BROCADE NETIRON XMR 4000, 8000 16000, 32000

HIGH-PERFORMANCE BACKBONE ROUTING

IPv4/IPv6/MPLS Multi-Service Backbone Routers

HIGHLIGHTS

- 4-, 8-, 16-, and 32-slot high-end IPv4/IPv6/MPLS multi-service routers
- Terabit-scale architecture offering up to 3.2 Tbps data capacity and approximately 2 billion pps per system
- Up to 128 10-GbE/640 1-GbE/64 OC-192/256 OC-48 ports per system
- Built for scalable routing via OSPF, IS-IS, BGP, OSPFv3, RIPng, PIM-DM/SM/SSM
- Up to 1 million IPv4 routes in hardware to support future growth
- Carrier class IPv4, IPv6, and MPLS routing featuring Brocade Direct Routing (FDR) technology
- High-capacity MPLS Layer 3/Layer 2 VPNs and IP over MPLS routing
- Enables virtual routing in non-MPLS environments via Multi-VRF
- Highly resilient architecture offering redundant management modules, switch fabrics, power supplies, cooling, and hitless failover
- Flexible SONET/SDH support via either native POS interfaces or 10-GbE WAN PHY

Today's service providers face market challenges that require a new breed of solutions to ensure successful and profitable operation. Service providers operate in an environment of fierce competition that continues to drive service pricing down. A smooth introduction of new, reliable, and scalable services is difficult for many service providers, yet, it is crucial to expanding the subscriber base and improving subscriber retention. Adding to these challenges is an exponential growth trend in Internet traffic that continues to erode network capacities. Furthermore, ensuring and increasing profitability, which require controlling Capital Expenditures CapEx) and Operational Expenditures (OpEx), are key goals for any service provider.

The Brocade® NetIron® XMR Series routers are built to address all these hurdles by offering state-of-the-art design in hardware and software. Based on a superior terabit-scale architecture that includes cutting-edge, fifth-generation network processors, this series comprises the industry's most powerful, high density IPv4/ IPv6/MPLS multi-service routers. To enable the deployment of scalable, high value, and profitable services, the NetIron XMR Series offers highly versatile, cost-efficient solutions for Internet routing, inter-Metro backbones, large scale multi-service backbones, and IP carrier's carrier transport.

The Brocade NetIron XMR Series includes the 4-slot NetIron XMR 4000, 8-slot NetIron XMR 8000, the 16-slot NetIron XMR 16000, and the 32-slot NetIron XMR 32000. The series offers industry-leading port capacity and density for both Carrier Ethernet and Packet over SONET/SDH (POS) with up to 128 10-GbE, 640 1-GbE, 64 OC-192 (STM-64), or 256 OC-48 (STM-16) ports in a single chassis, high density router.

BROCADE

The Brocade NetIron XMR Series is designed from the ground up for high performance and scalability to address the needs of the most demanding ISP, Internet data center, inter-Metro connectivity, and multi-service operator applications. All routers in the series feature wire-speed, low latency, and low jitter routing for IPv4, IPv6, MPLS, and MPLS VPN services, and they support both edge (PE) and core (P) router deployments. For metropolitan area networks (MANs), the NetIron XMR routers support high-performance Layer 2 switching which allows for cost efficient and seamless integration with Layer 2 MANs or Layer 2 MAN access layers without compromising performance.

Designed for high-end routing applications, the Brocade NetIron XMR Series features Brocade Direct Routing (BDR) technology for full Forwarding Information Base (FIB) programming in hardware, together with hardware-based, wire-speed access control lists (ACLs) and policy-based routing (PBR) for robust, high performance IPv4, IPv6, and Layer 3 VPN routing. Complementary to FDR is a full suite of unicast and multicast routing protocols for both IPv4 and IPv6. Supported IPv4 protocols include RIP, OSPF, IS-IS, BGP4, PIM-DM, PIM-SM/SSM, IGMP, BGP-MP for multicast, and MSDP. Supported IPv6 protocols include RIPng, OSPFv3, IS-IS, BGP-MP for IPv6 (BGP4+), PIM-SSM, and MLD. Building on this solid routing architecture, the NetIron XMR routers also provide dual-stack IPv4/IPv6 wire-speed routing to facilitate a seamless migration to IPv6 without sacrificing performance.

