ETHERNET ACCESS SOLUTIONS

Datasheet

OptiSwitch® 900 Series - Service Demarcation

OS900

Product highlights

- Service demarcation for Metro Ethernet E-Line E-LAN & EPL connectivity services:
  - MEF 9 service conformance
  - Provider bridging or MPLS L2 VPN services
  - Service protection (50msec)
- H-QoS - MEF 14 Traffic Management conformance
- Ethernet Service OAM to monitor SLAs
- Multipurpose customer & network interfaces at lower TCO
- IPv6 future proof (hardware enabled)

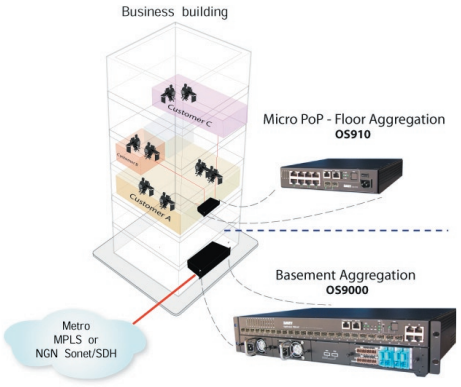
Applications

- Business Ethernet Services
- WAN Ethernet Manageable Services
  - All ports can serve as UNI / NNI

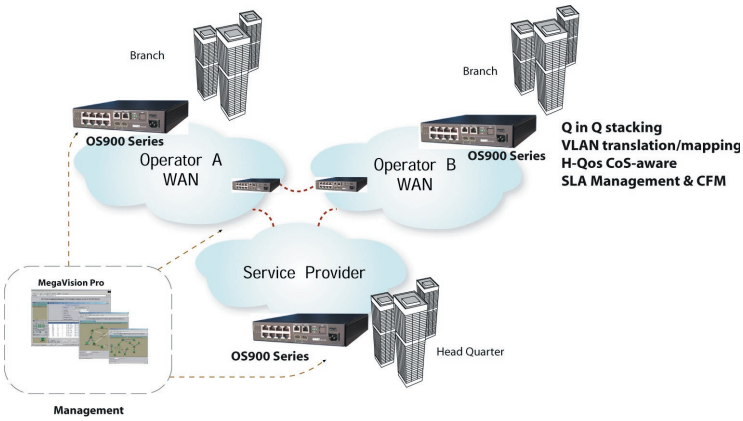
The OptiSwitch® 900 series is a compact carrier-class Ethernet Demarcation service unit. The OS900 enables premium manageable Ethernet services with extensive traffic management and end-to-end control for Service level conformance.

The OS900 series acts as a demarcation device at the customer premises and is owned by the service provider. It provides a carrier-to-customer User/Network Interface (UNI) that separates the carrier's WAN from the customer's LAN. The OS900 enables bandwidth limiting, security and monitoring of customer and network interfaces with clear visibility of LAN and WAN segments.

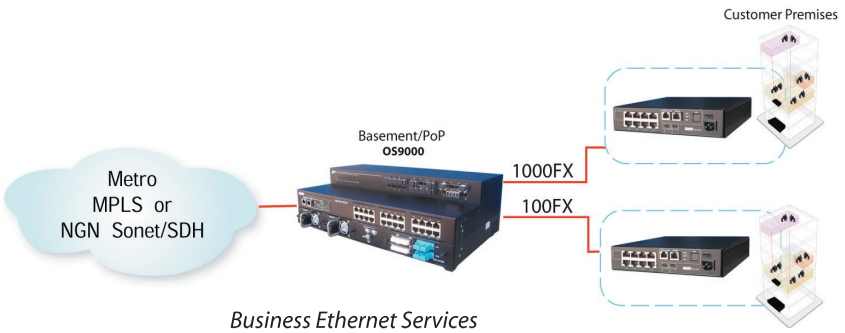
For inter-provider demarcation points, the OS900 serves as a demarcation device at the carrier-to-carrier on-net locations, and provides Network/Network interfaces (NNI) that separate two different service provider networks. In such an application, the OS900 Series enables Ethernet service delivery over multiple carrier transport networks with end-to-end visibility and control.



