The Brocade One™ strategy helps simplify networking infrastructures through innovative technologies and solutions. The Brocade FastIron SX Series supports this strategy by enabling non-stop network access to today’s mission-critical applications with the best price/performance while ensuring scalability for tomorrow’s needs.

www.brocade.com

*Multi-Chassis Trunking (MCT) available for purchase the first half of 2012.*
scalable and resilient Power over Ethernet (PoE) design, with a robust feature set to secure and simplify the deployment of an edge-to-core converged network. In addition, the Fastiron SX Series supports high-density 10 Gigabit Ethernet (GbE) capabilities for enterprise backbone deployments.

FUTURE-PROOFING THE NETWORK WITH IPv6
Migration to IPv6 is inevitable, but by starting with the deployment of IPv6-capable hardware, organizations can make the transition more controlled and less disruptive to the network. Japan and Europe are aggressively deploying IPv6, and deployment in North America is on the rise. In fact, some government agencies are mandating the purchase of IPv6-capable switches and routers. Therefore, it is important that enterprises and service providers plan to deploy IPv6-capable devices to capitalize on this inevitable change.

Combined with the Brocade FCX Series, the Brocade ICX 6610 Switch, and the Brocade MLX® Router solutions, the IPv6-capable Fastiron SX Series provides the industry’s most complete end-to-end IPv6 solution. Organizations can deploy the switches knowing they are IPv6-capable whether deploying IPv6 today or in the future.


CONFIGURATION ALTERNATIVES
The Fastiron SX Series is optimized for flexibility with upgradeability for PoE/PoE+, 10 GbE, and redundant management, switch fabrics, and power. Available in two chassis models, the scalable Fastiron SX Series helps enterprises and service providers reduce costs and gain the operational benefits of a common operating system, a shared interface, and common power supply modules.

The Fastiron SX Series includes the following switch models:

- **Fastiron SX 800 switches**
  - Eight interface slots
  - Up to 64 10 GbE SFP+ ports
  - Up to 192 FE/GbE SFP ports
  - Up to 192 Class 3 PoE or PoE+ (802.3at-compliant) ports
  - N+1 system power redundancy
  - N+1 PoE power redundancy
  - Management redundancy
  - Switch fabric redundancy
  - Brocade Assurance Limited Lifetime Warranty

- **Fastiron SX 1600 switches**
  - Sixteen interface slots
  - Up to 128 10 GbE ports
  - Up to 384 FE/GbE SFP ports
  - Up to 384 Class 3 PoE or PoE+ (802.3at-compliant) ports
  - Up to N+3 system power redundancy
  - Up to N+3 PoE power redundancy
  - Management redundancy
  - Switch fabric redundancy
  - Brocade Assurance Limited Lifetime Warranty

PRIMARY FEATURES AND BENEFITS
The Fastiron SX Series provides a wide range of business advantages, as described in the following sections.

Resilient Design to Guarantee Business Continuity
The Fastiron SX Series is built for mission-critical environments and features Multi-Chassis Trunking (MCT), which enables two Fastiron SX chassis to appear as a single logical switch at Layer 2 in active/active mode and delivers uninterrupted traffic flow in the event of node failover. Fastiron SX 800 and Fastiron SX 1600 switches also feature redundant management modules, fans, load-sharing switch fabrics, and power supply modules for maximum system availability and non-stop networking.

Switch fabric failover preserves network connectivity in the event of a switch module failure. Hitless failover provides automatic management failover from the active management module to the standby module without interrupting traffic forwarding in the event of a management module failure. Hitless In-Service Software Upgrade (ISSU) enables network administrators to perform software upgrades with no interruption of service.

In the event of a topology change due to a port or facility failure, Layer 1 and Layer 2 protocols—such as Protected Link, Metro Ring Protocol (MRP), IEEE 802.3ad, UDLD, VSRP, and Rapid Spanning Tree Protocol (RSTP)—will restore service in sub-second time (tens to hundreds of milliseconds, depending on the protocol), protecting users from costly service disruption. Enhanced spanning tree features such as Root Guard and BPDU Guard prevent rogue hijacking of spanning tree root and maintain a contention- and loop-free environment, especially during dynamic network deployments.

