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NetIron CER 2000 Series

PRODUCT OVERVIEW

Carrier Class Routing

The NetIron CER 2000 features best-in-class interior and exterior gateway protocols that are commonly deployed in provider networks. The routers support standard IPv4 and IPv6 routing protocols—including Routing Information Protocol (RIP/RIPng), Open Shortest Path First (OSPF/OSPFv3), Intermediate System-to-Intermediate System (IS-IS/IS-IS for IPv6), and Border Gateway Protocol (BGP/BGP-MP for IPv6)—with the same performance and reliability typically associated with larger chassis systems. To complement these routing features, the NetIron CER 2000 can store the full Internet routing table in hardware and achieve wire-speed forwarding performance. As a result, it is ideally suited for service provider edge routing applications as well as for enterprise border routing applications.

Carrier Class Reliability

The NetIron CER 2000 supports graceful restart helper mode for both OSPF and BGP. In addition, it supports Bidirectional Forwarding Detection (BFD) for OSPF, IS-IS, and BGP, streamlining the detection of network failures and enabling sub-second convergence. The NetIron CER 2000 supports up to eight Equal-Cost Multi-Paths (ECMPs), which can help increase redundancy. Moreover, redundant, load-sharing power supplies help ensure complete carrier-class uptime.

Video Delivery

Providing up to 136 Gbps of capacity, the NetIron CER 2000 is ideally suited for the high-bandwidth, low-latency requirements of video traffic. Today, service providers deliver triple-play and IPTV services using both Layer 2 and Layer 3 models. The NetIron CER 2000 gives them the flexibility of choosing between traditional IP multicast and Virtual Private LAN Services (VPLS) to deliver high-quality video. The NetIron CER 2000 provides comprehensive support for multicast routing and switching through a variety of protocols—including PIM-SM, PIM-DM, PIM-SSM, IGMP v2/v3—and through other platform-independent capabilities.

Product Highlights

- Compact 1U IP/MPLS router purpose-built for high-performance Ethernet edge routing applications
- Scalable routing and MPLS for advanced business and residential triple-play services
- Scalable compact edge router designed to support a full Internet routing table
- Available in 24-port and 48-port 1 GbE versions with two optional 10 GbE uplink ports
- Up to 136 Gbps of non-blocking wire-speed performance
- Powered by the field-proven Multi-Service IronWare OS that also runs on Brocade's XMR and MLX Series routers
- Complete suite of IPv4/IPv6 unicast and multicast routing with fast convergence times
- Advanced QoS features to enforce strict SLAs at the edge of the network
- NEBS Level 3 certification

Comprehensive IPv4/IPv6 routing support based on the Multi-Service IronWare OS

- 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
- 8-path Equal-Cost Multi-Path(ECMP)
- Up to 1.5 million IPv4 unicast routes in FIB
- Up to 256,000 IPv6 unicast routes in FIB

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Rich multicast support

- IPv4 multicast protocols, including PIM-DM, PIM-SM, and PIM-SSM
- IPv6 multicast support, including PIM-SM/SSM and MLD
- IGMP v2/v3 routing and snooping support
- IGMP static group support
- Multicast boundaries to facilitate admission control
- Up to 6000 multicast groups in hardware
- Multicast traffic distribution over Link Aggregation Groups (LAGs)
- Efficient egress interface-based replication to maximize performance and conserve buffers

Advanced MPLS features

- Comprehensive MPLS signaling and path calculation algorithms for both traffic-engineered and non-traffic-engineered applications: OSPF-TE, IS-IS-TE, RSVP-TE, and CSPF
- MPLS Fast ReRoute (FRR) and hot standby paths for traffic protection
- Label Distribution Protocol (LDP)
- Advanced MPLS services: IP over MPLS, VLL, VPLS, Layer 3 VPN, routing over VPLS

Advanced carrier-grade Ethernet services

- Up to 128,000 MAC addresses
- 4000 VLANs/S-VLANs/B-VLANs
- Ability to reuse VLAN-ID on each port using the Ethernet Service Instance (ESI) framework
- MPLS Layer 2 VPN services
- IEEE 802.1ad Provider Bridges
- IEEE 802.1ah Provider Backbone Bridges
- IEEE 802.1ag Connectivity Fault Management
- Comprehensive set of Layer 2 control protocols: MRP/MRP-II, VSRP, RSTP, and MSTP
- MEF 9, MEF 14, and MEF 21 certification
- E-LINE (EPL and EVPL), E-LAN, and E-TREE support
- Protocol tunneling of Bridge Protocol Data Units (BPDUs)

