FSP 150 ProVMe Series

Multi-layer demarcation and NFV hosting

Edge NFV creates many opportunities for revenue growth and equipment consolidation, but it also brings challenges. Customer premises and cell sites are remote, the cost of repair is high and the scale out is huge. Edge NFV requires robust management, remote testing and diagnostics, and in-service monitoring to keep OPEX under control.

Our FSP 150 ProVMe series enables service providers to bring NFV to existing L2/L3 connectivity services, with value-added offers such as managed routers, firewalls, WAN acceleration and SD-WAN. It minimizes truck rolls by combining the world's most popular L2/L3 service demarcation solution with high-performance and self-contained NFV infrastructure. The FSP 150 ProVMe extends the proven benefits of remote testing and monitoring, and a highly reliable management channel to cover NFV hosting. Both the hosting platform and the service layers are monitored, status is reported, and faults can be remotely diagnosed and repaired. What's more, our FSP 150 ProVMe provides open, standardized interfaces, hardware encryption and comprehensive timing distribution.

Your benefits

⬤ **Single-box solution**
Open platform for VNF and true multi-layer business service demarcation

⬤ **Pluggable server**
L2/L3 demarcation unit that can be upgraded with NFV; choose the server capacity that best fits and upgrade it later without replacing the base unit

⬤ **Open interfaces**
Runs ADVA Ensemble Connector or any other NFV infrastructure (NFVI) solution

⬤ **ConnectGuard™ security**
Advanced security functions such as encryption, access control lists and secure authentication

⬤ **HW-accelerated virtualization**
Physical switch improves performance and offloads the server to free resources for revenue-generating appliances

⬤ **Industrialized latform**
Operating Range -40 to +65 C. SyncE / PTP for tight time synchronization.

FSP 150 ProVMe Series at a glance

	Product	Key application
	FSP 150 ProVMe (P2.4)	Cost-optimized edge NFV hosting. Can be deployed as a NID initially and upgraded with a hot-swappable server without affecting running services. Various server choices enable operator to size performance and upgrade when needed.
	FSP 150 ProVMe (F2.6)	Provides more specialist functions such as synchronization, ConnectGuard™ encryption and higher-scale NID functions. Also provides carrier class dual hot-swappable power supply units and full industrial temperature operation for cell sites and other harsh environments.

## Applications in your network

Assured robust vCPE hosting

- Open support for Ensemble Connector or third-party NFV infrastructure (NFVI) solutions, allowing a wide range of VNFs including CE routers, firewalls and WAN acceleration
- Underlying compute platform managed as part of physical NE for operational savings / reduced truck rolls
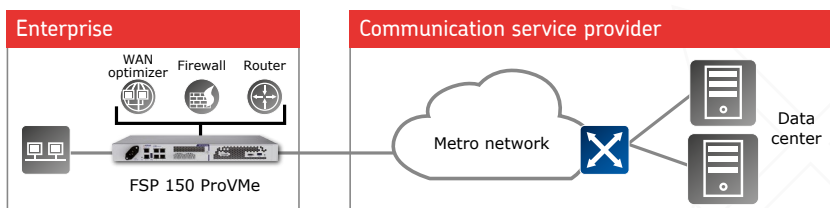
Complete cell site virtualization

- Open support for Ensemble Connector or third-party NFV infrastructure (NFVI) solutions, allowing a wide range of VNFs including cell site gateway and network tests
- Hardware-based synchronization for accurate phase and frequency distribution
- Industrial temperature range for deployment in street cabinets
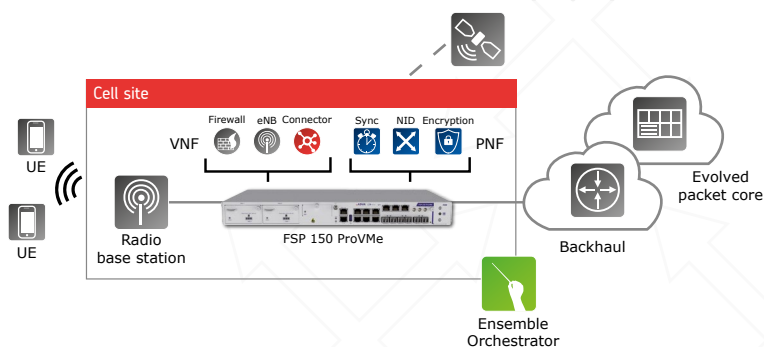
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FSP 150 ProVMe Series overview

	FSP 150 ProVMe (F2.6.x8.S/32/0) [1]	FSP 150 ProVMe (F2.6.x8.C.S/32/0) [2]	FSP 150 ProVMe (P2.4) [3]
Server	Xeon-D 8 Core	Xeon-D 8 Core	Hot pluggable Xeon-D 2,4, 8 Core
PSU redundancy	Dual pluggable	Dual pluggable	1x fixed + 1x external
Fan	Hot pluggable	Hot pluggable	Hot pluggable; fanless if NID only
ConnectGuard™	—	Yes	—
Synchronization	Yes	Yes	—
I-Temp -40 to +65C	Yes	Yes	—