A comprehensive set of path calculation and signaling capabilities using OSPF-TE, IS-IS-TE, RSVP-TE, CSPF, and LDP allows the creation of both traffic engineered and non-traffic engineered infrastructures. Within either infrastructure, the NetIron XMR Series supports IP over MPLS as well as MPLS VPN applications. The NetIron XMR Series supports all three popular MPLS VPN services, Virtual Leased Line (VLL), LDP-Based Virtual Private LAN Service (VPLS), and BGP/MPLS VPN, on all ports at wire-speed.

In addition, the Brocade NetIron XMR Series offers Multi-VRF Routing for environments where virtual routing is needed without the complexity of MPLS. Using Multi-VRF Routing, backbone operators can create multiple routing protocol instances that peer with each other in completely virtualized domains while sharing the same physical routers and links. The NetIron XMR Series is able to support overlapping IP address spaces through complete separation of the routing tables. Forwarding plane separation is supported through the use of standard 802.1Q VLAN tags.

The Brocade NetIron XMR Series is also designed for enabling the evolving multi-service and triple-play infrastructures. Built with an innovative view of Virtual Output Queuing (VOQ) architectures, packet buffering, and packet scheduling, the NetIron XMR routers offer non-blocking packet forwarding and large capabilities for handling severe congestion scenarios. Built on that superior foundation, the Brocade NetIron XMR routers deliver a comprehensive suite of QoS mechanisms to enable next-generation architectures. Using the Brocade NetIron XMR routers, operators can implement eight distinct traffic classes of prioritization with true performance guarantees. Operators can implement those performance guarantees by choosing from different packet scheduling schemes and tweaking the associated configurable parameters. Additionally, by relying on DSCP Drop Precedence, operators can take advantage of Weighted Random Early Discard (WRED) for differentiated packet dropping in case of congestion within a given traffic class.

High availability, crucial to converged networks, is ensured through a combination of highly resilient hardware and software design, and advanced failure detection and traffic protection/restoration schemes. The routers feature complete hardware redundancy combined with resilient software featuring hitless failover and hitless software upgrades with OSPF and BGP graceful restart for maximizing router uptime. The Multi-Service IronWare operating system, powering the NetIron XMR routers, offers advanced capabilities for rapid detection and bypass of link/node failures such as BFD, UDLD, MPLS FRR, and Hot Standby paths.

Security is an increasing concern for today's operators, and the Brocade NetIron XMR routers offer a powerful set of security mechanisms that allow operators to enhance both infrastructure security and subscriber security. The NetIron XMR routers feature highly scalable inbound and outbound ACLs, which allow operators to implement IPv4, IPv6, and Layer 2 security policies. These policies can be applied permanently or on demand without impacting normal operations. Receive ACLs further harden platform and infrastructure security, allowing operators to implement strict policies for controlling management traffic and control traffic. To counter IP address spoofing used in many forms of DoS attacks, the NetIron XMR routers offer hardware-based wire-speed Unicast Reverse Path Forwarding (uRPF) for both edge applications (strict mode), and backbone applications (loose mode). uRPF allows the routers to check the packet's source IP address against the routing table to ensure that the packet came from a valid, and expected, source network.

Using the Brocade NetIron XMR routers, operators can combine the benefits of SONET/SDH long haul transport and the abundance of cost-effective capacity of Carrier Ethernet in many POPs. The routers offer a portfolio of native POS interfaces with speeds ranging from OC-12 (STM-4) to OC-192 (STM-64), allowing for native connectivity to SONET/SDH optical transport equipment or to existing POS routers with distances up to 80 km. Carrier Ethernet interfaces offer distances up to 80 km for 10-GbE, and up to 150 km for GbE. In addition, the routers offer operators cost-effective 10-GbE transport over OC-192 (STM-64) links using IEEE standard 10-GbE WAN PHY.

