

Traverse

Ethernet over PDH Service Interface Modules

Key Features

- Delivers highly efficient and scalable EoPDH via GFP encapsulation, Low/High order VCAT bonding and LCAS bandwidth management
- Supports full featured Ethernet switching via MAC, VLAN, or stacked VLAN (Q-in-Q), with granular traffic policing/shaping per EVC and per CoS
- Compliant with MEF 9 service definitions and MEF 14 QoS/traffic management
- Carrier Ethernet Protection (CEP) supports high availability services via link aggregation and equipment protection
- Multiple versions available offering 4 GbE SX, LX or TX ports, with optional 16 10/100Mbps Ethernet electrical ports

Flexible Connectivity with Carrier-Class Protection

The Traverse EoPDH modules are available in several configurations to provide the maximum amount of flexibility. All versions offer 4 GbE ports with either 2 optical (1000Base-SX or -LX) and 2 electrical (1000Base-TX) or 4 optical ports with optional 16 10/100Mbps Ethernet electrical ports on a single module. When used in a Carrier Ethernet Protection Pair (CEPP), the Traverse EoPDH modules provide facilities protection via link aggregation across ports on the two modules in the CEPP. The modules also support 1:1 equipment protection.

Traverse[®] Ethernet over PDH Service Interface Modules Enables MEF E-Line and E-LAN Ethernet services for off-net customers over copper PDH access networks (DS1/E1, DS3/E3). Traverse EoPDH modules bond up to 16 DS1/E1 or DS3/E3 PDH circuits per EVC enabling the delivery of 10 or 100 Mbps Ethernet services. The EoPDH modules aggregates 336 DS1, 252 E1 or 48 DS3/E3 Ethernet over PDH circuits per module.

Ubiquitous Ethernet Services

Ethernet is most commonly delivered over fiber to the customer premise. In dense metropolitan areas, fiber access to commercial buildings is often widely available. However, according to Vertical Systems, over 86% of commercial buildings with over 20 employees do not have access to fiber. These buildings utilize DS1 or E1 copper PDH circuits for their Internet access, voice and VPN needs.

By offering Ethernet services over these copper PDH access network connections, service providers can offer the same services available over their fiber network to off-net customers, or to customers whose buildings do not have access to fiber. Using EoPDH (Ethernet over PDH), a service provider can offer customers an Ethernet UNI for all Ethernet services and Ethernet-based access to IP services.

The EoPDH Service Interface Modules for the Traverse multiservice switching and transport platform offers the industry-leading solution for multiservice transport with Ethernet service delivery over fiber and copper PDH access networks. The Traverse platform supports any combination of Ethernet, SONET/SDH, or TDM circuit grooming, switching and transport in a single shelf. This versatility enables network operators to leverage their existing infrastructure as they transition to a multiservice, Carrier Ethernet network at their desired pace.

Bandwidth Flexibility

The Traverse EoPDH modules support Metro Ethernet Forum compliant Ethernet bandwidth profiles with a Committed Information Rate (CIR) for guaranteed bandwidth as well as a Peak Information Rate (PIR) for excess, oversubscribed bandwidth. Since most packet-based traffic is bursty and bandwidth utilization is far less, on average, than the interface speed, oversubscription enables service providers to optimize their transport bandwidth and reduce overall OpEx, while increasing service revenue.

Ethernet Switching and Transport

The EoPDH modules provide a comprehensive set of Ethernet switching and transport features including support for 802.1Q C-VLANs, IEEE 802.1ad (Provider Bridges), and S-VLANs (Q-in-Q) with granular traffic shaping to support differentiated service classes and guaranteed SLAs.

The EoPDH modules are compliant with the Metro Ethernet Forum Ethernet Private Line (EPL), Ethernet Virtual Private Line (EVPL) and E-LAN (multipoint-to-multipoint) service definitions.

The Traverse EoPDH modules provide advanced Ethernet bandwidth management and scalability over PDH circuits by utilizing Virtual Concatenation (VCAT) and Link Capacity Adjustment Scheme (LCAS) for bonding up to 16 T1/E1 or 8 DS3/E3 PDH circuits. This capability enables service providers to deliver standard 10Mbps or 100Mbps Ethernet services.



