.8021 PHY level monitoring
- ITU-T Y.1731 single- and dual-ended frame loss measurement
- Synthetic frame loss and delay measurement for multi-point service monitoring
- TWAMP sender/reflectors for L3 based service assurance
- Multi-CoS monitoring on EVCs
- IPFIX
- Threshold-setting and threshold-crossing alerts
- Physical parameter monitoring for SFP optics, including TCAs
- Temperature monitoring and thermal alarms

## Low-touch provisioning

- DHCP/BOOTP auto-configuration
- IEEE 802.1x port authentication (supplicant and authenticator)
- Text-based configuration files
- TFTP/SCP for software image upgrade and configuration file copy

## Management and security

### Local management

- Local LAN port (RJ45) using CLI, SNMP and Web GUI interfaces
- USB (Type B Mini) using CLI
- 3G/LTE/Wi-Fi USB interface

### Remote management

- Maintains in-band VLAN and MAC-based management tunnels
- Fully interoperable with other FSP 150 products

### Management protocols

- IPv4 and IPv6 DCN protocol stacks, including dual-stack operation and 6-over-4 tunnels
- Telnet, SSH (v1/v2), HTTP/HTTPS, SNMP (v1/v2c/v3)
- NETCONF/YANG, OpenFlow

### Secure administration

- Configuration database backup and restore
- System software download via FTP, HTTPS, SFTP or SCP (dual flash banks)
- Remote authentication via RADIUS/TACACS
- SNMPv3 with authentication and encryption
- IPsec on management traffic
- Access control list (ACL)

### IP routing

- DHCP, RIPv2 and static routes, ARP cache access control

### System logging

- Alarm log, audit log and security log

## Regulatory and standards compliance

- MEF CE 2.0 certified
- IEEE 802.1Q (VLAN), 802.1p (Priority), 802.1ag (CFM), 802.3ah (EFM), 802.1x
- ITU-T Y.1731, G.8010/Y.1306, G.8011.1+2, G.8032
- MEF-6.1, -9, -10.2, -11, -14, -20, -21, -22.1, -23.1, -25, -26.1, -30, -33, -35, -36
- IETF RFC 2544 (Frame Tests), RFC 2863 (IF-MIB), RFC 2865 (RADIUS), RFC 2819 (RMON), RFC 5357 (TWAMP)
- MEF-48 and MEF-49 compliant ITU-T Y.1564 service activation testing

- ANSI C84.1-1989
- ETSI 300 132-2, BTNR2511, ETS 300-019, ETS 300-019-2-[1,2,3], ETS 300-753
- NEBS Level 3 compliant
- Telcordia GR-499, GR-63-CORE, SR-332
- Safety IEC/UL/EN 60950, 21CFR1040.10, EN 60825, EN 50371, EN 300-386, EN 50160, IEC 60320/C14
- EMI EN 300-386, GR-1089-CORE, ETS 300-132, FCC Part 15, Class A, Industry Canada

## Environmental

- Dimensions (W x H x D):
  - FSP 150-XG116Pro: 220mm x 43.7mm x 280mm (1RU half rack-width chassis)
  - FSP 150-XG116Pro (H): 443mm x 43.7mm x 217.8mm (1RU chassis)
  - FSP 150-XG120Pro AC: 443mm x 43.6mm x 387.6mm (1RU chassis)
  - FSP 150-XG120Pro DC: 443mm x 43.6mm x 216.8mm (1RU chassis, ETSI 300mm)
  - FSP 150-XG118Pro (SH) AC: 445.5 mm x 43.6 mm x 366.6 mm
  - FSP 150-XG118Pro (SH) DC: 445.5 mm x 43.6 mm (1.7 in.) x 255.4 mm
  - FSP 150-XG120Pro (SH) AC: 443mm x 43.6mm x 387.6mm (1RU chassis)
  - FSP 150-XG120Pro (SH) DC: 443mm x 43.6mm x 216.8mm (1RU chassis, ETSI 300mm)
- Operating temperature:
  - -40°C to +65°C / -40°F to 149°F (hardened environment)
- Storage temperature:
  - -40°C to +70°C / -40°F to 158°F (GR-63-CORE)
- Humidity:
  - 5 to 95%, BI (non-condensing)
- Power supply:
  - FSP 150-XG116Pro: integrated PSU, 110/240VAC, -48 to -72VDC with over-voltage and over-current protection
  - FSP 150-XG116Pro (H), FSP 150-XG120Pro, XG118Pro (SH) and FSP 150-XG120(SH): redundant modular hot-swappable PSU:
    - a. 110/240VAC, with over-voltage and over-current protection or
    - b. -48 to -72VDC with over-voltage and over-current protection



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