KEY FEATURES

Service provider-grade IPv4/IPv6/MPLS multi-service backbone routers

4-, 8-, 16-, and 32-slot systems for maximum deployment versatility

Terabit-scale architecture designed for massive 10-GbE and OC-192 scalability

Performance of competitor multi-chassis routers in a fraction of the rack space:

- Up to 2 billion pps routing performance with non-blocking 3.2 Tbps data capacity

Industry-leading port capacity for a single chassis router:

- 128 10 Gigabit Ethernet/640 Gigabit Ethernet ports
- 64 OC-192/256 OC-48 ports

Wire-speed dual stack IPv4/IPv6 routing

Wire-speed edge (PE) and core (P) Label Switching Routers

Industry-leading performance for MPLS services providing concurrent IP over MPLS, Virtual Leased Lines (VLLs), Virtual Private LAN Services (VPLSes), and BGP/MPLS VPNs at wire speed

High-performance, robust routing via Brocade Direct Routing (FDR) for complete programming of the Forwarding Information Base (FIB) in hardware

Full suite of unicast and multicast IPv4 and IPv6 routing protocols:

- Supported IPv4 protocols include RIP, OSPF, BGP-4, IS-IS, PIM-DM, PIM-SM/SSM, IGMP, BGP-MP for multicast, and MSDP
- Supported IPv6 protocols include RIPng, OSPFv3, IS-IS for IPv6, BGP-MP for IPv6 (BGP4+), PIM-SM/SSM, and MLD

Comprehensive MPLS signaling and path calculation algorithms for both traffic engineered and non-traffic engineered applications:

- OSPF-TE, IS-IS-TE, RSVP-TE, CSPF
- LDP

Powerful Multi-VRF Routing supports virtual routing applications over non-MPLS backbones

Industry-leading scalability up to:*

- 10 million BGP routes
- 1 million IPv4 routes in hardware (FIB)
- 240,000 IPv6 routes in hardware (FIB)
- 2000 BGP peers per system
- 2,000 BGP/MPLS VPNs and up to 1 million VPN routes
- 32,000 VLLs per system
- 16,000 VPLSes and up to 1 million VPLS MAC addresses
- 4,094 VLANs and up to 2 million MAC addresses8-path Equal Cost Multipath (ECMP)

Superior high-availability design:

- Redundant management modules
- Redundant switch fabrics
- Redundant power supplies and cooling system
- Hitless Layer 3 and Layer 2 failover with OSPF and
- BGP graceful restart
- Hitless (in-service) software upgrades leveraging graceful restart

** Scalability limits dependent on configured system parameters, system profile selected, and routing database complexity.*

KEY FEATURES CONTINUED

Rapid link/node failure detection with advanced traffic protection:

- BFD for rapid detection of neighbor/adjacency failure
- Brocade UDLD and IEEE LFS for fast detection of link problems
- MPLS FRR and Hot Standby paths for traffic protection
- Distributed, scalable, wire-speed tunneling for IPv4 over GRE, and IPv6 over IPv4

Industry leading 320 Gbps link aggregation capability for aggregating up to 32 10GbE/OC-192 links in provider backbones

Advanced QoS:

- Eight distinct priority levels
- Weighted Random Early Discard (WRED) support for congestion management and precedence dropping (tunable via configuration)
- Support for hybrid queue servicing disciplines: Strict Priority + Weighted Fair Queuing

State-of-the-art policy enforcement and monitoring for enforcing SLAs and implementing security policies:

- Two rate three color traffic policers
- Traffic policer accounting
- Layer 3 and Layer 2 ACLs
- Granular ACL accounting
- Hardware-based packet filtering
- Hardware-based policy based routing (PBR)
- Unicast Reverse Path Forwarding (uRPF)
- Receive ACLs
- Extensive sFlow Layer 2-7 traffic monitoring for IPv4,
- IPv6 and MPLS services

Combine both Carrier Ethernet and powerful Packet over SONET/SDH:

- MEF 9 and MEF 14 certified for offering Carrier Ethernet services
- Flexible set of POS interfaces with carrier class timing offering internal stratum 3, loop, line, and BITS timing support

BROCADE NETIRON XMR SERIES AT A GLANCE

Features	NetIron XMR 4000	NetIron XMR 8000	NetIron XMR 16000	NetIron XMR 32000
Interface Slots	4	8	16	32
Switch Fabric Capacity	960 Gbps	1.92 Tbps	3.84 Tbps	7.68 Tbps
Data Forwarding Capacity	400 Gbps	800 Gbps	1.6 Tbps	3.2 Tbps
Packet Routing Performance				
Full Duplex	240 million pps	480 million pps	~1 billion pps	~2 billion pps
Total	480 million pps	960 million pps	~2 billion pps	~4 billion pps
Switch Fabric Redundancy	2+1	2+1	3+1	7+1
Max 10-GbE Ports	16	32	64	128
Max 1-GbE Ports	80	160	320	640
Max OC-192 (STM-64) Ports	8	16	32	64
Max OC-48 (STM-16) Ports	32	64	128	256
Height (inches/rack units)	6.96''/4RU	12.21''/7RU	24.47''/14RU	57.71''/33RU
Power Supply Redundancy	M+N	M+N	M+N	M+N
Air Flow	Side to side	Side to side	Front to back	Front to back