These high-availability capabilities enable deployment of a highly reliable network infrastructure that is resilient to, and tolerant of, network and equipment failures.

Advanced QoS and Low Latency for Enterprise Convergence
The Fastiron SX Series offers superior QoS features that enable organizations to prioritize high-priority and delay-sensitive services throughout the network. The switches can classify, re-classify, police, mark, and re-mark an Ethernet frame or an IP packet prior to delivery. This flexibility lets...
Multi-Chassis Trunking (MCT) available for purchase the first half of 2012.

Once classified, the traffic is queued and scheduled for delivery. Three configurable queuing options provide flexible control over how the system services the queues. Weighted Round Robin (WRR) queuing applies user-configured weighting for servicing multiple queues, ensuring that even low-priority queues are not starved for bandwidth. With Strict Priority (SP) queuing, queues are serviced in priority order to ensure that the highest-priority traffic is serviced ahead of lower-priority queues. Combined SP and WRR queuing ensures that packets in the SP queue are serviced ahead of the WRR queues. Combined queuing is often used in VoIP networks where the VoIP traffic is assigned to the SP queue and data traffic is assigned to the WRR queues.

In addition, the switch management modules are available with integrated 1 GbE or 10 GbE ports. These modules provide cost-effective system configurations supporting high-capacity connections to upstream switches. The management modules utilize high-performance system processors with high-capacity memory for scalable networking up to a routing capacity of one million BGP routes and 20 BGP peers.

The FastIron SX Series utilizes an advanced cell-based switch fabric with internal flow control, ensuring very low latency and jitter performance for converged applications.

High-Quality and Reliable Network Convergence

The FastIron SX Series provides a scalable, secure, low-latency, and fault-tolerant infrastructure for cost-effective integration of Unified Communications (UC), video, wireless access, Virtual Desktop Infrastructure (VDI), and high-performance data onto a common network. The system architecture features a scalable and resilient PoE design and a low-latency, cell-based switch fabric with intelligent traffic management to help ensure reliable and high-quality VDI and UC services.

A rich suite of security features—including policy-based access control, IP source guard, dynamic ARP inspection, and DHCP snooping—work in unison to control network access and shield the network from internal and external threats. The FastIron SX Series establishes a new class of convergence-ready solutions, enabling organizations to implement a secure, reliable, scalable, and high-quality infrastructure for total network convergence.

Flexible Bandwidth Management

The FastIron SX Series supports a rich set of bandwidth management features, allowing granular control of bandwidth utilization. On ingress, extended ACLs can be used in combination with traffic policies to control bandwidth by user, by application, and by Virtual LAN (VLAN). On egress, outbound rate limiting can control bandwidth per port and per priority queue. These features allow fine-grained control of bandwidth utilization based on a wide range of application and user criteria.

A Complete Solution for Multicast and Broadcast Video

The use of video applications in the workplace requires support for scalable multicast services from the edge to the core. IGMP and PIM snooping improves bandwidth utilization in Layer 2 networks by restricting multicast flows to only those switch ports that have multicast receivers. In Layer 3 networks, support for IGMP (v1, v2, and v3), IGMP Proxy, PIM-SM, PIM-SSM, and PIM-DM multicast routing optimizes traffic routing and network utilization for multicast applications.

The Advanced Full Layer 2/Layer 3 Wire-Speed IP Routing Solution

The advanced Brocade IronWare operating system supports a full complement of unicast and multicast routing protocols, enabling users to build fully featured Layer 2/Layer 3 networks. Supported routing protocols include RIPv2, OSPF, PIM-SM/DM, BGP, and Equal Cost Multi-Path (ECMP) for improved network performance. M2, M3, and M4 management modules can support routing table capacity of up to one million BGP routes and 20 BGP peers. The FastIron SX Series can be upgraded with Advanced IronWare routing software (a Layer 3 upgrade).

