

## Highlights

### High-Performance Routing

- Maximizes performance and investment protection for new forwarding capabilities with a programmable architecture built on Extreme Networks VersaScale Packet Processor technology
- Delivers 400 Gbps of throughput per module and up to 640 10 GbE/1 GbE ports per chassis with full Layer 2, IPv4, IPv6, Multi-Protocol Label Switching (MPLS), and OpenFlow performance
- Integrates hardware support for OpenFlow 1.3 in the industry's only true hybrid port mode, enabling Software-Defined Networking (SDN) for increased agility and programmatic control of the network
- Hardware-enabled for industry-standard MAC security (MACsec) and MACsec Key Agreement (MKA), enabling data privacy with support for flexible policy application on customer-owned networks
- Provides a scalable and flexible solution for IX, Colo and Cloud data center cores and borders, High-Performance Computing (HPC) networks, secure campus cores, and mobile and data center visibility applications



## ExtremeRouting™ MLX 20-Port 10 GbE Module

### Flexible Scale and Wire-Speed Throughput with Uncompromised Feature Set

Networks today are straining to support unprecedented levels of traffic due to high-bandwidth demands for on-demand personalized content. Leading-edge services such as high-definition video streaming, mobile broadband, and cloud services have significantly altered network traffic behavior. Instead of localized flows with occasional bursts, traffic flows are more collaborative over geographical distances and last longer. These new traffic patterns not only consume enormous amounts of network capacity, but also add a greater degree of complexity to network operations. Additionally, as many organizations look to offer IT services via the cloud, the need for networks to be cloud-optimized and cloud-ready is pressing. As a result, today's network planners are seeking solutions that provide the right mix of scalability, performance, and operational simplicity.

The ExtremeRouting MLX® 20-port 10 GbE/1 GbE combo module for MLXe Routers delivers up to 400 Gbps of throughput per module without compromising the performance of features such as Layer 2, IPv4, IPv6, Multi-Protocol Label Switching (MPLS), OpenFlow-based Software-Defined Networking (SDN), and MAC security (MACsec). The 10 GbE/1 GbE combo ports deliver flexibility and scalability by enabling up to 640 ports of wire-speed 10 GbE or 1 GbE in a single chassis. This high-density half-slot module also uses less infrastructure to deliver services by helping to collapse network architectures, vastly improving operational efficiency and helping to reduce costs. In addition, the MLX 20-port 10 GbE/1 GbE

half-slot module comes in two versions, offering a flexible scale-as-you-grow model with hardware Forwarding Information Base (FIB) capacity options in an -M version for up to 512,000 IPv4 routes or 240,000 IPv6 routes, or an -X2 version for up to 2 million IPv4 routes and 800,000 IPv6 routes.

## Ensuring Data Privacy Through High-Performance Encryption

Today's organizations face a wide range of data privacy challenges, from cyber attacks and third-party snooping on private networks, to compliance and regulatory requirements. Ensuring data privacy throughout the network is therefore imperative as organizations seek to enable secure operations while increasing growth, productivity, and profitability. To address this, the MLX 20-port 10 GbE module supports IEEE 802.1AE MACsec, which provides 128-bit MAC layer encryption at wire speed. MACsec provides fast, low-latency, easy-to-deploy hop-by-hop encryption, which is ideal within the campus or data center network where the physical network is owned and there is a need to support unified communications and apply policy to traffic at the switch or router level. This allows for fine-grained management of the traffic while meeting security requirements for data-in-flight.

## Extreme Networks Versascale Packet Processor

The MLX 20-port 10 GbE module is built on the Extreme Networks VersaScale-200 Packet Processor. The processor is designed to enable service innovation through programmability and flexibility without sacrificing performance. The VersaScale-200 provides leading density, zero-packet loss, and line speed for all packet sizes—supporting up to 16,000 simultaneous hardware-multicast entries at line rate. The processor provides extremely deep packet buffering to handle the dynamic traffic. In addition, it supports large-scale Equal-Cost Multi-Pathing (ECMP) for 32 IPv4 or IPv6 paths, which is ideal for cloud service providers and Web 2.0 companies that need scalable solutions to handle explosive bandwidth growth and to optimize the core for efficient packet transport.

