

NetIron CES 2000 Series

PRODUCT OVERVIEW

Multi-Service Compact Ethernet Switch Series

The NetIron CES 2000 Series is a family of compact 1U, multiservice edge/aggregation switches that combine powerful capabilities with high performance and availability. These NEBS and ETSI certified switches provide a broad set of advanced Layer 2, IPv4, and MPLS capabilities in the same device. As a result, they support a diverse set of applications in metro edge, service provider, mobile backhaul, data center, and large enterprise networks. Based on the feature-rich Brocade Multi-Service IronWare software, these 10 GbE-capable 1U switches offer deep buffers and are ideal for Carrier Ethernet service delivery at the network edge and for data center top-of-rack server access. By enabling rapid deployment of leading-edge services, the NetIron CES 2000 Series helps organizations increase their profitability.

Carrier Class Reliability

To provide higher reliability in Carrier Ethernet services, the NetIron CES 2000 Series supports Metro Ring Protocol (MRP/MRP-II), the ring resiliency protocol of choice on many metro networks worldwide. Standard Layer 2 protocols such as MSTP, RSTP, and STP are also supported. The Brocade MRP/MRP-II implementation enables the delivery of Carrier Ethernet services over ring-based topologies, including overlapping rings that help optimize the use of fiber in metro rings and provide recovery from node/link failures in milliseconds. Brocade MRP/MRP-II can also be used within PB/PBB networks.

Multicast Support

Multicast transport is a key enabler of next-generation services such as IPTV as well as the use of video, financial, and other one-to-many applications. To meet this challenge, the NetIron CES 2000 Series provides comprehensive support for multicast switching and routing through a variety of protocols, including PIM-SM, PIM-DM, PIM-SSM, IGMP v2/v3, and other platform-independent capabilities. Egress interface-based replication optimizes switch performance and buffer usage within the system to help maximize network performance for multicast traffic.



Product Highlights

- Compact 1U IP/MPLS/VRF-enabled switch that is purpose-built for advanced Carrier Ethernet and large data center applications
- Wire-speed, non-blocking performance in all configurations
- Available in 24-port and 48-port configurations in both Hybrid Fiber (HF) and RJ45 versions to suit versatile access/aggregation media
- Powered by the field-proven Brocade Multi-Service IronWare OS that also runs on NetIron XMR/MLX Series routers
- Advanced, scalable Carrier Ethernet services, including E-LINE, E-LAN, and E-TREE
- Comprehensive IPv4 and IPv6 routing
- Virtual Routing in non-MPLS environments via Multi-VRF
- MEF 9, MEF 14, and MEF 21 certified, with comprehensive OAM capabilities

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
- Brocade Ethernet Service Instance (ESI) framework
- MPLS services: IP over MPLS, Virtual Leased Line (VLL), and Virtual Private LAN Service (VPLS)
- IEEE 802.1ad Provider Bridges
- IEEE 802.1ah Provider Backbone Bridges
- IEEE 802.1ag Connectivity Fault Management
- Comprehensive set of Layer 2 control protocols:
- Brocade 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 customer BPDUs
- ITU Y.1731 OAM functions and mechanisms for
- Ethernet-based networks

Comprehensive IPv4/IPv6 unicast routing support based on the Brocade 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 to support Virtual Routing applications over non-MPLS backbones
- Support for VRRP and VRRP-E
- 8-path Equal Cost Multipath (ECMP)
- Up to 32,000 IPv4 unicast routes in FIB
- Up to 8000 IPv6 unicast routes in FIB
- Connecting IPv6 islands over IPv4 MPLS using IPv6 Provider Edge routers (6PE)

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

- Up to 12 links per trunk
- Support for single-link trunks

Deep egress buffering for transient bursts in traffic

- 64 to 192 MB of buffering, based on configuration

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

Rich multicast support

- Supported IPv4 multicast protocols, including PIM-DM, PIM-SM, and PIM-SSM
- IGMP v2/v3 routing and snooping support
- IGMP static groups support
- Multicast boundaries to facilitate admission control
- PIM and MLD snooping for IPv6
- Up to 4000 multicast groups in hardware
- Multicast traffic distribution over LAGs
- Efficient egress interface-based replication to maximize performance and conserve buffers