Micro PoP Services



WAN Ethernet Manageable Services



Business Ethernet Services

Architecture

With its design based on state-of-the-art wire-speed technology, the OS900 series offers a futureproof solution for ILECs, IXCs, MSOs or green-field service providers, fitting various business subscriber SLAs. A single OS900, serving as a demarcation device, can facilitate the provisioning of revenue generating new value-added services thanks to its wide spectrum of service features.

Side-to-side installation in 19" or 23" Telco racks

Compact in size and with a front to back cooling factor, the OS900 Series enables the installation of two systems, side-to-side in a single rack frame in standard 19" and 23" Telco racks to enable device protection for highest availability.

Optical SFP interfaces

SFP interfaces provide unmatched deployment flexibility to enable versatile optical extensions from short to long haul singlemode, single fiber, or CWDM/DWDM connections – simply by means of a specific SFP.
For service providers that build next-generation optical networks, the consolidation of xWDM services with intelligent traffic forwarding on the same platform offers significant costs savings in capital expenditures.
The integration of CWDM and DWDM SFPs eliminates the need for a transponder on the network, and offers better fiber optimization along physical services separation with dedicated Gigabit rate for premium optical services with the same concept of legacy "leased-line" services.

VPN Services & Protection

Compliant to MEF Ethernet Virtual Circuit (EVC), the OS900 can offer three types of VPNs:

1. Layer 1 Optical VPN – a cross-connect mode with transparent mode (no MAC learning)
2. Layer 2 VPN – VLAN-based tunneling Q-in-Q stacking, swapping or mapping services
3. Layer 2.5 VPN – a label-based MPLS VC for direct connection into MPLS domains or H-VPLS MTU-s

All the above VPN services can be fully protected using port redundancy, dual-homing, and/or ring topology with a recovery time of less than 50 ms.
In addition to L2 VPN, the OS900 can offer integrated IP router services to save the costs of an external router and provides a single demarcation platform for managed L2 VPN and IP services.

Traffic Management

The OS900 enables a value-added network infrastructure, with end-to-end per flow QoS.
It supports full CoS and QoS (MEF 14 model) including flows classification, rate limiting, shaping, WFQ scheduling, and strict priority for lower delay/jitter and guaranteed throughput in real-time applications. In addition, it enables dynamic/adaptive buffer pools to prevent bursty traffic starvation and ensure queuing resources effectiveness.
For network convergence applications that have a clear boundary between customer's and carrier's networks, CoS layers (802.1p, IP ToS & MPLS EXP bits) can be mapped/marked to preserve priorities or map them into predefined protection profiles set by the carrier.

Hierarchical QoS – CoS-Aware rate limit

Defining premium SLAs is a key fundamental for service differentiation.
The OS900 enables traffic management based on innovative CoS-aware rate limit to dynamically reuse bandwidth profiles. Dynamic QoS is an important feature that allows for sharing defined rate limited flows with aggregate profile applied to a user network interface or an Ethernet Virtual Circuit. In the new service offering, the consolidated real-time, high-priority and best effort data require different rates and marked class of service. Dynamic QoS helps to share/borrow the bandwidth that was allocated for real-time or high priority applications at a time when these services are not active. Such an offering contributes to a more efficient way of provisioning bandwidth at the access/demarcation of the network without complex configuration sets at the aggregation layer.

Denial of Service (DoS) protection

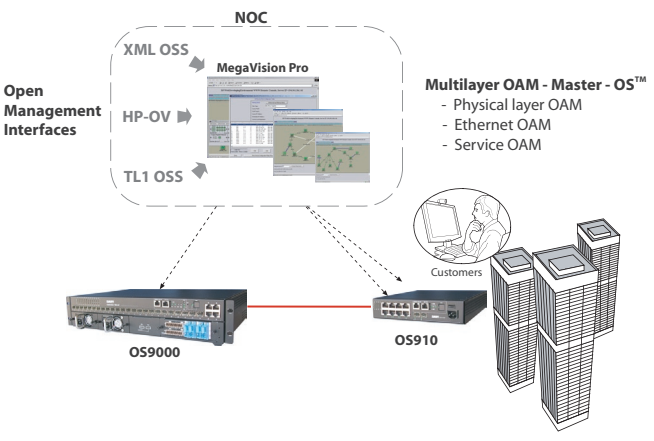
The OS900 incorporates multilayer DoS protection at the hardware architecture on the CPU control plane and data-switching plane. The multilayer control protects the service and the device functionality from hostile traffic without degradation of service performance or affecting of the forwarding database or CPU availability. Multiple traffic types can be policed or discarded starting from frame level such as broadcast, multicast up to IP/TCP/UDP layers.