The VersaScale-200 has distributed network processing and advanced Quality of Service (QoS) capabilities, helping providers tighten their Service Level Agreements (SLAs) for traditional and value-add cloud services. As demands for network virtualization through SDN increase, the ability to easily add new services becomes vital. The VersaScale-200 is SDN-enabled with OpenFlow support today, and field upgradeable for future versions of OpenFlow and other overlay technologies.

### 10/1 GbE Port Density on ExtremeRouting MLX Series Routers

ExtremeRouting MLXe Chassis	Wire-Speed 1 GbE Ports	Wire-Speed 10 GbE Ports
MLXe-4	80	80
MLXe-8	160	160
MLXe-16	320	320
MLXe-32	640	640

### ExtremeRouting MLX 20-PORT 10 GbE Module Specifications

Item	Maximum Scalability per -M Module	Maximum Scalability per -X2 Module
MAC entries	256,000	512,000
IPv4 routes	512,000	2,400,000
IPv6 routes	240,000	1,800,000
Bandwidth per half-slot	400 Gbps	400 Gbps
Virtual Output Queues (VOQ)	32,000	32,000
Multicast groups	16,000	16,000
Switch fabric modes	Normal and turbo	Normal and turbo
OpenFlow flows	32,000	64,000

## Software Feature Highlights

### Comprehensive IPv4/IPv6 and Layer 2 Support:

High-performance, robust routing using Forwarding Information Base (FIB) programming in hardware

RIP/RIPng, OSPF/OSPFv3, IS-IS/IS-IS for IPv6, and BGP-4/BGP-MP for IPv6

Secure Multi-VRF routing for supporting virtual routing applications over non-MPLS backbones

VRRP and VRRP-E

Connecting IPv6 islands over IPv4 MPLS using IPv6 Provider Edge (GPE) routers

6VPE enabling IPv6 multitenancy to the edge of the cloud

BFD Holdover for OSPFv2/3 and IS-IS

BFD for Static Routes

BFD for OSPFv3

ND6 IPv6 Prefix Suppress

IS-IS Graceful Restart Helper Mode

127-Bit IPv6 Interface Addresses

### Software-Defined Networking (SDN):

OpenFlow 1.3: QoS (for metering and enqueue), Group Table (select and fast failover), QinQ (TAG type auto-recognition), Active-Standby Controller, IPv6, Transport Layer Security (TLS) 1.2 (controller interface)

Extreme Networks OpenFlow in hybrid port mode with support for sFlow, IP, and MPLS/VPLS (uplinks) with protected VLAN for additional flexibility

Up to 64,000 flows per module (-X2)

12-tuple matching for a diverse set of applications

### **MPLS Support:**

IPoMPLS

MPLS VPNs: L3 VPNs, L2 VPNs  
(VPLS, VLL)

BGP auto-discovery for VPLS endpoints

MPLS-PBB- (B-VID + I-SID) based interworking

MPLS over GRE

BFD for RSVP-TE LSPs

LDP Inbound and Outbound FEC Filtering

RSVP Liberal Bypass LSP Selection

Link Protection Request for RSVP

Fast Reroute

RSVP Hello Messages for Neighbor Failure Detection

RSVP TE Link Metric for

CSPF Computation

Static Route over RSVP LSP

Inter-VRF routing with MPLS LSP  
and MPLS VPN

Multi-Chassis Trunking (MCT) support  
for routing over VPLS

Map a VLL to a specific group of LSPs

### **Service Provider Scale:**

Carrier trunks: Advanced LAG, ECMP, LSP load balancing

Terabit trunks with 64x10 GbE LAG

### **Comprehensive OAM Support:**

802.1ag, Y.1731, 802.3ah, UDLD

BFD for BGP, OSPF, IS-IS, RSVP LSPs

Fine-grained timers (3.3 ms) with 802.1ag

### **Advanced Resiliency:**

NSR for OSPF, IS-IS, multicast

Graceful Restart for BGP, OSPF

In-Service Software Upgrades (ISSU)

### **Scalable Carrier Ethernet:**

MEF 9, MEF 14 compliant

G.8032 v1/v2 for ring resiliency

MRP (Metro Ring Protocol)