To achieve wire-speed Layer 3 performance, the FastIron SX Series supports Brocade Direct Routing (BDR), in which the Forwarding Information Base (FIB) is maintained in local memory on the line modules. The hardware forwarding tables are dynamically populated by system management with as many as 256,000 routes.

Comprehensive Security Suite

The FastIron SX Series supports a powerful set of network management solutions to help protect the switch. Multilevel-access security on the console and a secure Web management interface prevent unauthorized users from accessing or changing the switch configuration. Using Terminal Access Controller Access Control Systems (TACACS/TACACS+) and RADIUS authentication, organizations can enable considerable centralized control and restrict unauthorized users from altering network configurations.

The FastIron SX Series includes Secure Shell (SSHv2), Secure Copy, and SNMPv3 to restrict and encrypt communications to the management interface and system, thereby ensuring highly secure network management access. For an added level of protection, network managers can use ACLs to control which ports and interfaces have Telnet, Web, and/or SNMP access.

Controlling network access is a top priority for network operators. FastIron SX switches support a flexible suite of access control capabilities in the Brocade IronShield product, including multi-host IEEE 802.1x and MAC authentication schemes. Upon successful user or device authentication, the switches will apply the appropriate access policy for the user. The access policy may define the assigned VLAN, QoS, and ACL to be applied to the user’s traffic.

Organizations can also specify an action in case the MAC or 802.1x authentication times out. Because of its standards-based design, this solution can be augmented with access control software and external appliances for enhanced access control operation. For example, an external NAC appliance and/or software can be used in combination with the FastIron SX Series, providing host posture verification and remediation. This design allows organizations the flexibility to build best-of-breed solutions for their access control infrastructure and not be locked into a single offering.
Once the user is permitted access to the network, protecting the user’s identity and controlling where the user connects become a priority. To prevent “user identity theft” (spoofing), the FastIron SX Series supports DHCP snooping, Dynamic ARP inspection, and IP source guard. These features work together to deny spoofing attempts and to defeat man-in-the-middle attacks. To control where users connect, the switches support private VLANs, quarantine VLANs, policy-based routing, and extended ACLs, all of which can be used to control a user’s access to the network.

In addition, the FastIron SX Series features embedded hardware-based sFlow packet sampling, which provides system-wide traffic monitoring for accounting, troubleshooting, and intrusion detection. Using Brocade Network Advisor to process sFlow data from the switches, Brocade IronShield 360 provides closed-loop threat detection and response. sFlow packet samples are scanned for known threat signatures. Upon a positive match, Brocade Network Advisor can automatically send a control command to the switches to throttle or disable the port on which the threat has been detected. This advanced security capability provides a network-wide security umbrella without the added complexity and cost of ancillary sensors.

**Future-Proofing the Network through IPv6-Capable Hardware**

Networks are in the early stages of large-scale IPv6 production deployment. However, few IPv6-innovative applications are currently available. Although the success of IPv6 will ultimately depend on the new applications that run over IPv6, a key part of the IPv6 design is the ability to integrate into and coexist with existing IPv4 switches within the network and across networks during the steady migration from IPv4 to IPv6.

The FastIron SX Series’ IPv6-capable management and interface modules, commencing with software release Brocade FSX 04.0.01, support an easy migration path by interworking between IPv4 and IPv6 switches within the existing network or across networks. Organizations can choose which sites are upgraded with IPv6-capable modules, preparing the network for future IPv6 applications.

**Resilient Power Distribution and Consumption in Support of Green Initiatives**

The FastIron SX Series features a unique power distribution design for the system and PoE power. The chassis are designed with independent systems and PoE power subsystems. This design achieves optimal power operation and configuration, reducing the amount of equipment and ongoing costs compared to modular systems that use a common power supply for both the systems and the PoE equipment. In the FastIron SX Series, the power consumption of a line module’s PoE circuitry does not impact the system power. Similarly, the power consumption of the line modules, switch modules, and management modules does not impact the PoE power.

