# BROCADE BIGIRON RX SERIES

## HIGH-PERFORMANCE ETHERNET SWITCHING

# Modular Layer 2/3 Ethernet Switches

### HIGHLIGHTS

- System redundancy (switch, management and power) across all BigIron RX chassis
- Interchangeable half-height line modules reduce sparing costs and provide cost-effective modular growth
- Compact chassis design supports very high-density single rack configurations—up to 192 wire-speed 10-Gigabit Ethernet and 2,304 wire-speed Gigabit Ethernet in standard 7-foot Telco rack
- Scalable hardware-based IP routing to 512,000 IPv4 routes per line module
- Powerful suite of unicast and multicast IPv4 and IPv6 protocol support
- Advanced virtual output queue (VoQ) design eliminates head of line blocking and provides scalable QoS
- End to End QoS supported with hardware based honoring and marking and congestion management
- High-capacity 80 Gbps cross-module link aggregation supports high-bandwidth inter-switch trunking
- High-availability design features redundant and hot-pluggable hardware, hitless Layer 2 software upgrades and graceful BGP and OSPF restart
- Advanced non-blocking Clos fabric features adaptive self-routing with graceful system degradation in the event of two or more module failures
- Embedded sFlow per port supports scalable hardware-based traffic monitoring across all switch ports without impacting performance

The role of data networks in our daily lives continues to expand and grow. Emerging needs such as application convergence, non-stop operation, scalability and IPv6-readiness place new demands on the network. Modern network solutions must be assessed across a wider set of attributes than earlier generation equipment. In particular, the network must be evaluated on merits that include performance, reliability, scalability, quality of service, security and total cost of ownership (TCO).

The Brocade® BigIron® RX Series of Layer 2/3 Ethernet switches excels in all of these areas, enabling network designers to deploy an Ethernet infrastructure that addresses today's requirements with a scalable architecture designed to support network growth and evolution. The BigIron RX Series incorporates the latest advances in switch architecture, system resilience, quality of service and switch security in a family of modular chassis setting leading industry benchmarks for price-performance, scalability and TCO.

Available in four chassis models, the BigIron RX Series allows network designers to standardize on a single product family for aggregation and backbone switching. In addition to its enterprise role, the BigIron RX Series, with its high-density and compact design, is an ideal IP solution for high-performance computing environments and Internet Exchanges and Internet Service Providers (IXPs and ISPs) where non-blocking, high-density Ethernet switches are needed.

All four BigIron RX systems are designed for non-stop operation, supporting 1:1 management module redundancy, N+1 switch module redundancy, M+N power module redundancy and N+1 fan redundancy. Additionally, the BigIron RX Series supports hitless Layer 2 software upgrades and graceful restart routing for fast convergence in the event of a management module failure.

At the heart of the BigIron RX architecture is an adaptive self-routing Clos switch fabric with a virtual output queue (VOQ) design. This non-blocking architecture is optimized for maximum throughput and low latency for

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all size packets. Scalable to over two billion packets per second, the BigIron RX Series is the most powerful Ethernet switch family in the industry. This advanced and scalable design ensures the reliable deliver of all IP-based voice, video and data applications.

The BigIron RX switches ship with field-proven IronWare networking software and IronShield security, embedded sFlow per port, advanced Ethernet switching, IPv4/IPv6 routing and multilayer security services. The BigIron RX Series enables a user to deploy a reliable, secure and scalable networking solution today that is ready to accommodate tomorrow's applications and technologies.

## PURPOSE-BUILT FEATURE SET FOR DEMANDING NETWORKS

### Industry-Leading Performance and Scalability

The BigIron RX Series is the industry's most powerful switch family, delivering up to 3.2 terabits per second data throughput per system.

### High-Availability Design

Redundant and resilient design ensures high availability operation for demanding environments:

- Redundant, hot-swappable components provide non-stop service delivery:
  - **Management Module:** Systems configured with dual management modules with sub-second detection and fail-over
  - **Switch Fabric Element Redundancy:** Systems configured with a redundant switch fabric module support millisecond fail-over performance
  - **Hitless Management Failover (HMF):** Stateful failover ensures that the forwarding engines on the line modules are not impacted by a management failover. This capability enables non-stop packet forwarding in the event of a management module failover.
  - **Redundant Power Supplies:** All three chassis support M+N power module redundancy for AC and DC power configurations
- **Distributed Forwarding Architecture:** Advanced network processors, high-performance CPU and high-speed memory on each interface module provide for a scalable high-performance architecture
- **IEEE 802.3ad Link Aggregation up to Eight Links:** Scalable, cross-module trunking provides for resilient high-capacity connections between switches
- Resilient Layer 2 and Layer 3 protocols provide fast service restoration in event of link or equipment failures:
  - Metro Ring Protocol optimized for ring topologies, IEEE 802.1s and 802.1w for general Layer 2 topologies, VSRP for redundant switch configurations and VRRP/VRRP-E for redundant router configurations, ECMP for routed backbones