Virtual Switch Redundancy (VSRP)

MCT

Provider Backbone Bridging (PBB)

### **Advanced Visibility, Statistics:**

sFlow for granular network traffic accounting

sFlow support for MPLS LSR and  
LER interfaces

Flow- and port-based mirroring

Per-queue counters

Per-VLAN, port+VLAN, per-VE counters

GTP session-based filtering and  
load balancing

### **Queuing:**

Virtual Output Queuing (VOQ) architecture

### **Encryption:**

IEEE 802.1AE: Media Access Control Security (MACsec)

## **Hardware Components\***

Idle power consumption: 268 W

Typical power consumption: 315 W

Maximum power consumption: 440 W

\*Under worst-case conditions, BR-MLX-10GX20-M/-X2 will operate up to 45 C° at sea level, or 35 C° at 3 km.

All fans need to be installed and running.

# Product Support For Optics with Key Standards and Features

Optic Type	IEEE Standards	Domestic Safety Standards	International Safety Standards	Wavelength (nm)	Fiber Type	Maximum Cable Distance	Digital Optical Monitoring
<b>1 GbE Optics</b>							
E1MG-SX-OM	802.3z	FDA 21CFR 1040.10 Class 1, CSA 60950-1-03/UL 60950-1	EN 60825-1, EN 60950-1	850	MMF	220 m to 550 m	Yes
E1MG-LX-OM	802.3z			1,310	MMF/SMF	550 m to 10 km	Yes
E1MG-LHA-OM	802.3z			1,550	SMF	70 km	Yes
E1MG-LHB	802.3z			1,550		150 km with 0.18 dB/km cable, 91 km with standard 0.3 dB/km cable	No
E1MG-BXD	802.3ah			TX: 1,490 RX: 1,310		10 km	No
E1MG-BXU	802.3ah			TX: 1,310 RX: 1,490		10 km	No
E1MG-CWDM80-XXXX	802.3z			1,470 to 1,610	80 km	No	
E1MG-TX	802.3z	CSA 60950-1-03/UL	EN 60950-1	N/A	Cat5	100 m	N/A
<b>10 GbE Optics</b>							
10G-XFP-SR	802.3ae	FDA 21CFR 1040.10 Class 1, CSA 60950-1-03/UL 60950-1	EN 60825-1, EN 60950-1	850	MMF	26 m to 300 m	Yes
10G-XFP-LR	802.3ae			1,310	SMF	10 km	
10G-XFP-ER	802.3ae			1,550		40 km	
10G-XFP-ZR	802.3ae			1,550		80 km	
10G-XFP-ZRD	802.3ae			1,528.77 to 1,561.42		80 km	
10G-SFPP-USR	N/A			850	MMF	100 m	
10G-SFPP-SR	802.3ae			850	MMF	26 m to 300 m	
10G-SFPP-LR	802.3ae			1,310	SMF	10 km	
10G-SFPP-ER	802.3ae			1,550	SMF	40 km	
10G-SFPP-ZR	802.3ae			1,550	SMF	80 km	
10G-SFPP-ZRD-T	802.3-2005 Clause 52 standard			102 C-band tunable wavelengths from 1,528 to 1,568 (50 GHz apart)	SMF	80 km	
10G-SFPP-LRM	802.3ae			1,310	MMF	220 m	
10G-SFPP-TWX-XXXX	802.3ae			Direct-attached SFP+ Twinax copper cables			
10G-SFPP-AOC-XXXX	N/A	Direct-attached SFP+ active optical cables			7 m, 10 m	No	

ExtremeRouting MLX 20-Port 10 GbE Module Ordering Information	
Part Number	Description
BR-MLX-10GX20-X2	ExtremeRouting MLX 20-port 10 GbE/1 GbE (X2) SFP+ and SFP combo module. Extended route table support for up to 2 million IPv4 routes or 1.8 million IPv6 routes.
BR-MLX-10GX20-M	ExtremeRouting MLX 20-port 10 GbE/1 GbE (M) combo module. Supports SFP+ and SFP with 512,000 IPv4 routes or 240,000 IPv6 routes in FIB.



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