**Benefits of the IPv6-capable modules include:**

- The IPv6-capable FastIron SX 800 and FastIron SX 1600 management modules have a console port and a 10/100/1000 Mbps port for out-of-band management. The management modules optionally support 2-port 10 GbE ports.
- The IPv6-capable FastIron SX 800 and FastIron SX 1600 management modules are interchangeable between devices with systems using second- or third-generation modules.
- Redundant management modules on the IPv6-capable FastIron SX 800 and FastIron SX 1600 provide full redundancy.
- The crossbar (xbar) architecture enables the management module to switch 30 Gbps between each interface module and within the management module.
- The IPv6-capable interface modules and power supplies are interchangeable among FastIron SX Series switches.
- The IPv6-capable FastIron SX 800 and FastIron SX 1600 management, switch fabric, and interface modules are hot-swappable, which means a module can be removed and replaced while the chassis is powered on and running.

Power consumption for the system and PoE are calculated, provisioned, and managed independently of one another. As more PoE devices are added to a switch, a simple power budget calculation determines whether another PoE power supply needs to be added to the switch. The system power distribution and the PoE power distribution subsystems are each designed for M+N load-sharing operation. This dual-distribution power design simplifies the power configuration of the system while enhancing system reliability.

The chassis can be configured for a wide range of power environments, including 110 V/220 VAC power, ~48 VDC power, and mixed AC/DC power configurations. To scale PoE configurations, PoE power supplies are available in two ratings—1250 W and 2500 W. When configured with four 2500 W PoE supplies, the FastIron SX 1600 supports up to 384 10/100/1000 Mbps Class 3 PoE or 802.3at PoE+ ports and still maintains N+1 power redundancy. This resiliency is unmatched in the industry.

**Intelligent and Scalable Power over Ethernet (PoE/PoE+)**

PoE is a key enabler of applications such as VoIP, IEEE 802.11 WLANs, and IP video. The FastIron SX Series is a third-generation PoE-capable switch family and incorporates the latest advances in PoE/PoE+ provisioning and system design to provide scalable and intelligent PoE capabilities. The PoE power distribution subsystem is independent of the system power, eliminating system disruption in the event of PoE oversubscription or a PoE power failure.

Organizations have the choice of purchasing PoE/PoE+ ready line modules or upgrading 10/100/1000 Mbps line modules when needed with field-installable PoE daughter modules. PoE power per port can be manually or dynamically configured. Dynamic configuration is supported using standards-based auto-discovery or legacy Layer 2 discovery protocols. Port priorities are also configurable and are used to prioritize PoE power in over-subscribed configurations.

*Multi-Chassis Trunking (MCT) available for purchase the first half of 2012.*
Ease of Use: Plug and Play
The FastIron SX Series supports the IEEE 802.1AB LLDP and ANSI TIA 1057 LLDP-MED standards, enabling organizations to build open convergence, advanced multivendor networks. LLDP greatly simplifies and enhances network management, asset management, and network troubleshooting. For example, it enables discovery of accurate physical network topologies, including those that have multiple VLANs where all subnets might not be known.

LLDP-MED addresses the unique needs that voice and video demand in a converged network by advertising media and IP telephony-specific messages that can be exchanged between the network and the endpoint devices. LLDP-MED provides exceptional interoperability, IP telephony troubleshooting, and automatic deployment of policies, inventory management, advanced PoE power negotiation, and E911 location/emergency call service. These sophisticated features make converged network services easier to install, manage, and upgrade, and they significantly reduce operations costs.

Software Key or EPROM License Activation
To simplify feature upgrades and deployments, a key-based license activation technology for FastIron SX Series switches is available to unlock optional features and software functionality, complementing the alternative EPROM-based licensing mechanism. This process eliminates the need to physically access the switch, greatly reducing the amount of time required to activate optional features. This capability enables organizations to use software keys to activate optional features on existing switches without removing the management module.