Management

The OS900 Series control plane incorporates a list of highly manageable feature that offers ensured interaction with carrier's OSS and NMS platforms, based on industry standard Southbound out-of-band or in-band interfaces. In addition, it can be managed via MRV's MegaVision-Pro NMS to have complete GUI and Northbound gateway (XML, TL1 & SNMP) of an entire map of clustered devices for configuration, performance analysis, and inventory control.
For the service providers, the OAM that is provided by a demarcation device determines to a significant extent the metrics that can be used to establish the SLA with a business subscriber. The OS900 incorporates enhanced standards compliant MEF OAM and gives the service provider the ability to monitor the network and provision services, and promptly determine the location of faults remotely from the network operation center.

Ethernet OAM with IEEE802.1ag & ITU-T Y.1731

The connectivity of Ethernet bridge devices across Metro Ethernet or other transport networks creates dedicated or virtual Ethernet circuits. An end-to-end service architecture requires administrative domain hierarchy with corresponding OAM enabled titles. The OS900 Series incorporate connectivity, discovery and fault management along performance statistics of delay, jitter and frame loss for demarcation and intermediate points of service.



Ethernet loopbacks

The OS900 Series offers remote loopback functionality on a physical interface or a specific VLAN that traverses UNI or NNI interfaces. The loopback function allows for the troubleshooting of the service, remotely, from NOC, or any other manageable location without needing to actually visit the customer premises.
Loopback functionality performed in hardware level for performance monitoring and SLA verification in wire-speed.

Copper TDR

The OS900 incorporates copper TDR that can identify problems with CAT5 copper cables on a customer's site such as opens, shorts and wrong impedance.

Optical Performance Level Monitoring (Digital Diagnostics)

The OS900 Series supports the SFP Digital Diagnostics standard (as per SFF-8472). A powerful OPM tool, it provides access to a number of real-time SFP operating parameters such as optical TX/RX power, voltage and temperature, as well as component information such as vendor code, serial number and wavelength. The information provided by Digital Diagnostics, together with alarm and warning thresholds, enables a network administrator to identify potential problems in optical transmission and take preemptive action before any service outage actually occurs.

Per-service performance monitoring

The OS900 offers real-time and historical reporting on various service performance metrics, including port/VPN-EVC utilization, transmission errors, and QoS threshold exceptions.
Each service can be tracked for statistical information to help in base lining and troubleshooting traversing services. This service enables users to verify service guarantees, increase network reliability by validating network performance. Performance monitoring uses pro-active monitoring to generate traffic in a continuous, reliable, and predictable manner, thus enabling the measurement of network performance and health.

Link Fault Reflection/Propogation

The link fault reflection propogates the fault from network interface to user interface. Such functionality is configurable and operated on LOS fault that will trigger the user link to down mode. In scenario of network interfaces protection, the fault propogation will be triggered only after the LOS of both network interfaces.

Sniffer VLAN

The OS900 incorporates a powerful tool called Sniffer VLAN. This feature enables the operator to configure a dedicated sniffer VLAN to remote surveillance center for remote analyzer. Sniffing on the OS900 can be set per specific customers' VLAN, per L2-3-4 fields or per learn table MAC. The remote service monitoring inline with interception processes based on requirements of Law Enforement Monitoring.

Specifications

Services and Interfaces	OS904	OS906	OS910	OS912
MEF Services and Certifications	EPL, E-Line, E-LAN, E-Tree; MEF 9, 14	EPL, E-Line, E-LAN, E-Tree; MEF 9, 14	EPL, E-Line, E-LAN, E-Tree; MEF 9, 14	EPL, E-Line, E-LAN, E-Tree; MEF 9, 14
Non-blocking architecture wire-speed forwarding	+	+	+	+
All ports can serve as UNI / ENNI	+	+	+	+
10/100/1000Base-T			8	
10/100/1000Base-T or 100/1000Base-FX SFP	2	6		12
100/1000Base-FX SFP	2		2	
Hot Swappable SFP Optics	Short/Long Haul, Multi-rate, BX & WDM	Short/Long Haul, Multi-rate, BX & WDM	Short/Long Haul, Multi-rate, BX & WDM	Short/Long Haul, Multi-rate, BX & WDM
Power Supply AC=A, DC=D, Dual-Red.=2	A, D	A, D	A, D, 2A, 2D	2A, 2D