### Robust Layer 3 Feature Set

Brocade IronWare™ software suite includes scalable EGP and IGP routing protocols:

- **BGPv4:** Scalable to 4 million routes, 500 peers and 14,000 attributes with MR2 management module
- **OSPF:** Scalable to over 400,000 routes
- **IS-IS:** Support for Level 1 and Level 2, includes 25,000 routes and 512 adjacencies
- **Brocade Direct Routing (BDR):** The forwarding information base (FIB) is downloaded to the hardware-based forwarding engine on each line module. This memory can be pre-populated with as many as 512,000 IPv4 and 64,000 IPv6 routes for wire-speed routing performance.
- **Policy-Based Routing (PBR):** Support customizable routing policies using access control lists (ACLs). This feature can be used to balance network usage by controlling the network paths for different traffic flows.
- **Comprehensive Multicast Feature Set:** Provides hardware-based support for a number of multicast protocols including MSDP, PIM-SM (Sparse Mode) and PIM-DM (Dense Mode), allowing network managers to efficiently deploy next-generation multicast applications
- **VRRP and VRRPE (Enhanced VRRP):** Enables the BigIron RX to operate as a backup router to other network routers. In the event of a router failure, the BigIron RX will automatically and seamlessly perform the tasks of the failed router.

### Industry-Leading Layer 2 Features

To provide self-healing topologies in Layer 2 configurations, the BigIron RX supports industry standard Ethernet protocols including Spanning Tree Protocol (STP), Rapid Spanning Tree (RSTP), per VLAN STP (PVST) and per VLAN group STP (PVGST). The BigIron RX also supports Brocade Metro Ring Protocol (MRP) for sub-second service restoration in ring topologies. Additionally, the BigIron RX supports multi-instance spanning tree, VLAN topology grouping and VLAN tunneling for advanced Layer 2 service configurations.

## SYSTEM SUMMARY

| Feature | BigIron RX-4 | BigIron RX-8 | BigIron RX-16 | BigIron RX-32 |
|---|---|---|---|---|
| I/O Module Slots | 4 | 8 | 16 | 32 |
| Switching capacity per system | | | | |
| Available data capacity | 400 Gbps | 800 Gbps | 1.60 Tbps | 3.2 Tbps |
| Total switch capacity | 960 Gbps | 1.92 Tbps | 3.84 Tbps | 5.12 Tbps |
| Packet forwarding capacity per system | 286 Mpps | 571 Mpps | 1,142 Mpps | 2.284 Mpps |
| Max 10-GbE ports per system | 16 | 32 | 64 | 128 |
| Max 1-GbE ports per system | 192 | 384 | 768 | 1,536 |
| Height (inches/rack units) | 7"/4RU | 12.25"/7RU | 24.5"/14RU | 57.75"/33RU |
| Airflow | Side-to-Side | Side-to-Side | Front-to-Back | Front-to-Back |
| Power supply redundancy | M+N | M+N | M+N | M+N |

*(M = Number of supplies needed for fully loaded system and N = 1 to M supply redundancy)*

- **Metro Ring Protocol (MRP):** An alternative to Spanning Tree Protocol, MRP provides sub-second fault detection and failover for Ethernet ring topologies. MRP works in conjunction with VSRP and 802.3ad based link aggregation to provide bandwidth scalability and SONET-like resilience.
- **Virtual Switch Redundancy Protocol (VSRP):** Supports sub-second fault detection and fail-over for mesh topologies in which redundant switches provide back-up operation for one another
- **Single-instance STP:** Provides a single instance of STP to run on all port-based VLANs within a single device, interoperable with others that are 802.1d compliant
- **Rapid Spanning Tree Protocol Based on IEEE 802.1w:** Dramatically improves the spanning tree convergence time to sub-second by automatically renegotiating port roles in case of a link failure without relying on timers
- **Per VLAN Spanning Tree (PVST):** Allows for control of STP on an individual VLAN basis for traffic engineering VLAN traffic (i.e., load distribution)
- **Topology Groups:** Dramatically improves Layer 2 control protocol scalability by allowing a few instances of STP, RSTP, MRP, or VSRP to control large groups of VLANs
- **Super Aggregated VLANs (SAVs):** Allows transparent tunneling of multiple VLANs through a single backbone VLAN
- **PIM and IGMP Snooping:** Offers efficient handling of multicast traffic in Layer 2 topologies by identifying ports that request a multicast stream and forwarding the stream only on these ports. This dramatically improves the performance of multicast applications, allowing for many more streams to be transiting the network.