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Traverse Ethernet over PDH (EoPDH) Service Interface Modules

Gigabit Applications: Ethernet Service Delivery over Copper PDH Access Networks

The Traverse EoPDH modules aggregate, switch and transport any mix of MEF-compliant point-to-point (E-Line) or multipoint (E-LAN) services. This flexible design makes them an ideal solution for the delivery of Layer 2 VPNs, converged IP services and wireless backhaul applications. The Traverse EoPDH module enables service providers to deliver a ubiquitous set of feature-rich Ethernet services for both on-net and off-net customer locations.



Physical Traverse EoPDH Service Interface Module

Weight: 2.1 lbs or .95 kg

Dimensions: 13.9 x 2.06 x 11 (inches), or 35.3 x 5.23 x 27.94 cm

Environmental

Operating Temperature: -5°C to +55°C

Operating Humidity: To 90% max. non-condensing

Power Consumption: 75 Watts max.

Functional

EoPDH Circuit Aggregation
Aggregates 336 DS1, 252 E1 or 48 DS3/E3 EoPDH circuits per module

PDH Circuit Bonding
Bonds up to 16 DS1/E1 or 8 DS3/E3 PDH circuits per service (EVC)

Ethernet UNIs/NNIs (ports)
4 GbE (1000BASE-SX,

-LX, or -TX) with optional 16 10/100BASE-TX

ports per module for use as UNIs or E-NNIs to connect to a PE router or metro Ethernet transport network

Ethernet over PDH UNIs or SONET/SDH NNIs
Up to 128 EoPDH UNIs or EoS NNIs per module in any HO VCAT (STS-1nv, STS-3c-nv, VC-3-nv, VC-4-nv) or LO VCAT (VT-1.5-nv or VC-11/12-nv) increment for EoPDH service delivery over a Traverse transport network

Maximum Frame Size
9600 Bytes (jumbo frames) on all interfaces

Protection Options
1:1 Equipment Protection*, Carrier Ethernet Protection (CEP), RSTP, Ethernet Link Aggregation, LCAS diverse routes, SONET/SDH APS/MSP

Rate-shaping
Ethernet rate shaping in 1 Mbps increments

Policing and Traffic Management
MEF-compliant dual rate (CIR/PIR) policer for guaranteed and oversubscribed service bandwidth profiles in 1Mbps increments. Supports Priority Queuing (PQ) and Weighted Fair Queuing (WFQ)

Ethernet Topologies and Services
Supports MEF-compliant Point-to-point (E-Line), rooted multipoint (E-Tree), and multipoint-to- multipoint (E-LAN)

Maximum MAC Addresses
32,000

VLAN Support
4,093 customer-tagged C-VLANs (802.1Q) per UNI and up to 4,093 provider-tagged service S-VLANs (Q-in-Q) per E-NNI or EoS I-NNI. VLAN ID swapping and CoS preservation. Supports MEF-style VLAN bundling. Tagged stacked VLANs (QinQ) can be supported on any port.

Traffic Classes
4 CoS using priority code point (PCP) based queuing

Service Management
Ethernet performance monitoring of packet loss, errored frames, etc.

Fault Management
Loopback of NNI and PDH circuits, fault detection via standard PDH circuit alarms

Performance
5 Gbps switching capacity per module**

Physical Interface Specifications

MPX (Optical ports), Optional Telco 50 (Electrical ports, via connector panel).

Optical Specifications

- 1000BASE-SX
- 1000BASE-LX

Media

- Multi-mode fiber
- Single-mode fiber

Nominal Wavelength

- 850 nm
- 1310 nm

Maximum Reach

- 550 m
- 10 km

Industry Standards

IEEE 802.3, 802.3ab, 802.3ad, 802.3i, 802.3u, 802.3x, 802.3z, 802.1D, 802.1Q, 802.1w

ITU-T

G.707, G.7041, G.7042, G.7043, G.8040

MEF

MEF 9 for EPL, EVPL and E-LAN service definitions and MEF 14 for QoS/traffic management

Telcordia/NEBS

GR-253-CORE, GR-1377-CORE, GR-63-CORE, GR-1089-CORE

Regulatory and Standards Compliance

Safety

CSA C2.22 No. 60950; UL/IEC/EN60950, CE Mark

Eye Safety

Class 1

EMI

FCC Part 15, Class A; EN 300; EN 55022, Class A

ETSI

ETS 300 019-1-3, 019-1-3 (Environmental)

* 1:1 Equipment Protection for optical interfaces requires an external passive optical splitter (Y cable)

** Assumes bi-directional capacity (to the backplane and external ports), as well as a mix of frame sizes typical of Internet traffic