Support for link aggregation using either IEEE 802.3ad LACP or static trunks

- Up to 12 ports per LAG
- Support for single-link Link Aggregation Control Protocol (LACP)

Advanced QoS

- Inbound and outbound two-rate three-color traffic policers with accounting
- Eight queues per port, each with a distinct priority level
- Multiple queue servicing disciplines: Strict Priority, Weighted Fair Queuing, and hybrid
- Advanced remarking capabilities based on port, VLAN, PCP, DSCP, or IPv4 flow
- Egress port and priority-based shaping

Comprehensive hardware-based security and policies

- Hardware-based Layer 3 and Layer 2 ACLs (both inbound and outbound) with logging
- Ability to bind multiple ACLs to the same port
- Hardware-based Policy-Based Routing (PBR)

Deep egress buffering for transient bursts in traffic

- 64 to 192 MB of buffering, based on configuration

Additional security capabilities

- Port-based network access control using 802.1x or MAC port security
- Root guard and BPDU guard
- Broadcast, multicast, and unknown unicast rate limits
- ARP inspection for static entries

Advanced monitoring capabilities

- Port- and ACL-based mirroring that enables traffic mirroring based on incoming port, VLAN-ID, or IPv4/TCP/UDP flow
- Hardware-based sFlow sampling that allows extensive Layer 2-7 traffic monitoring for IPv4 and Carrier Ethernet services
- ACL-based sFlow support

Interface capabilities

- Jumbo frame support up to 9216 bytes
- Optical monitoring of SFP and XFP optics for fast detection of fiber faults
- UDLD and LFS/RFN support

Intuitive, comprehensive status indication via LEDs

- Per-port UP/DOWN/ACTIVITY indicators
- FAN tray status
- Power supply status

Redundancy

- Redundant, hot-swappable AC/DC power supplies at the rear
- Removable fan tray with fan redundancy

Software-Defined Networking

- Support for OpenFlow v1.0

NetIron CER 2000 Series Software Options

BASE:

- Advanced Layer 2 and 3 functions:
- IPv4 routing: RIP, OSPF, IS-IS, and BGP
- IPv6 routing: RIPng, OSPFv3, IS-IS for IPv6, and BGP-MP for IPv6
- Virtual routing in non-MPLS environments via Multi-VRF
- All classic Layer 2 capabilities
- QoS and ACLs
- Management via SNMP/CLI
- Bundled with base hardware
- Connectivity Fault Management (IEEE 802.1ag) and Service OAM

ADV_SVCS_PREM (Advanced Services Premium): All functions in BASE plus:

- Multi-Protocol Label Switching (MPLS)
- MPLS-based Layer 2 (VLL and VPLS) and Layer 3 (BGP VPNs) VPNs
- Provider Bridges (IEEE 802.1ad) and Provider Backbone Bridges (IEEE 802.1ah)
- Ethernet Service Instance (ESI) framework

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NetIron CER 2000 Series Overview