### Advanced Quality of Service

- **Advanced QoS:** Allows administrators to enforce QoS policies based on port, VLAN, source MAC, ACL rules, 802.1p priority, Type of Service (ToS), DiffServ settings or Rate Limiting status
- **Very Low Latency Across all Packet Sizes:** Consistent low latency for strict priority applications such as voice over IP, high performance computing and video over IP
- **Configurable Combinations of Queuing Disciplines and Congestion Control Policies:** Combinations of Strict Priority (SP) and Weighted Fair Queuing (WFQ) provide flexibility for network administrators. In the event of egress port congestion, traffic policies can be configured for tail drop or weighted random early detection (WRED) operation.
- **Advanced Bandwidth Management:** Allows intelligent bandwidth management using hardware based enforcement of Committed Information Rate (CIR) with Excess Burst control capabilities and seamless integration with other advanced QoS features including priority marking and honoring.

### Cohesive, Unified and Easy-to-Use Network Management

- **Centralized Network Management:** Brocade IronView Network Manager is a Web-based, graphical interface tool that empowers network operators to seamlessly control software and configuration updates
- **Command Line Interface (CLI):** Industry-standard configuration interface, consistent and common throughout Brocade products
- **Web interface:** Provides easy-to-use Graphical User Interface (GUI) for system configuration from standard Web browsers
- **sFlow (RFC 3176):** Provides scalable, wire-speed network monitoring and accounting with no impact on network performance

### Brocade IronShield Security

- **Wire-speed Extended Layer 2, Layer 3 and 4 Access Control Lists (ACL):** Control packet forwarding and restricts access to the system management interface, while providing wire-speed switching and routing:
  - **Extensible ACL Implementation for Layer 3 and 4 Information:** Identifies traffic based on source or destination IP address, IP protocol type, TCP or UDP port, IP precedence or ToS values
  - **Flexible ACL Implementation for Layer 2 Information:** Identifies traffic based on source or destination MAC address, Ethernet type, VLAN-ID values and 802.1p values
  - **ACL Scalability:** Support for up to 8,000 ACLs
  - **Ease of Administration:** Identify an ACL by name or number, or add a comment line for ease of administration
  - **Secure Shell and Secure Copy:** Provides secure access to the administration and management interface over the network
- **Protection Against Denial of Service (DoS) Attacks:** Prevents or minimizes network downtime from malicious users by limiting TCP SYN and ICMP traffic and protects against broadcast storms
- **User Authentication:** Authentication with AAA, 802.1x, RADIUS, TACACS, and TACACS+ prevents unauthorized network access
- **MAC Port Security:** Controls the MAC addresses allowed per port
- **sFlow (RFC 3176):** Provides cost-effective, scalable, wire-speed network monitoring to detect unusual network activity
- **SNMPv3:** Secured SNMP management with authentication and privacy services
- **BGP-Guard:** Complements MD5 security for BGP sessions to protect against session disruption by restricting the number of hops the BGP session can traverse

## APPLICATIONS

### Brocade Enterprise Infrastructure Solutions

Today's Enterprise network is critical to the ongoing operations of the organization. Network administrators are concerned about zero downtime on the network, securing the network from DoS attacks, cyber-spying, and malicious users, and maintaining data integrity and confidentiality, without adding excessive cost or impacting performance. All this in a structure that allows for graceful growth as the Enterprise grows.

