T-Marc 3308

CARRIER ETHERNET 2.0, MPLS, IP AND SDN ENABLED PREMIUM NID

T-Marc 3308 is the first quad-tech demarcation device in the market, offering Carrier Ethernet 2.0, MPLS, IP (Layer 3), and SDN (OpenFlow and NETCONF). Combining all of these capabilities in one device delivers the most cost-effective solution and provides operators with the flexibility to face any service scenario now and in the future.

T-Marc 3308 Ethernet/MPLS premium business demarcation device comes with Layer 3 (L3) support and is ready for future SDN-enabled networks. With the right feature blend, T-Marc 3308 brings the highest available value for cost performance. T-Marc 3308 is suitable for wholesale and business service providers to connect their customers efficiently between sites and into the cloud. T-Marc 3308 enables service providers to choose whether to use Carrier Ethernet network capabilities or to use MPLS to the edge without any additional software costs. In addition, T-Marc 3308 allows service providers to combine L3 native services together with Layer 2 (L2) advanced OAM tools. By supporting SDN, T-Marc 3308 allows service providers a smooth transition to future SDN-enabled networks.

T-Marc 3308 supports IEEE802.1q, Q-in-Q and MPLS transport technologies, providing high flexibility in network design and thus “future proofing” the network. The device allows access to advanced data services such as virtual private wire services (VPWS), virtual private LAN service (VPLS) and hierarchical VPLS (HVPLS), simplifying the network and making it easier to manage, while gaining the added value of MPLS.

T-Marc 3308 offers excellent value for performance in a compact size (1RU by ½ shelf width), with 4x10/100/1000BaseTx and 4 dual-speed (100M/1G) fiber ports. T-Marc 3308 comes with an internal power supply (AC or wide range DC) and with an optional external redundant AC power supply (AC/24VDC/-48VDC).

Flexible Control of Traffic and Services

To allow communications service providers to cope more efficiently with the increased demand for a more diverse range of services, T-Marc 3308 embeds sophisticated and flexible QoS and HQoS capabilities such as hierarchical queuing, rate limiting and traffic shaping, advanced scheduling schemes, and intuitive service-oriented SLA configurations. This allows providers to benefit from the multiplexed nature of Carrier Ethernet while assuring SLA requirements during traffic congestion.

As an MPLS demarcation device, T-Marc 3308 supports various traffic engineering technologies like LDP and RSVP-TE. These technologies allow service providers to engineer data paths based on several attributes while offering the highest level of protection and assuring that requested paths can meet defined SLA requirements. They also ensure fast switchover time to minimize degradation or interruption of services in case of failure, and provide high availability and sub-50ms resiliency using G.8031, G.8032, FRR, and Fast Ring standards.

L3 Support

T-Marc 3308 provides comprehensive solutions and services that best support IP (Internet Protocol) environment requirements– including Virtual Routing and Forwarding (VRF) support , IP static routing and dynamic routing protocols like OSPF and BGP. T-Marc 3308 also supports Dynamic Host Configuration Protocol (DHCP) for dynamically distributing network configuration parameters, and Virtual Router Redundancy Protocol (VRRP).

OAM Support

T-Marc 3308 supports a broad set of hardware-based OAM tools to help providers reduce their operating expenses (OPEX) and to assure their customers that they are meeting their agreed SLAs. T-Marc 3308 supports IEEE 802.1ag connectivity fault management (CFM) and ITU-T Y.1731, allowing service providers to monitor services end-to-end, identify connectivity and performance issues, enable SLA enforcement, and remotely isolate problems to avoid expensive truck rolls. The device also supports IEEE 802.3ah EFM-OAM at the link-level, and complies with MEF requirements, definitions and monitoring. Using RFC 2544 based embedded test heads and Y.1564 EtherSAM, T-Marc 3308 enables providers to pre-provision and remotely test services (e.g., from a central office), thereby further reducing costly truck rolls, saving OPEX, and improving service quality. Additionally, T-Marc 3308 supports Zero Touch Provisioning to reduce the need for expensive support when connecting new customers.

SDN Support

T-Marc 3308 provides full SDN support with comprehensive adoption of NETCONF, the network configuration protocol, and YANG, its data modeling language. It also supports OpenFlow 1.3.1 by using a simple software upgrade to ViNOX OS (orderable separately).

PRODUCT HIGHLIGHTS

- Premium Carrier Ethernet & MPLS (VPWS, VPLS and HVPLS) service demarcation device
- Layer 3 features support: HW-based L3 forwarding with VRF support using static route, OSFP and BGP routing protocols
- L3 features support
- Software upgradeable to SDN with OpenFlow support
- Wire speed, full duplex, non-blocking switching
- Support for high scale of services using hierarchical QoS (HQoS)
- Multiple resiliency mechanisms
- Extensive, field-proven, OAM support
- MEF, IEEE, ITU-T and IETF standards compliance
- Multi-vendor interoperable
- Small footprint, 1RU height, ½ shelf width