BROCADE NETIRON XMR SERIES POWER SPECIFICATIONS

	NETIRON XMR 4000	NETIRON XMR 8000	NETIRON XMR 16000	NETIRON XMR 32000
Maximum DC Power Consumption (W)	1,384	2,750	5,572	11,353
Maximum AC Power Consumption (W) (100-240 VAC)	1,384	2,750	5,572	11,353
Maximum Thermal Output (BTU/HR)	4,724	9,386	19,017	38,476

BROCADE NETIRON XMR SERIES PHYSICAL SPECIFICATIONS

	Dimensions		Weight	
NetIron XMR 4000	17.45"w x 6.96"h x 22.5"d	44.32w x 17.68h x 57.15d cm	78 lbs	35 kg
NetIron XMR 8000	17.45"w x 12.21"h x 22.5"d	44.32w x 31.01h x 57.15d cm	131 lbs	60 kg
NetIron XMR 16000	17.45"w x 24.47"h x 25.5"d	44.32w x 62.15h x 64.77d cm	236 lbs	107 kg
NetIron XMR 32000	17.45"w x 57.71"h x 24.1"d	44.32w x 146.58h x 61.21d cm	approx 478 lbs	approx 217 kg

BROCADE NETIRON XMR SERIES SPECIFICATIONS

IEEE Compliance

- 802.3-2005 CSMA/CD Access Method and Physical Layer Specifications
- 802.3ab 1000BASE-T
- 802.3ae 10 Gigabit Ethernet
- 802.3x Flow Control
- 802.3ad Link Aggregation
- 802.1Q Virtual Bridged LANs
- 802.1D MAC Bridges
- 802.1w Rapid STP
- 802.1s Multiple Spanning Trees
- 802.1ag Connectivity Fault Management (CFM)

RFC Compliance

BGPv4	• RFC 4271 BGPv4 • RFC 1745 OSPF Interactions • RFC 1997 Communities & Attributes • RFC 2439 Route Flap Dampening • RFC 2796 Route Reflection • RFC 1965 BGP4 Confederations • RFC 2842 Capability Advertisement • RFC 2918 Route Refresh Capability • RFC 1269 Managed Objects for BGP • RFC 2385 BGP Session Protection via TCP MD5 • RFC 3682 Generalized TTL Security Mechanism, for eBGP Session Protection • RFC 4273 BGP-4 MIB • draft-ietf-idr-restart Graceful Restart Mechanism for BGP
OSPF	• RFC 2328 OSPF v2 • RFC 3101 OSPF NSSA • RFC 1745 OSPF Interactions • RFC 1765 OSPF Database Overflow • RFC 1850 OSPF v2 MIB • RFC 2370 OSPF Opaque LSA Option • RFC 3630 TE Extensions to OSPF v2 • RFC 3623 Graceful OSPF Restart
IS-IS	• RFC 1195 Routing in TCP/IP and Dual Environments • RFC 1142 OSI IS-IS Intra-domain Routing Protocol • RFC 2763 Dynamic Host Name Exchange • RFC 2966 Domain-wide Prefix Distribution
RIP	• RFC 1058 RIP v1 • RFC 1723 RIP v2 • RFC 1812 RIP Requirements
IPv4 Multicast	• RFC 1122 Host Extensions • RFC 1112 IGMP • RFC 2236 IGMP v2 • RFC 3376 IGMP v3 • RFC 3973 PIM-DM • RFC 2362 PIM-SM • RFC 2858 BGP-MP • RFC 3618 MSDP • RFC 3446 Anycast RP
General Protocols	• RFC 791 IP • RFC 792 ICMP • RFC 793 TCP • RFC 783 TFTP • RFC 826 ARP • RFC 768 UDP • RFC 894 IP over Ethernet • RFC 903 RARP • RFC 906 TFTP Bootstrap • RFC 1027 Proxy ARP • RFC 951 BootP • RFC 1122 Host Extensions for IP Multicasting • RFC 1256 IRDP • RFC 1519 CIDR • RFC 1542 BootP Extensions • RFC 1812 Requirements for IPv4 Routers • RFC 1541 and 1542 DHCP • RFC 2131 BootP/DHCP Helper • RFC 3768 VRRP • RFC 854 TELNET • RFC 1591 DNS (client)
QoS	• RFC 2475 An Architecture for Differentiated Services • RFC 3246 An Expedited Forwarding PHB • RFC 2597 Assured Forwarding PHB Group • RFC 2698 A Two Rate Three Color Marker