Feature	NetIronCER 2024C	NetIron CER 2024F	NetIron CER 2048C	NetIron CER 2048F	NetIron CER 2048CX	NetIron CER 2048FX
Port density	24 10/100/1000 RJ45 ports with optional slot for 2×10 GbE XFP uplinks	24 100/1000 Hybrid Fiber SFP ports with optional slot for 2×10 GbE XFP uplinks	48 10/100/1000 RJ45 ports	48 100/1000 SFP ports	48 10/100/1000 RJ45 ports with 2×10 GbE XFP uplinks	48 100/1000 Hybrid Fiber SFP ports with 2×10 GbE XFP uplinks
10 G uplinks	Yes (optional slot for 2×10 GbE XFP uplinks)	Yes (optional slot for 2×10 GbE XFP uplinks)	No	No	Yes (built in)	Yes (built in)
Combination ports	Yes (4 100/1000 SFP ports)	Yes (4 10/100/1000 RJ45 ports)	Yes (4 100/1000 SFP ports)	No	No	No
Forwarding performance	48 Gbps 88 Gbps (with 2×10 GbE module installed)	48 Gbps 88 Gbps (with 2×10 GbE module installed)	96 Gbps	96 Gbps	136 Gbps	136 Gbps
Packet forwarding performance	36 Mpps 65 Mpps (with 2×10 GbE module installed)	36 Mpps 65 Mpps (with 2×10 GbE module installed)	71 Mpps	71 Mpps	101 Mpps	101 Mpps
Buffering	64 MB 128 MB (with 2×10 GbE uplinks)	64 MB 128 MB (with 2×10 GbE uplinks)	128 MB	128 MB	192 MB	192 MB
Power supply options	Internal AC or DC	Internal AC or DC	Internal AC or DC	Internal AC or DC	Internal AC or DC	Internal AC or DC
Power supply redundancy	1+1	1+1	1+1	1+1	1+1	1+1
Fan redundancy	M+N	M+N	M+N	M+N	M+N	M+N
Airflow	Front to back	Front to back	Front to back	Front to back	Front to back	Front to back

NetIron CER 2000 Series Power Specifications

Configuration	Maximum AC Power Consumption (Watts) (100 to 240V AC)	Maximum DC Power Consumption (Watts)	Maximum Thermal Output (BTU/hour)
NetIron CER 2024C	135	135	461
NetIron CER 2024C with 2×10 G uplink	205	205	700
NetIron CER 2024F	180	180	548
NetIron CER 2024F with 2×10 G uplink	230	230	785
NetIron CER 2048C	240	240	819
NetIron CER 2048CX	305	305	1041
NetIron CER 2048F	280	280	956
NetIron CER 2048FX	350	350	1195

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Environmental

Temperature	Operating: 0°C to 40°C (32°F to 104°F) Non-operating: –25°C to 70°C (–13°F to 158°F)
Humidity	Relative: 5% to 90% at 40°C (104°F), non-condensing Non-operating: 95% maximum relative humidity, non-condensing
Altitude	Operating: 10,000 ft (3048 m) Non-operating: 15,000 ft (4500 m) maximum

Environmental regulatory compliance

- EU 2002/95/EC RoHS
- EU 2002/96/EC WEEE

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 and Flicker
- EN 61000-6-3 Emission Standard (Supersedes: EN 50081-1)

Immunity

- EN 61000-6-1 Generic Immunity and Susceptibility; this supersedes EN 50082-1
- EN 55024 Immunity Characteristics. This 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

- 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

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 Products—Part 2: Safety of Optical Fibre Communication Systems

IEEE compliance

- IEEE 802.3 10Base-T
- IEEE 802.3u 100Base-TX, 100Base-FX, 100Base-LX
- IEEE 802.3z 1000Base-SX/LX
- IEEE 802.3ab 1000Base-T
- 802.3 CSMA/CD AcCERs Method and Physical Layer Specifications
- 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
- 802.1x Port-based Network Access Control
- 802.1ad Provider Bridges
- 802.1ah Provider Backbone Bridges
- 802.1ag Connectivity Fault Management (CFM)
- 802.1ab Link Layer Discovery Protocol
- 802.1ah Provider Backbone Bridging

MEF specifications

- MEF 2 Requirements and Framework for Ethernet Service Protection
- MEF 4 Metro Ethernet Network Architecture Framework Part 1: Generic Framework
- MEF 6.1 Metro Ethernet Services Definitions Phase 2
- MEF 9 Abstract Test Suite for Ethernet ServiCER at the UNI
- MEF 10.1 Ethernet Services Attributes Phase 2
- MEF 11 User Network Interface (UNI) Requirements and Framework
- MEF 12 Metro Ethernet Network Architecture Framework Part 2:
- Ethernet Services Layer
- MEF 13 User Network Interface (UNI) Type 1 Implementation Agreement
- MEF 14 Abstract Test Suite for Traffic Management Phase 1
- MEF 15 Requirements for Management of Metro Ethernet Phase 1

Network Elements
- MEF 17 Service OAM Framework and Requirements (partial)
- MEF 19 Abstract Test Suite for UNI Type 1
- MEF 21 Abstract Test Suite for UNI Type 2 Part 1 Link OAM

For more information, please contact your Vector Data account manager.