BROCADE NETWORK MANAGEMENT SUITE
Managing enterprise campus networks continues to become more complex, due to the growth in enterprise applications and services that rely on campus networks. Services such as Internet, e-mail, video conferencing, real-time collaboration, and distance learning all have specific configuration and management requirements. At the same time, organizations face increasing demand to provide uninterrupted services for high-quality voice, data, and multimedia applications.

To reduce complexity and time spent managing these environments, the easy-to-use Brocade Network Advisor discovers, manages, and deploys configurations to campus LAN switches and groups of IP devices. By using the Brocade Network Advisor Device Configuration Manager tool, organizations can configure VLANs within the network or execute CLI commands on specific IP devices or groups of IP devices. sFlow-based proactive monitoring is ideal for performing network-wide troubleshooting, generating traffic reports, and gaining visibility into network activity from the edge to the core. Moreover, Brocade Network Advisor centralizes management of the entire family of Brocade FastIron enterprise LAN switches.

BROCADE GLOBAL SERVICES
Brocade Global Services has the expertise to help organizations build scalable, efficient cloud infrastructures. Leveraging 15 years of expertise in storage, networking, and virtualization, Brocade Global Services delivers world-class professional services, technical support, network monitoring services, and education, enabling organizations to maximize their Brocade investments, accelerate new technology deployments, and optimize the performance of networking infrastructures.

ONE YEAR OF FREE TECHNICAL SUPPORT
To further improve service levels and operational efficiency, Brocade includes one year of free technical support on the FastIron SX 800 and FastIron SX 1600, providing direct access to the Brocade Technical Assistance Center and resources on a 24×7 basis. The one-year free support term begins when the chassis ships from the factory. While product registration is not required, it is recommended to help ensure timely product support, updates, and other benefits.

WARRANTY
The FastIron SX 800 and the FastIron SX 1600 are covered by the Brocade Assurance Limited Lifetime Warranty for as long as the original purchaser continues to own and use the product. The warranty covers the product hardware, including internal power supplies and internal fans. To streamline the product replacement process, qualified customers can directly access the MyBrocade™ portal to initiate advanced replacement on registered products.

CLOUD-OPTIMIZED NETWORK ACQUISITION
Brocade helps organizations easily address their information technology requirements by offering flexible network acquisition and support alternatives to meet their financial needs. Organizations can select from purchase, lease, and Brocade Network Subscription options to align network acquisition with their unique capital requirements and risk profiles.

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

*Multi-Chassis Trunking (MCT) available for purchase the first half of 2012.
KEY FEATURES AND BENEFITS

Advanced Security
- Multilevel access security for console access
- sFlow-powered automated closed-loop threat detection and mitigation solution
- Secure Web-based management interface prevents unauthorized users from accessing or changing the switch configuration
- Terminal Access Controller Access Control Systems (TACACS/TACACS+) and RADIUS operator authentication
- Secure Shell, Secure Copy, and SNMPv3 restrict and encrypt communications to the management interface and system
- IEEE 802.1x authentication, including multiple device authentication and dynamic policy configuration for authenticated clients—VLAN and ACL
- Private VLANs provide security and isolation between switch ports to help ensure that users cannot snoop on other users’ traffic
- Denial of Service protection—monitoring, throttling, and locking out of ICMP and TCP SYN traffic both to the management address of the switch and for transit traffic
- IP Source Guard, DHCP Snooping, and ARP Inspection to protect against snooping and man-in-the-middle attacks
- Byte-based and packet-based broadcast, multicast, and unknown unicast rate limiting
- ACL log reports provide source detail for denied packets
- ACL-based Port Mirroring enables IP monitoring for CALEA and related law enforcement traffic monitoring
- Enhanced MAC filtering to include Denial of Service protection
- MAC address authentication, including multiple device authentication and dynamic policy configuration
- Enhanced Port security for controlling access of authorized users