BROCADE NETIRON XMR SERIES SPECIFICATIONS CONTINUED

Other	• RFC 1354 IP Forwarding MIB • RFC 2665 Ethernet Interface MIB • RFC 1757 RMON Groups 1,2,3,9 • RFC 2068 HTTP • RFC 2030 SNTP • RFC 2865 RADIUS • RFC 3176 sFlow • RFC 2863 Interfaces Group MIB • Draft-ietf-tcpm-tcpsecure TCP Security • RFC 3704 Ingress Filtering for Multihomed Networks (uRPF) • RFC 2784 Generic Routing Encapsulation (GRE) • draft-ietf-bfd-base Bidirectional Forwarding Detection (BFD) • draft-ietf-bfd-v4v6-1hop BFD for IPv4 and IPv6 (Single Hop); for OSPFv2, OSPFv3, IS-IS
IPv6 Core	• RFC 2460 IPv6 Specification • RFC 2461 IPv6 Neighbor Discovery • RFC 2462 IPv6 Stateless Address Auto-Configuration • RFC 4443 ICMPv6 • RFC 4291 IPv6 Addressing Architecture • RFC 3587 IPv6 Global Unicast Address Format • RFC 2375 IPv6 Multicast Address Assignments • RFC 2464 Transmission of IPv6 over Ethernet Networks • RFC 2711 IPv6 Router Alert Option • RFC 3596 DNS support
IPv6 Routing	• RFC 2080 RIPng for IPv6 • RFC 2740 OSPFv3 for IPv6 • draft-ietf-isis-ipv6 Routing IPv6 with IS-IS • RFC 2545 Use of BGP-MP for IPv6
IPv6 Multicast	• RFC 2710 Multicast Listener Discovery (MLD) for IPv6 • RFC 3810 Multicast Listener Discovery Version 2 for IPv6 • RFC 4604 IGMPv3 & MLDv2 for SSM • draft-ietf-ssm-arch SSM for IP • RFC 2362 PIM-SM • draft-ietf-pim-sm-v2-new; partial support: SSM mode of operation
IPv6 Transitioning	• RFC 2893 Transition Mechanisms for IPv6 Hosts and Routers • RFC 3056 Connection of IPv6 Domains via IPv4 Clouds

MPLS	• RFC 3031 MPLS Architecture • RFC 3032 MPLS Label Stack Encoding • RFC 3036 LDP Specification • RFC 2205 RSVP v1 Functional Specification • RFC 2209 RSVP v1 Message Processing Rules • RFC 3209 RSVP-TE • RFC 3270 MPLS Support of Differentiated Services • RFC 4090 Fast Reroute Extensions to RSVP-TE for LSP Tunnels; partial support: detour style • RFC 3812 MPLS TE MIB • draft-ietf-bfd-mpls BFD for MPLS LSPs (RSVP-TE)
L3VPN	• RFC 2858 Multiprotocol Extensions for BGP-4 • RFC 3107 Carrying Label Information in BGP-4 • RFC 4364 BGP/MPLS IP VPNs • draft-ietf-idr-bgp-ext-communities BGP Extended Communities Attribute • RFC 4576 Using LSA Options Bit to Prevent Looping in BGP/MPLS IP VPNs (DN Bit) • RFC 4577 OSPF as the PE/CE Protocol in BGP/MPLS IP VPNs • draft-ietf-idr-route-filter Cooperative Route Filtering Capability for BGP-4 • RFC 4382 MPLS/BGP Layer 3 VPN MIB
L2VPN and PWE3	• draft-ietf-l2vpn-l2-framework Framework for Layer 2 Virtual Private Networks • draft-ietf-l2vpn-requirements Service Requirements for Layer 2 Provider Provisioned Virtual Private Networks • RFC 4762 VPLS Using LDP Signaling • draft-ietf-pwe3-arch PWE3 Architecture • RFC 4447 Pseudowire Setup and Maintenance using LDP • RFC 4448 Encapsulation Methods for Transport of Ethernet over MPLS Networks • draft-ietf-pwe3-pw-tc-mib Definitions for Textual Conventions and OBJECT-IDENTITIES for Pseudo-Wires Management • draft-ietf-pwe3-pw-mib Pseudo Wire (PW) Management Information Base