The BigIron RX Series incorporates exceptional resiliency, security and scalability in an architecture designed to scale from the edge to the core to minimize TCO. The resilient design includes redundant management modules, switch fabrics, fans and power supplies. This hardware resiliency is enhanced with software resiliency including hitless system failover, graceful restart, MRP, VSRP, and VRRP for Layer 2 and Layer 3 resiliency. High priority voice and data traffic fly through the chassis utilizing the high performance hardware-based QoS features of the RX Series. Wire-speed security is maintained by locking out unauthorized users with port security, by filtering DoS and unauthorized traffic with ACLs, and by monitoring traffic flows with sFlow. The BigIron RX Series allows you to grow from just 24 ports of 10/100/ 1000 at the edge up to 1,536 ports of 10/100/ 1000 or 128 ports of 10-Gigabit Ethernet in the core. The BigIron RX Series provides one common architecture that meets the demands of today's, and tomorrow's Enterprise network needs with high performance, resiliency, security and scalability with low TCO.

### Brocade for Enterprise and Application Hosting Solutions

Data centers are the core of business operations requiring high density, high performance, high security and low latency switching to ensure connectivity to mission critical applications. The increasing value of the data center to business operations necessitates that data and network integrity, confidentiality and security must be maintained without impacting performance.

The BigIron RX Series addresses these needs by acting as the gateway and switch fabric of the data center. The density of the RX Series allows for growth from the smallest to the largest data center. Port aggregation allows for high performance interconnects up to 80 Gbps increasing the availability of the server farm.

Brocade hardware based IronShield security features protect the server farm against Denial of Service (DoS) attacks and provide security for maintaining network integrity. The sFlow functionality supplies the network access information required to track who has accessed which server on the network as a means to provide network usage audit trails. Utilizing Brocade wire-speed switching and filtering to screen and direct traffic to the appropriate server and block undesired traffic with minimal latency ensure the optimal operation, security and integrity of the network and data center.

**Figure 1.**
Enterprise infrastructure solutions.

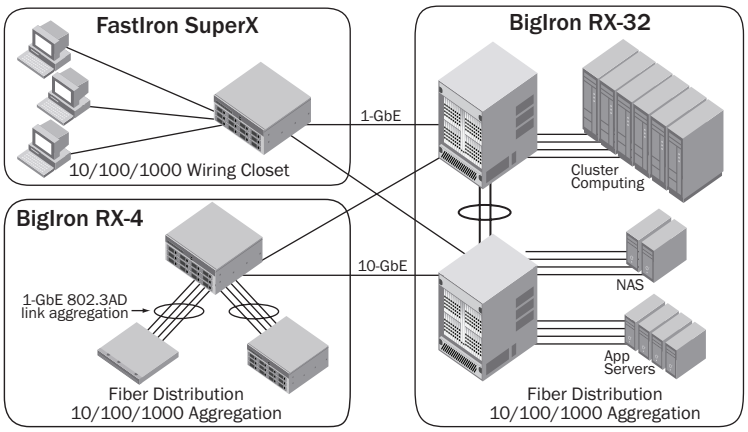
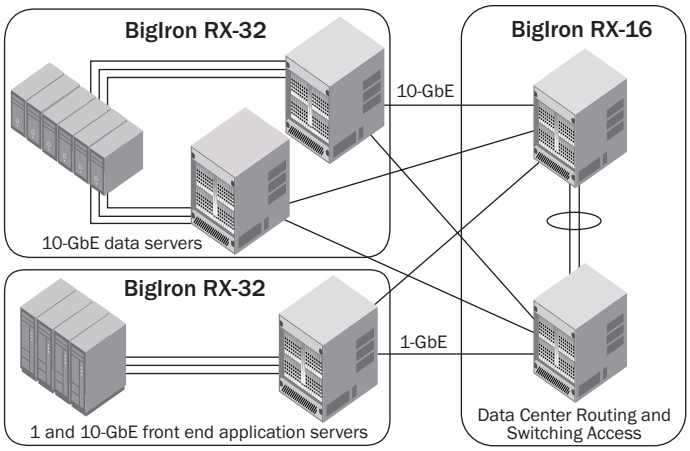



**Figure 2.**
Enterprise and application hosting solutions.



### Brocade for Internet Exchange Solutions

Internet Exchanges (IX) demand high-performance Layer 2 topologies with high density Gigabit and 10-Gigabit Ethernet ports. These cross-roads of the Internet connect high-performance routers from many Service Providers in peering relationships without requiring a full mesh of router ports.

The BigIron RX Series excels in this environment. Offering high density 1-Gigabit and 10-Gigabit Ethernet together with the resiliency features of the chassis make the BigIron RX Series an extremely cost effective and robust solution.