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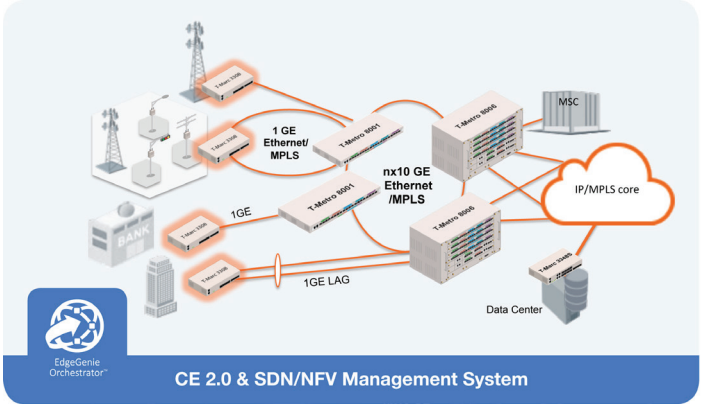
PRODUCT SPECIFICATIONS

Hardware Characteristics	4 x 100FX/1000BaseX SFP ports 4 x copper 10/100/1000BaseT ports Non-blocking 8Gbps FD platform Dual AC and dual feed 24/48VDC power supplies
Services	All MEF services: E-Line, E-LAN, E-Tree, and E-Access (defined in MEF 6.1, 22.1, 33) IEEE 802.1Q bridging IEEE 802.1ad Q-in-Q (TLS), MPLS Services: VPWS, VPLS, HVPLS Dynamic routing and signaling utilizing OSPF, IS-IS, RSVP-TE and T-LDP for path computation and signaling OpenFlow support IP Services: Virtual Routing and Forwarding (VRF) Static IP routing, OSFPv2, BGPv4, BFD*, DHCP server/client/relay, VRRP- RFC 3768
Timing	IEEE 1588v2 TC
Resiliency	Sub-50ms ITU-T G.8031 EPS, ITU-T G.8032v2 R-APS and MSTP Fast Ring, Sub-50ms FRR, HVPLS dual homing, secondary LSP xSTP, Resilient Link, LAG (static/IEEE 802.3ad LACP) redundant AC power supply and dual feed 24/48VDC power supply
Quality of Service	Per-port/EVC/flow single/dual rate limiting, hierarchical rate limit per EVC, hierarchical QoS – multi-level SP, WRR and hybrid frames scheduling, CoS marking and mapping per EVC, IPv6 data path support, WRED, flow control for congestion handling
Multicast Management	IGMP snooping v1/v2/v3, IGMP proxy; multicast VLAN registration (MVR)
OAM	Hardware-based IEEE 802.3ah EFM, IEEE 802.1ag CFM, OAM over VPLS (OAMoVPLS)
Testing and Monitoring	Hardware-based ITU-T Y.1564 and RFC 2544 test head and service performance analyzer, ITU-T Y.1731 PM, SM and SLM support, per-port/ EVC/VLAN/COS hardware-based flexible MAC-based loopbacks*, TWAMP*
Management	Console, Telnet, SSHv2, Radius, TACACS+, SNMP v1/2/3, xFTP, NTP, DNS resolver, DHCP client and Zero-Touch Provisioning*
Security	ACLs, RADIUS, SSHv2, SNMPv3, SFTP, port security, broadcast storm prevention, secured access, IS-IS authentication
General Specifications	Dimensions: (H x W x D): 1.75" (1RU) x 8.7" x 9.25" (44 mm x 221mm x 235 mm) Weight: 2.42 lbs (1.1 kg) Operating Temperature: 0°C to 50°C (32°F to 122°F) Humidity: 5% to 95% non-condensing Input power: 100-240VAC or 24/48VDC
Regulatory Compliance	**Safety:** NRTL certified: C-UL 60950, CSA 22.2 No. 950, EN/IEC 60950, TUV/GS (EN60950),CB, EN 60825-1/2 **EMC:** CE Mark: EN50081-1: EN55022 Class A, EN60555-2/3; North America: FCC 47 CFR Part 15 Class A; ICES-003 Issue 4 Class A (Canada); Japan: VCCI Class A; Australia/NZ: CISPR 22 Class A **Immunity:** EN50082-1, EN/IEC 61000-4-2/3/4/6/11 RoHS compliance



KEY APPLICATIONS

- MEF CE 2.0 type of services
- Business services – MTU or site NID
- SDN networks with NETCONF and OpenFlow support
- Multi-service multiplexing for different customers and services while ensuring service separation
- OAM monitored network for SLA assurance

ORDERING INFORMATION

Part Number	Description
TMC-3308-x	Ethernet/MPLS premium multi-purpose demarcation: 4 x 10/100/1000Base-T UNI/NNI, 4 x 100Base-FX/1000Base-X UNI/NNI, 1 x RJ-45 ASCII management console port; 1588v2 support; Internal AC power supply with optional external AC power supply redundancy (orderable separately)
TMC-3308-2DC	Ethernet/MPLS premium multi-purpose demarcation: 4 x 10/100/1000Base-T UNI/NNI, 4 x 100Base-FX/1000Base-X UNI/NNI, 1 x RJ-45 ASCII management console port; 1588v2 support; internal DC (24/48VDC), dual feed power supply
ViNOX-TMC-3308	ViNOX** is a next generation carrier grade networking operating system which supports multiple transport technologies such as Carrier Ethernet, IP/MPLS and OpenFlow 1.3.1. and supports MEF CE2.0 services, high resiliency, HQoS, OAM and next-generation management protocols like NETCONF and YANG. ViNOX-TMC-3308 runs on TMC-3308 products
TMC-3X0-EXTPS-x	Optional, external redundant AC power supply

*Future feature
**ViNOX software (purchased separately)

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