Packet Over SONET/SDH

- RFC 1661 The Point-to-Point Protocol (PPP)
- RFC 1662 PPP in HDLC-like Framing
- RFC 2615 PPP over SONET/SDH
- RFC 1332 Internet Protocol Control Protocol (IPCP)
- RFC 1377 The PPP OSI Network Layer Control Protocol (OSINLCP)
- RFC 2472 IPv6 over PPP
- RFC 3592 SONET/SDH Objects
- GR-253-CORE SONET Transport Systems: Common Generic Criteria
- G.707/Y.1322 Network Node Interface for SDH

MEF Certification

- MEF 9 Certified—Abstract Test Suite for Ethernet Services at the UNI
- MEF 14 Certified—Abstract Test Suite for Traffic Management Phase 1

Network Management

- IronView Network Manager (INM) Web-based graphical user interface
- Integrated industry standard Command Line Interface (CLI)
- sFlow (RFC 3176)
- Telnet
- SNMP v1, v2c, v3
- SNMP MIB II
- RMON

Element Security Options

- AAA
- RADIUS
- Secure Shell (SSH v2)
- Secure Copy (SCP v2)
- HTTPs
- TACACS/TACACS+
- Username/Password (Challenge and Response)
- Bi-level Access Mode (Standard and EXEC Level)
- Protection against Denial of Service attacks, such as TCP SYN or Smurf Attacks

Environmental

- Operating Temperature: 0° C to 40° C (32° F to 104° F)
- Relative Humidity: 5% to 90%, @40° C (104° F), non-condensing
- Operating Altitude: 6,600 ft (2,012 m)
- Storage Temperature: -25° C to 70° C (-13° F to 158° F)
- Storage Humidity: 95% maximum relative humidity, non-condensing
- Storage Altitude: 15,000 ft (4,500 m) maximum

Safety Agency Approvals

- CAN/CSA-C22.2 No. 60950-1-3
- UL 60950-1
- IEC 60950-1
- EN 60950-1 Safety of Information Technology Equipment
- EN 60825-1 Safety of Laser Products—Part 1: Equipment Classification, Requirements and User's Guide
- EN 60825-2 Safety of Laser Product—Part 2: Safety of Optical Fibre Communication Systems

Electromagnetic Emission

- ICES-003 Electromagnetic Emission
- FCC Class A
- EN 55022/CISPR-22 Class A/VCCI Class A
- AS/NZS 55022
- EN 61000-3-2 Power Line Harmonics
- EN 61000-3-3 Voltage Fluctuation & Flicker
- EN 61000-6-3 Emission Standard (Supersedes: EN 50081-1)

Immunity

- EN 61000-6-1 Generic Immunity and Susceptibility. Supersedes: EN 50082-1
- EN 55024 Immunity Characteristics. Supersedes:
  - — EN 61000-4-2 ESD
  - — EN 61000-4-3 Radiated, radio frequency, electromagnetic field
  - — EN 61000-4-4 Electrical fast transient
  - — EN 61000-4-5 Surge
  - — EN 61000-4-6 Conducted disturbances induced by radio-frequency fields
  - — EN 61000-4-8 Power frequency magnetic field
  - — EN 61000-4-11 Voltage dips and sags

TELCO NEBS/ETSI

Designed to meet the following specifications (formal testing under way):

- Telcordia GR-63-CORE NEBS Requirements: Physical Protection
- Telcordia GR-1089-CORE EMC and Electrical Safety
- Telcordia SR-3580 Level 3
- ETSI ETS 300-019 Physical Protection
  - - Part 1-1, Class 1.1, Partly Temperature Controlled Storage Locations
  - - Part 1-2, Class 2.3, Public Transportation
  - - Part 1-3, Class 3.1, Temperature Controlled Locations (Operational)
- ETSI ETS 300-386 EMI/EMC