### Brocade for High-Performance Computing Solutions

High-performance computing has entered the mainstream marketplace with Ethernet switching as the technology of choice. Ultra-low latency and high-density Ethernet switching are required for successful deployment.

The BigIron RX Series chassis are ideal for this environment. They offer low latency through the switch with unparalleled densities of 10/100/1000 Ethernet, fiber Gigabit Ethernet and 10-Gigabit Ethernet in compact size chassis—up to 1,536 ports of Gigabit Ethernet or 128 ports of 10-Gigabit Ethernet in a single chassis. The high-performance architecture offers up to 3.2 Tbps of data switching capacity to meet the needs of the most demanding HPC environment. The combination of performance, density and reliability makes the BigIron RX Series an excellent choice for Enterprise HPC environments.

**Figure 3.**
Internet exchange solutions.

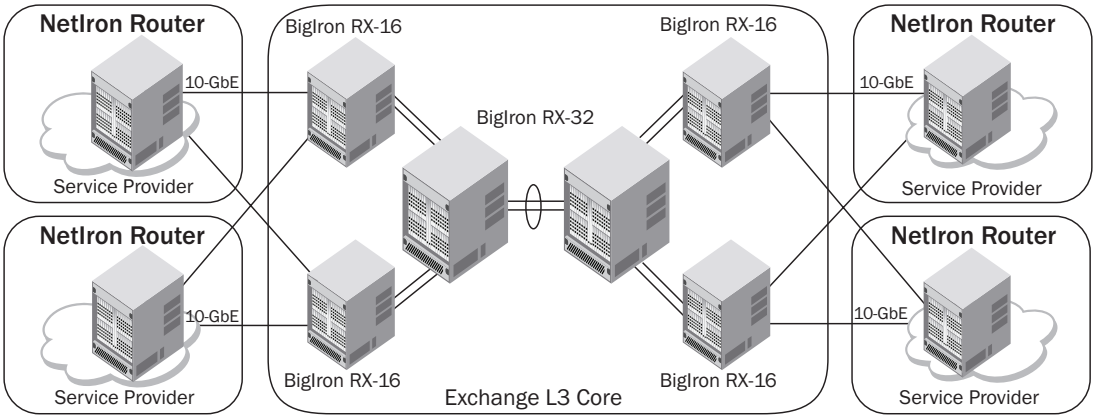
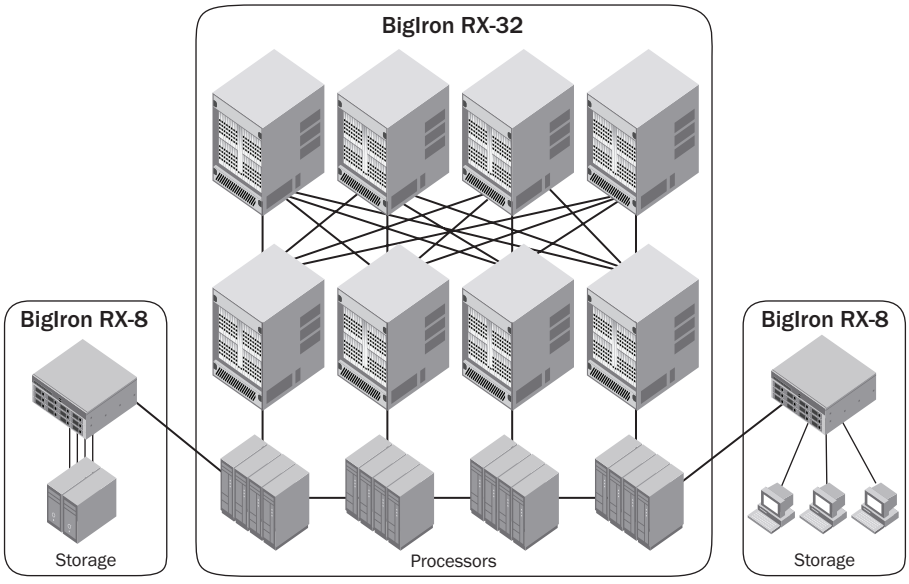



**Figure 4.**
High-performance computing solutions.



# BROCADE BIGIRON RX SERIES SPECIFICATIONS

## IEEE Compliance

- 802.3ae 10-Gigabit Ethernet
- 802.3x Flow Control
- 802.3ad Link Aggregation
- 802.1Q VLAN Tagging
- 802.1D Bridging
- 802.1w Rapid STP
- 802.1s Multiple Spanning Tree Protocol
- 802.1X User authentication
- 802.3 Ethernet Like MIB