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 receive ACLs
- Hardware-based Policy-Based Routing (PBR)

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

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 (SDN)

- Support for OpenFlow v1.0

NetIron CES 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 GbE 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 CES 2000 Series Physical Specifications

	Dimensions
NetIron CES 2024C	17.4 in. W × 1.7 in. H × 17.6 in. D (44.3 cm × 4.4 cm × 44.8 cm)
NetIron CES 2024C with 2×10 GbE uplink installed	17.4 in. W × 1.7 in. H × 17.6 in. D (44.3 cm × 4.4 cm × 44.8 cm)
NetIron CES 2024F	17.4 in. W × 1.7 in. H × 17.6 in. D (44.3 cm × 4.4 cm × 44.8 cm)
NetIron CES 2024F with 2×10 GbE uplink installed	17.4 in. W × 1.7 in. H × 17.6 in. D (44.3 cm × 4.4 cm × 44.8 cm)
NetIron CES 2048C	17.4 in. W × 1.7 in. H × 17.6 in. D (44.3 cm × 4.4 cm × 44.8 cm)
NetIron CES 2048CX	17.4 in. W × 1.7 in. H × 17.6 in. D (44.3 cm × 4.4 cm × 44.8 cm)
NetIron CES 2048F	17.4 in. W × 1.7 in. H × 17.6 in. D (44.3 cm × 4.4 cm × 44.8 cm)
NetIron CES 2048FX	17.4 in. W × 1.7 in. H × 17.6 in. D (44.3 cm × 4.4 cm × 44.8 cm)

NetIron CES 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 CES 2024C	120	120	410
NetIron CES 2024C with 2×10 GbE uplink installed	170	170	580
NetIron CES 2024F	145	145	495
NetIron CES 2024F with 2×10 GbE uplink installed	195	195	666
NetIron CES 2048C	205	205	700
NetIron CES 2048CX	255	255	870
NetIron CES 2048F	245	245	836
NetIron CES 2048FX	295	295	1007

Software Options

Premium License	Content
BASE	<p>Fundamental Layer 2 and 3 functions:</p> <ul style="list-style-type: none">• All Classic Layer 2 capabilities• Base Layer 3 (RIP and static routes)• QoS and ACLs• Management via SNMP/CLI• Bundled with base hardware• Connectivity Fault Management (IEEE 802.1ag) and Service OAM
ME_PREM (Metro Edge Premium License)	<p>All functions in BASE plus:</p> <ul style="list-style-type: none">• Provider Bridges (IEEE 802.1ad)• Provider Backbone Bridges (IEEE 802.1ah)• In-band management for PB/PBB network• IPv4 routing: OSPF and ISIS• IPv6 routing: RIPng, OSPFv3, and IS-IS for IPv6• Ethernet Service Instance (ESI) framework• Multi-VRF• MPLS (IPoverMPLS, VPLS, VLL)• 802.3ah Link OAM
L3_PREM (Layer 3 Premium License)	<p>All functions in BASE plus:</p> <ul style="list-style-type: none">• IPv4 routing: OSPF, ISIS, and BGP• IPv6 routing: RIPng, OSPFv3, IS-IS for IPv6, and BGP-MP for IPv6• Multi-VRF

Note: To optimize deployment, software functionality is available in different licensed packages

Network Management

- Brocade Network Advisor Web-based Graphical User Interface (GUI)
- Integrated industry-standard Command Line Interface (CLI)
- sFlow (RFC 3176)
- Telnet
- SNMP v1, v2c, v3
- SNMP MIB II
- RMON
- NETCONF

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% at 40°C (104°F), non-condensing
Operating Altitude	10,000 ft (3048 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 (4500 m) maximum

Physical Mounting & Design

Rack mount	19-inch rack mount supporting racks compliant with: <ul style="list-style-type: none"> • ANSI/EIA-310-D • ETS 300 119 • GR-63-CORE Seismic Zone 4
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Power & Grounding

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

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

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

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

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