Power and Grounding

- ETS 300 132-1 Equipment Requirements for AC Power Equipment Derived from DC Sources
- ETS 300 132-2 Equipment Requirements for DC Powered Equipment
- ETS 300 253 Facility Requirements

Physical Design and Mounting

19-inch rack mount supporting racks compliant with:	• ANSI/EIA-310-D • ETS 300 119 • GR-63-CORE Seismic Zone 4
Tabletop	

Environmental Regulatory Compliance

- EU 2002/95/EC RoHS (with lead exemption)
- EU 2002/96/EC WEEE

ORDERING INFORMATION

Part Number	Description
NI-XMR-4-AC	4-slot NetIron XMR 4000 AC system
NI-XMR-8-AC	8-slot NetIron XMR 8000 AC system
NI-XMR-16-AC	16-slot NetIron XMR 16000 AC system
NI-XMR-32-AC	32-slot NetIron XMR 32000 AC system
NI-XMR-4-DC	4-slot NetIron XMR 4000 DC system
NI-XMR-8-DC	8-slot NetIron XMR 8000 DC system
NI-XMR-16-DC	16-slot NetIron XMR 16000 DC system
NI-XMR-32-DC	32-slot NetIron XMR 32000 DC system
NI-XMR-MR	NetIron XMR Series system management module, 2 GB SDRAM, dual PCMCIA slots, EIA/TIA-232 and 10/100/1000 Ethernet ports for out-of-band management
NI-XMR-32-MR	NetIron XMR 32000 system management module, 2 GB SDRAM, dual PCMCIA slots, EIA/TIA-232 and 10/100/1000 Ethernet ports for out-of-band management
NI-X-SF1	NetIron XMR 4-slot system switch fabric module
NI-X-SF3	NetIron XMR 8-/16-slot system switch fabric module
NI-X-32-SF	NetIron XMR 32-slot system switch fabric module
BR-MLX-10Gx4-X	NetIron XMR/Brocade MLXe 4-port 10 GbE (X) module with IPv4/IPv6/ MPLS hardware support—requires XFP optics. Supports 1M IPv4 routes in FIB.
NI-XMR-10Gx4	NetIron XMR Series 4-port 10-GbE module with IPv4/IPv6/MPLS hardware support — requires XFP optics
NI-XMR-10Gx2	NetIron XMR Series 2-port 10-GbE module with IPv4/IPv6/MPLS hardware support — requires XFP optics
BR-MLX-1GFx24-X	NetIron XMR/Brocade MLXe 24-port 1 GBE (X) SFP module with IPv4/ IPv6/MPLS hardware support. Supports 1M IPv4 routes in FIB.
BR-MLX-1GCx24-X	NetIron XMR/Brocade MLXe 24-port 1 GBE (X) RJ-45 copper module with IPv4/IPv6/MPLS hardware support. Supports 1M IPv4 routes in FIB.
NI-XMR-1Gx20-SFP	NetIron XMR Series 20-port FE/GE (100/1000) module with IPv4/IPv6/MPLS hardware support — requires SFP optics
NI-XMR-1Gx20-GC	NetIron XMR Series 20-port 10/100/1000 copper module with IPv4/IPv6/MPLS hardware support
NI-X-OC192x2	2-port Packet over SONET (SDH) OC-192 (STM-64) interface module
NI-X-OC192x1	1-port Packet over SONET (SDH) OC-192 (STM-64) interface module
NI-X-OC48x8	8-port Packet over SONET (SDH) OC-12/48 (STM-4/16) interface module
NI-X-OC48x4	4-port Packet over SONET (SDH) OC-12/48 (STM-4/16) interface module
NI-X-OC48x2	2-port Packet over SONET (SDH) OC-12/48 (STM-4/16) interface module

Corporate Headquarters
San Jose, CA USA
T: +1-408-333-8000
info@brocade.com

European Headquarters
Geneva, Switzerland
T: +41-22-799-56-40
emea-info@brocade.com

Asia Pacific Headquarters
Singapore
T: +65-6538-4700
apac-info@brocade.com

BROCADE