## RFC Compliance

| | |
|---|---|
| BGPv4 | • RFC 4271 BGPv4<br>• RFC 1745 OSPF interactions<br>• RFC 1997 Communities & Attributes<br>• RFC 2439 route flap dampening<br>• RFC 2796 route reflection<br>• RFC 3065 BGP4 confederations<br>• RFC 3392 Capability Advertisement<br>• RFC 2918 Route Refresh Capability<br>• RFC 1269 Managed Objects for BGP<br>• RFC 1657 Managed Objects for BGP-4 using SMIv2<br>• RFC 3682 Generalized TTL Security Mechanism for eBGP Session Protection<br>• RFC 2385 BGP Session Protection via TCP MD5<br>• draft-ietf-idr-restart Graceful Restart for BGP<br>• draft-ieft-idr-route-filter |
| OSPF | • RFC 2178 OSPF<br>• RFC 1583 OSPF v2<br>• RFC 3101 OSPF NSSA<br>• RFC 1745 OSPF Interactions<br>• RFC 1765 OSPF Database Overflow<br>• RFC 1850 OSPF v2 MIB and Traps<br>• RFC 2154 OSPF w/Digital Signatures (Password, MD-5)<br>• RFC 2328 OSPF v2<br>• RFC 2370 OSPF Opaque LSA Option<br>• RFC 3623 Graceful OSPF Restart |
| IS-IS | • RFC 1195 Routing in TCP/IP and Dual Environments<br>• RFC 2763 Dynamic Host Name Exchange<br>• RFC 2966 Domain-wide Prefix Distribution<br>• RFC 3567 IS-IS Cryptographic Authentication (MDS) |
| RIP | • RFC 1058 RIP v1<br>• RFC 1723 RIP v2<br>• RFC 1812 RIP Requirements |
| IP Multicast | • RFC 1122 Host Extensions<br>• RFC 1256 ICMP Router Discovery Protocol<br>• RFC 1112 IGMP<br>• RFC 2236 IGMP v2<br>• RFC 2362 PIM-SM<br>• RFC 3973 PIM-DM<br>• PIM-DM v1<br>• DVMRP v3-07<br>• RFC 1075 DVMRP v2<br>• RFC 2336 IGMP v2<br>• RFC 3618 MSDP<br>• RFC 2283 MBGP<br>• RFC 2858 BGP-MP<br>• RFC 3376 IGMP v3<br>• RFC 3446 Anycast RP<br>• RFC 4541 Considerations for IGMP and MLD Snooping |
| General Protocols | – RFC 791 IP<br>– RFC 792 ICMP<br>– RFC 793 TCP<br>– RFC 783 TFTP<br>– RFC 826 ARP<br>– RFC 768 UDP<br>– RFC 894 IP over Ethernet<br>– RFC 903 RARP<br>• RFC 906 TFTP Bootstrap<br>• RFC 1027 Proxy ARP<br>• RFC 950 Subnets<br>• RFC 951 BootP<br>• RFC 1122 Host Requirements<br>• RFC 1256 IRDP<br>• RFC 1519 CIDR<br>• RFC 1542 BootP Extensions<br>• RFC 1812 General Routing<br>• RFC 1541 and 1542 DHCP<br>• RFC 2131 BootP/DHCP Helper<br>• RFC 3768 VRRP<br>• RFC 854 TELNET<br>• RFC 1591 DNS (client)<br>• RFC 2784 GRE<br>• RFC 1191 Path MTU Discovery<br>• RFC 896 Congestion Control<br>• RFC 3635 Pause Control<br>• RFC 1858 IP Fragment Filtering<br>• RFC 1340 Assigned Numbers |
| Others | • RFC 2578 SMIv2<br>• RFC 2579 Textual Conventions for SMIv2<br>• RFC 2665 Ethernet Interface MIB<br>• RFC 1354 IP Forwarding MIB<br>• RFC 1757 RMON Groups Partial 1, full for 2, 3, 9<br>• RFC 2068 HTTP<br>• RFC 2030 SNTP<br>• RFC 2138 RADIUS<br>• RFC 3176 sFlow<br>• Draft-ietf-tcpm-tcpsecure-00 |
| IPv6 Core | • RFC 2373 IPv6 Addressing architecture<br>• RFC 1886 DNS Extensions to support IPv6<br>• RFC 1887 IPV6 Unicast address allocation architecture<br>• RFC 2374 IPv6 aggregatable global Unicast address format<br>• RFC 2450 Proposed TLA and NLA Assignment Rules<br>• RFC 2471 IPv6 testing address allocation<br>• RFC 2526 Reserved IPv6 subnet anycast address<br>• RFC 2928 Initial IPv6 sub TLA ID assignments<br>• RFC 2460 IPv6 Specification<br>• RFC 2461 IPv6 Neighbor Discovery<br>• RFC 2462 IPv6 Stateless Address Auto-configuration<br>• RFC 4443 ICMPv6<br>• RFC 3513 IPv6 Addressing Architecture<br>• RFC 1981 IPv6 Path MTU Discovery<br>• RFC 3587 IPv6 Global Unicast Address Format<br>• RFC 2375 IPv6 Multicast Address Assignments<br>• RFC 2464 Transmission of IPv6 over Ethernet Networks<br>• RFC 2711 IPv6 Router Alert Option<br>• RFC 3363 DNS support |

