

Highlights

- Provides a flexible and cost-effective solution for next-generation data center, service provider, research and education and distributed enterprise networks requiring high bandwidth and large Internet-scale route support—up to 2 million IPv4 routes and 1 million IPv6 routes across up to 64 100 GbE ports per chassis.
- Simplifies deployment and helps improve operational agility via industry-leading carrier trunks - aggregating up to 64 100 GbE links for up to 6.4 Tbps of capacity in a single trunk
- Maximizes investment protection with the flexibility of software while delivering the performance at scale of hardware - up to 400 Gbps per half slot for full Layer 2, IPv4, MPLS, SDN and packet broker forwarding - via Extreme VersaScale programmable packet processor technology



ExtremeRouting MLX 2-Port 100 GbE CFP2 Module

High-Performance Terabit Networking Built on Programmable Architecture

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. High-density 100 Gigabit Ethernet (GbE) can meet rising commodity traffic demands while helping organizations maximize revenue and reduce costs.

Extreme delivers 100 GbE with industry-leading route scale on its carrier-class routing platform, the ExtremeRouting MLX®Series. The ExtremeRouting MLX 2-port 100 GbE CFP2 module provides the performance and route scale needed for networks under extreme pressure—such as next-generation service providers, virtualized data centers, research and education and large distributed enterprises—to support increasing application traffic. Each 100 GbE module delivers 400 Gbps of throughput per half-slot without compromising the performance forwarding features such as Layer 2, IPv4, IPv6, and Multi-Protocol Label Switching (MPLS) and SDN.

This high-capacity module uses less infrastructure to deliver services to these networks, vastly improving operational efficiency and helping to reduce costs. In addition, the MLX 2-port 100 GbE CFP2 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 and 240,000 IPv6 routes, or an -X2 version for up to 2 million IPv4 routes and 1 million IPv6 routes

Extreme Versascale Packet Processor

The MLX Series is built on the Extreme VersaScale-200 Packet Processor. The processor is designed to enable service innovation through programmability and flexibility without sacrificing performance. The Extreme 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 VersaScale-200 is designed for service provider and large enterprise networks, and delivers a balance of scalability and feature richness. 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 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 customers begin to demand network virtualization through Software-Defined Networking (SDN), the ability to easily add new services becomes vital. The VersaScale-200 is SDN enabled with OpenFlow support today, and field upgradable for future SDN control and forwarding protocols.

Extreme Global Services

Extreme Global Services has the expertise to help organizations build scalable, efficient cloud infrastructures. Leveraging 15 years of expertise in storage, networking, and virtualization, Extreme Global Services delivers worldclass professional services, technical support, and education

services, enabling organizations to maximize their Extreme investments, accelerate new technology deployments, and optimize the performance of networking infrastructures.

Affordable Acquisition Options

Extreme Capital Solutions helps organizations easily address their IT requirements by offering flexible network acquisition and support alternatives. Organizations can select from purchase, lease, Extreme Network Subscription, and Extreme Subscription Plus options to align network acquisition with their unique capital requirements and risk profiles. To learn more, visit www.extremenetworks.com.

Maximizing Investments

To help optimize technology investments, Extreme and its partners offer complete solutions that include professional services, technical support, and education. For more information, contact a Extreme sales partner or visit www.extremenetworks.com.

100 GbE Port Density on Extreme MLX Series Routers

Extreme MLXe Chassis	Wire-Speed 100 GbE Ports
Extreme MLXe-4	8
Extreme MLXe-8	16
Extreme MLXe-16	32
Extreme MLXe-32	64

Extreme MLX 2-Port 100 GbE CFP2 Module Specifications

Item	Maximum Scalability per -M Module	Maximum Scalability per -X2 Module
MAC entries	576,000	1,216,000
IPv4 routes	512,000	2,000,000
IPv6 routes	240,000	1,000,000
Bandwidth per slot	200 Gbps	200 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	56,000	112,000

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 (6PE) 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 autorecognition), Active-Standby Controller, IPv6, Transport Layer Security (TLS) 1.2 (controller interface)
- OpenFlow in Extreme hybrid port mode with support for sFlow-RT, IP, and MPLS/VPLS (uplinks) with protected VLAN for additional flexibility
- Up to 112,000 flows supported
- 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

Phenomenal Scale

- Carrier trunks: Advanced LAG, ECMP, LSP load balancing
- Terabit trunks with 64x100 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
- Up to 2 GB of VOQ buffering per 100 GbE port

Hardware Components

- Free-scale new generation CPU
- 4 GB DDR3 SDRAM
- 512 KB flash memory boot code
- 64 MB flash memory for application code
- PCIe switch
- 100 Gbps traffic manager
- Network, fabric, stats, CPU interfaces
- DDR3 SDRAM packet buffer
- SP100-XPP FPGA packet processor
- 80 Mb TCAM
- RLDRAM3 LBLRAM
- RLDRAM3 CAM2PRAM
- RLDRAM3 PRAM
- Interlaken system and statistics interfaces
- PBIFS FPGA
- Temperature sensors
- JTAG support
- Hot-pluggable
- Maximum power consumption: 360 W
- Interoperable with 100 GbE CFP optics

Product Support for Optics with Key Standards and Features

Optic Type	IEEE Standards	Electrical Signaling	Fiber Type	Maximum Cable Distance	Digital Optical Monitoring
100GBASE-CFP2-LR4	802.3ba	4x25	SMF	10km	Yes
00GBASE-CFP2-SR10	802.3ba	10x10	OM3 MMF	100m	Yes
100GBASE-CFP2-ER4	802.3ba	4x25	SMF	40km	Yes
100G-QSFP28-SR4	802.3bm	4x25	MMF	7m (OM3), 100m (OM4)	Yes
100G-QSFP28-LR4L-2KM	802.3ba	4x25	SMF	2km	Yes
100G-QSFP28-LR4-10KM	802.3ba	4x25	SMF	10km	Yes

Ordering Information

Part Number	Description
BR-MLX-100GX2-CFP2-X2	Extreme MLX 2-port 100 GbE (X2) CFP2 module. Extended route table support for up to 2 million IPv4 and 1 million IPv6 routes in hardware.
BR-MLX-100GX2-CFP2-M	Extreme MLX 2-port 100 GbE (M) CFP2 module. Supports 512,000 IPv4 routes in FIB.



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