Hardware
- Auto-MDI/MDIX on copper ports
- MAC table size: 16K
- Jumbo frames (16,000 bytes) on all ports
- Packet buffer management
- Environmental sensor

Switching Services
- IEEE 802.1Q and IEEE802.1ad provider bridges
  - 4K active VLANs
  - Q-in-Q stacking per port+VLAN
  - VLAN translation and mapped modes (per port +VLAN)
- Transparent cross-connect mode (No MAC learning)
- Layer 2 Control Protocol tunneling (BPDU, CDP, VTP, PVST+ etc.)
- Learning table limit per VLAN/port
- IGMP Snooping v1, v2 , Static Multicast Fowarding

Service protection
- Automatic Optical switching on network interfaces (1:1)
- IEEE802.3ad Link Aggregation (1+1)
- Multiple Instance Spanning Tree IEEE802.1s & compatibility to 802.1w/d
- Link / Ports Flap Guard / BPDU Storm Guard

Traffic Management Services – MEF Compliant
- Inbound & Outbound traffic management per flow
- Classification by physical port, MAC, Ethertype, VLAN, IP/TCP/UDP, IEEE 802.1p (VPT), DiffServ (IPv4 & IPv6 TC)
- Marking/remarking profiles between layers (802.1p, ToS & MPLS EXP)
- 8 hardware queues per port & configurable CoS adaptive buffer
- In-profile & out-of-profile service counter sets (per UNI, CoS, EVC)
- Class-aware rate limit – dynamic bandwidth reuse between mapped classes
  - Hierarchical -QoS model with CIR/EIR rates

Tunneling - L2 Services
- Q-in-Q - mapped mode or translation
- Layer 2 VPN – Martini MPLS pseudo-wire
- Spoke H-VPLS - MTU-rs

IP Services
- IGP and EGP routing – Master-OS™
  - DHCP Server/Relay

Security
- CPU DoS protection
  - Frame rate control
  - Dedicated queues
- Wire-speed Access Control Lists
  - L2-3-4: from frame to application layer
- MAC, ARP and BPDU filtering
- Rate limit protection for Unicast/Multicast/Broadcast packets
- Security thresholds for L2 statistics counters

Management & Diagnostics Tools

- Industry Standard CLI
- Out-of-band Ethernet management – EIA-232 console
- Out-of-band Ethernet management – Dedicated Ethernet RJ45 port
- Telnet, SSH v2, SNMPv3, RMON (4 groups)
- VACM - View-based Access Control Mode
- Port mirroring - ingress & egress traffic to analyzer port
- Remote mirroring per ACL (port/service/flow) – Sniffer VLAN
- Ping, Trace route, DNS lookup, TCP dump (built-in sniffer)
- Management ACL for trusted connections (Telnet, SSH, SNMP)
- Optional SNMP/CLI disable
- Hierarchical Administration policy
- RADIUS & TACACS + Autentication Accounting
- Configuration load/save via FTP, Secure Copy (SCP)
- NTP – Network Time Protocol
- Logging Syslog
- Scripting tool for macro configurations & maintenance
- Action scheduler for automated rules (time/day/cycle)

OAM - Service Assurance Tools

- Enhanced performance monitoring and SLA management
  - Local and Remote hardware-base loop back functionality
  - Per VLAN loopback & MAC swapping
- End to end Service OAM
  - Connectivity Fault Management - IEEE802.1ag (MEP/MIP)
  - Performance Measurement ITU Y.1731 (Latency, Jitter & loss)
  - RFC2544 Internal Traffic Generator up to GigE throughput test
- Round Trip Reporter for IP Services
- Link OAM IEEE 802.3ah - EFM*
- Discovery Link Fault / Critical Dying Gasp
- Physical layer OAM - Cable Diagnostics
  - Optical signal level monitoring (SFP SFF-8472)
  - Copper TDR on RJ45 ports
- Remote failure notification / reflection
  - Link Integrity Notification (LIN)
- Binding OAM CCM for service protection mechanisms