| | |
|---|---|
| IPv6 Routing | • RFC 2080 RIPng for IPv6<br>• RFC 2740 OSPFv3 for IPv6<br>• IETF Draft_ietf_isis_IPv6 IS-IS for IPv6<br>• RFC 2545 Use of MP-BGP-4 for IPv6 |
| IPv6 Multicast | • RFC 2362 PIM-SM<br>• RFC 2710 Multicast Listener Discovery (MLD) for IPv6<br>• RFC 3306 Unicast-Prefix-based IPv6 Multicast Addresses<br>• RFC 3810 MLDv2<br>• RFC 4602 PIM-SM (Partial Address)<br>• draft-holbrook-idmr-igmpv3-ssm—IGMPv3 & MDLV2 for SSM<br>• draft-ietf-ssm-arch SSM for IP |
| IPv6 Transitioning | • RFC 2893 Transition Mechanisms for IPv6 Hosts and Routers<br>• RFC 3056 Connection of IPv6 Domains via IPv4 Clouds |

## Network Management

- IronView Network Manager (INM) Web-based graphical user interface
- Integrated Standard-based Command Line Interface (CLI)
- RFC 3176 sFlow
- RFC 854 Telnet
- RFC 2068 HTTP
- RFC 2578 and 3410 SNMPv2 and v3
- RFC 1757 RMON Group partial 1, full 2, 3, and 9
- HP OpenView for Sun Solaris, HP-UX, IBM's AIX, Linux and Windows NT
- SNMP MIB II

## Element Security Options

- AAA
- RADIUS
- Secure Shell (SSH v2)
- Secure Copy (SCP)
- TACACS/TACACS+
- Username/Password (Challenge and Response)
- Bi-level Access Mode (Standard and EXEC Level)
- Protection for 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 (3,000 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.60950-00/UL 60950—Third Edition, 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
- EN 60950 Safety of Information Technology Equipment

## Electromagnetic Emission Certification

- CSA 950 Electromagnetic Emission Certification
- FCC Class A
- EN 55022/CISPR-22 Class A/ VCCI Class A
- ICES-003 Electromagnetic Emission

## Immunity

- EN 61000-3-2 Power Line Harmonics
- EN 61000-4-2 ESD
- EN 61000-4-3 Radiated Immunity
- EN 61000-4-4 EFT
- EN 61000-4-5 Surge
- EN 61000-4-6 Low Frequency Common Immunity
- EN 61000-4-11 Voltage Dips and Sags Generic: EN50082-1
- ESD: IEC 61000-4-2; 4 kV CD, 8 kV AD
- Radiated: IEC 61000-4-3;3 V/m
- EFT/Burst: IEC 61000-4-4;1.0 kV (power line), 0.5 kV (signal line)
- Conducted: IEC 61000-4-6; 3 V