Access capacity
- Two[3]/Four[1,2] 10/100/1000BaseT or 100/1000BaseX (SFP) ports

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

Network interface redundancy
- IEEE 802.3ad link aggregation
- ITU-T G.8032 Ethernet ring protection

Server capability
- Open architecture supporting Ensemble Connector
- Hot pluggable[3] or fixed[1,2] server options
- High-performance Intel Xeon-D x86 CPU. Up to 8 cores
- Up to 16[3]/32[1,2] GBytes DDRAM
- Up to 500GB[1,2]/1TB[3] of SSD
- Independent supervision processor installs and monitors OS and other host components
- Expandable via eSATA[3] and USB interfaces

Synchronization[1,2]
- ITU-T G.8261 / G.8262 / G.8264 SyncE on all interfaces
- IEEE 1588v2 Precision Time Protocol
- ITU-T G.8265.1 and G.8275.1 PTP Telecom Profile
- BITS-in and BITS-out, BITS sync status messaging
- 1 PPS in/out and 10MHz
- Syncjack™ sync performance monitoring

VLAN support
- 4096 VLANs and stacked VLANs
- 2-tag management (push/pop/swap) for c-/s-tag
- IEEE 802.1ad provider bridging (c-tag, s-tag)
- Ethertype translation
- 32[3]/64[1,2] Ethernet virtual circuits (EVC)
- 9612 byte-per-frame MTU transparency
- EoMPLS encapsulation

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, MEF 10.3 hierarchical policing
- DiffServ supporting WFQ/SP mix

Layer 3 traffic management
- L2-L4 access control lists (ACL) for classification
- VRF-lite virtual routing and forwarding. IPv4 and IPv6
- DHCP relay agent
- DSCP remarking

Operation, administration and maintenance (OAM)
- IEEE 802.3ah EFM-OAM link management
- Hardware-assisted IEEE 802.1ag CFM
- ITU-T Y.1731 performance monitoring
- ITU-T Y.1564 service activation and testing
- Embedded RFC 2544 test generator and analyzer
- Embedded VNF test generator and analyzer
- Terminal and facility loopbacks
- Electrical cable diagnostics with benchmarks
- MEF-compliant Layer 2 control protocol disposition and extensive filter options for Layer 2 packet types
- Link loss forwarding
- Dying gasp message as EFM-OAM and SNMP trap
- Port mirror with timestamp[1,2], truncate and filte

Performance monitoring
- Monitoring of end-to-end services, service graphs and individual VNFs
- Server performance metrics
- RFC 2819 RMON etherstats
- 15-minute and 1-day performance data bins
- IEEE 802.3ah/ITU-T G.8021 PHY level monitoring

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- ITU-T Y.1731 single- and dual-ended frame loss measurement
- Synthetic frame loss and delay measurement
- TWAMP sender/reflectors
- Multi-CoS monitoring on up to 128 flows
- Threshold-setting and threshold-crossing alerts
- Physical parameter monitoring for SFP optics, including TCAs

ConnectGuard™ security[2]

- L2 MACsec encryption at line rate on a per-EVC basis
- End-to-end encryption mode with one or two VLAN tags in the clear
- Robust AES encryption algorithm (AES-128 / AES-256)
- Key distribution based on IEEE 802.1X
- Diffie-Hellmann key exchange process (2048 / 4096 bits)
- Tamper resistant and evident enclosure
- Full interoperability with all FSP 150 ConnectGuard™-enabled products

Low-touch provisioning

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

Management and security

Local management

- Serial connector (RJ45) using CLI
- Local LAN port (RJ45) using CLI, SNMP and Web GUI
- 3G/LTE/WiFi 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, 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-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 certified
- 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):
  - 437mm x 44mm x 220mm / 17.3" x 1.75" x 8.4" [1,2]
    443mm x 44mm x 210mm / 17.4" x 1.72" x 8.3" [3]
  - ETSI-compliant
- Operating temperature: 0 to +40°C[3], -40 to +65°C[1,2] (hardened environment)
- Storage temperature: -40 to +70°C (GR-63-CORE)
- Humidity: 5 to 95%, B1 (non-condensing)
- Power supply unit (PSU)
  - Redundant modular PSU[1,2]: 110/240 VAC, -48 to -72VDC with over-voltage and over-current protection
  - Fixed internal PSU[3]: 110/240 VAC with optional external backup PSU
- Maximum power consumption: 100 Watts
- Fanless for NID only operation[3]; hot-swappable fans for sever operation
- Dry alarm contacts[1,2]

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