Technical Specifications

Standard compliance	UL-1950; FCC part 15 Class A; 2004/108/EC, 2006/95/EC RoHS compliant
Environment	Operating Temp: 0˚ - 45˚C (32˚ - 104˚F) Storage Temp: -25˚ - 70˚C (-13˚ - 158˚F) - ETSI EN300-019 class 3.1
Humidity	95% maximum , non-condensing
Diagnostic LEDs	Power, Power RST, Temperature, Management Online / Active / Alarm Ports: Link, activity
Mounting (ETS300-119)	19" or 23" racks (1RU) and wall mount
Rack efficiency	Two units can be placed in a side-to-side and back-to-back mode - front maintainable for all elements
MTBF	OS910/AC1: 220,733 HRS @ 25˚C/77˚F - OS910 -AC2: 380,000 HRS @ 25˚C/77˚F OS904/AC-1: 283,000 Hrs. @ 25˚C/77˚F MTTR 3.4 Hrs. OS912-AC-2 : 252,266Hrs. @ 25˚C/77˚F MTTR 3 Hrs.
Performance	Non-blocking wire speed on all ports
Power Specifications	OS904/AC-1: 110V - 0.14A, 220V -0.07A (15W) OS906/AC-1: 110V - 0.25A, 220V -0.13A (27W) OS910/AC-1: 110V - 0.25A, 220V -0.13A (25W) OS910/DC-1: 0.69A (25W) OS912-AC-2: 110V - 0.35A, 220V -0.18A (39W) OS912-DC-2: 1.1A (39W)
Physical dimensions WxDxH	OS904 - OS910: 214.6 x 240 x 43.65mm (8.45 x 9.45 x 1.72 inch) Dual AC model OS912: 442 x 204 x 43.65mm (17.4 x 8.03 x 1.72 inch)
Weight	1.3kg (2.86 lb) 1.6kg (3.52 lb) - dual PS models

Order Info

OS900 Series	
OS904/AC-1	Intelligent Ethernet Services Demarcation platform - 2 Tri-Mode 100FX/1000FX SFP or RJ45 10/100 1000Base-T and 2x100FX/1000FX SFP, 19" bracket included, AC (90-240VAC) power supply
OS906/AC-1	Intelligent Ethernet Services Demarcation platform - 6 Tri-Mode 100FX/1000FX SFP or RJ45 10/100 1000Base-T, 19" bracket included, AC (90-240VAC) power supply
OS910/AC-1	Intelligent Ethernet Services Demarcation platform - 8 RJ45 10/100/1000Base-T and 2 100FX/1000FX SFP ports, AC (90-240VAC) power supply
OS910/AC-2	Intelligent Ethernet Services Demarcation platform - 8 RJ45 10/100/1000Base-T and 2 100FX/1000FX SFP ports, Dual redundant AC (90-240VAC) power supply
OS910/DC-1	Intelligent Ethernet Services Demarcation platform - 8 RJ45 10/100/1000Base-T and 2 100FX/1000FX SFP ports, (-48VDC) power supply
OS910/DC-2	Intelligent Ethernet Services Demarcation platform - 8 RJ45 10/100/1000Base-T and 2 100FX/1000FX SFP ports, Dual redundant DC (-48VDC) power supply
OS912-AC-2	Intelligent Ethernet Services Demarcation platform - 12 Tri-Mode 100FX/1000FX SFP or RJ45 10/100/ 1000Base-T ports, 19" bracket included, Dual redundant AC (90-240 VAC) power supply
OS912-DC-2	Intelligent Ethernet Services Demarcation platform - 12 Tri-Mode 100FX/1000FX SFP or RJ45 10/100/ 1000Base-T ports, 19" bracket included, Dual redundant DC (-48 VDC) power supply
Accessories	
EM900-BR-1	19" mounting brackets for a Telco rack
EM900-BR-2	23" mounting brackets for a Telco rack
EM900-BR-D	19" mounting brackets for side-to-side installation of dual OS900 - Two systems in 19"
EM900-BR-E	19" mounting brackets for side-to-side installation of dual OS900 and LDP100 side-to-side
EM900-WBR	Wall mounting bracket for OS900 series
MegaVision SNMP NMS	
MV-WEB/PRO	MegaVisio n Pro NMS complete package includes MegaVision Pro for one server and unlimited number of Web clients.

Fast Ethernet and Gigabit Ethernet fiber connectivity: For ordering codes of SFP pluggable optics, please refer to MRV's web site.

* Future SW release