## Environmental Regulatory Compliance

- EU 2002/95/EC RoHS (with lead exemption)
- EU 2002/91/EC WEEE

## Warranty

- 1-year hardware
- 90-day software

## Mounting Options

- 19 Universal EIA 310 (Telco) Rack or Tabletop

## BROCADE BIGIRON RX SERIES SYSTEM SPECIFICATIONS

| System Max | @ 100 VAC | | | @ 200 VAC | | | @ -48 VDC | | |
|---|---|---|---|---|---|---|---|---|---|
| | Current Amps | Power Watts | Thermal Output BTU/Hr | Current Amps | Power Watts | Thermal Output BTU/Hr | Current Amps | Power Watts | Thermal Output BTU/Hr |
| BigIron RX-32 | N/A | N/A | N/A | 57 | 11,353 | 38,746 | 237 | 11,353 | 38,746 |
| BigIron RX-16 | 49 | 4,905 | 16,741 | 24 | 4,905 | 16,741 | 102 | 4,905 | 16,741 |
| BigIron RX-8 | 24 | 2,417 | 8,249 | 12 | 2,417 | 8,249 | 50 | 2,417 | 8,249 |
| BigIron RX-4 | 12 | 1,217 | 4,155 | 6 | 1,217 | 4,155 | 25 | 1,217 | 4,155 |

## BROCADE BIGIRON RX SERIES PHYSICAL SPECIFICATIONS

| | Dimensions | | Weight | |
|---|---|---|---|---|
| BigIron RX-32 | 17.45w x 57.71h x 24.1d | 44.32w x 146.58h x 61.21d cm | approx 478 lbs | approx 217 kg |
| BigIron RX-16 | 17.45w x 24.47h x 25.5d | 44.32w x 62.15h x 64.77d cm | 236 lbs | 107 kg |
| BigIron RX-8 | 17.45w x 12.21h x 22.5d | 44.32w x 31.01h x 57.15d cm | 131 lbs | 60 kg |
| BigIron RX-4 | 17.45w x 6.96h x 22.5d | 44.32w x 17.68h x 57.15d cm | 78 lbs | 35 kg |

## ORDERING INFORMATION

| Part Number | Description |
|---|---|
| BI-RX-32-AC | BigIron RX-32 AC system |
| BI-RX-16-AC | BigIron RX-16 AC system |
| BI-RX-8-AC | BigIron RX-8 AC system |
| BI-RX-4-AC | BigIron RX-4 AC system |
| BI-RX-32-DC | BigIron RX-32 DC system |
| BI-RX-16-DC | BigIron RX-16 DC system |
| BI-RX-8-DC | BigIron RX-8 DC system |
| BI-RX-4-DC | BigIron RX-4 DC system |
| RX-BI2XG | 2-port 10-Gigabit Ethernet XFP module for BigIron RX Series |
| RX-BI4XG | 4-port 10-Gigabit Ethernet XFP module for BigIron RX Series |
| RX-BI24C | 24-port 10/100/1000 Ethernet RJ-45 module for BigIron RX Series |
| RX-BI24F | 24-port Gigabit Ethernet SFP module for BigIron RX Series |
| RX-BI24HF | 24-port 100/1000 Ethernet SFP module for BigIron RX Series |
| RX-BI48T | 48-port 10/100/1000 Ethernet MRJ-21 module for BigIron RX Series |
| RX-BI-32-MR | Management module for BigIron RX-32 chassis, 512MB memory |
| RX-BI-32-MR2 | Management module for BigIron RX-32 chassis, 2GB memory |
| RX-BI-MR | Management Module for BigIron RX Series chassis, 512MB memory |
| RX-BI-MR2 | Management Module for BigIron RX Series, 2GB memory |
| RX-BI-SFM1 | Switch Fabric Element for BigIron RX-4 |
| RX-BI-SFM3 | Switch Fabric Element for BigIron RX-8 and RX-16 |
| RX-BI-32-SFM | Switch Fabric Element for BigIron RX-32 |
| RX-32-ACPWR | BigIron RX-32 AC power supply |
| RX-32-DCPWR | BigIron RX-32 DC power supply |
| RX-ACPWR-B-SYS | 90 – 264 VAC power supply for BigIron RX-4 chassis |
| RX-ACPWR-F-SYS | 90 – 264 VAC power supply for BigIron RX-8 and RX-16 chassis |
| RX-DCPWR-B-SYS | -48 VDC power supply for BigIron RX-4 chassis |
| RX-DCPWR-F-SYS | -48 VDC power supply for BigIron RX-8 and RX-16 chassis |
| 10G-XFP-SR | 850nm serial pluggable XFP optic only (LC) over MMF |
| 10G-XFP-LR | 1310nm serial pluggable XFP optic only (LC) for up to 10km over SMF |
| 10G-XFP-ER | 1550nm serial pluggable XFP optic only (LC) for up to 40km over SMF |
| 10G-XFP-ZR | 1550nm serial pluggable XFP optic only (LC) for up to 80km over SMF |

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