Advanced Quality of Service
- Classification, reclassification, policing, and marking the traffic prior to delivery
- Identification, classification, and reclassification based on specific criteria (ACL-based), including port, source/destination MAC address
- 802.1p priority bit, source/destination IP address, Type of Service (ToS), Differentiated Services Control Point (DSCP) fields, or the Transmission Control Protocol/User Datagram Protocol (TCP/UDP) port
- Flexible queue servicing utilizing configurable Weighted Round Robin (WRR), Strict Priority (SP), or combined SP/WRR
- Eight hardware queues for flexible QoS management
- Ingress rate limiting—standard and extended ACL control, per VLAN, per port
- Egress rate shaping per port

System and Network Resilience
- Redundant, hot-swappable management and fabric switch modules (FastIron SX 800 and FastIron SX 1600)
- Redundant, hot-swappable, load-sharing, and distributed power supplies for system and PoE power
- Hot-swappable line modules

*Multi-Chassis Trunking (MCT) available for purchase the first half of 2012.
• Advanced protocols for topology resilience:
  – The Brocade Metro Ring Protocol (MRP)
  – Virtual Switch Redundancy Protocol (VSRP)
  – Virtual Router Redundancy Protocol (VRRP)
• Enhanced VRRP (VRRPE)
• Rapid Spanning Tree Protocol (RSTP)
• Multiple Spanning Tree (802.1s)
• Per-VLAN Spanning Tree (PVST/PVST)
• BPDU Guard and Root Guard
• Port loop detection
• STP Protect
• IEEE 802.3ad and static link aggregation
• UDLD with link error dampening; support for single instance LACP
• Image checksum verification
• Next Boot Information
• Enhanced Digital Optical Monitoring

IPv6 Future-Proofing
The following features enable the switches to be managed as IPv6 hosts or endpoints today:
• IPv6 addresses on the interfaces
• IPv6 debugs
• IPv6 Access Control Lists (ACL) to management ports
• IPv6 Web management using HTTP/HTTPS
• IPv6 logging
• Name-to-IPv6 address resolution using IPv6 DNS server
• IPv6 Ping
• IPv6 Traceroute
• IPv6 Telnet/SSH
• SNMPv3 over IPv6
• IPv6 RADIUS
• IPv6 SNTP

Robust VoIP and Power over Ethernet
• Standards-based IEEE 802.3af PoE and 803.3at PoE+ with auto-detection and auto-configuration
• Choice of 1250 W (70 Class 3) or 2500 W (140 Class 3) per PoE power supplies
• Independent system and PoE power subsystems that allow the addition of PoE without affecting the system power
• High-availability power design—N+1 PoE power redundancy for the FastIron SX 800 chassis and N+3 PoE power redundancy for the 16-slot FastIron SX 1600 chassis
• Software-accessible system and per-port power consumption
• Advanced QoS and cell-based fabric to enable high-quality VoIP service
• Voice VLAN feature that automatically places IP phones in their own VLAN
• LLDP/LLDP-MED standards that greatly simplify and enhance network management, asset management, and network troubleshooting

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## BROCADE FASTIRON SX SERIES SPECIFICATIONS

### IEEE Standards Compliance

- 802.3 10Base-T
- 802.3u 100Base-TX
- 802.3u 100Base-FX
- 802.3u 100Base-LX
- 802.3z 100Base-SX/LX
- 802.3ab 1000Base-T
- 802.3ae 10-Gigabit Ethernet
- 802.3af Power over Ethernet
- 802.3at Power over Ethernet Plus
- 802.3x Flow Control
- 802.3ad Link Aggregation
- 802.1d Ethernet Bridging
- 802.1D MAC Bridges
- 802.1p/q VLAN Tagging
- 802.1w Rapid Spanning Tree
- 802.1s Multiple Spanning Tree
- 802.1Q Generic VLAN Registration Protocol (GVRP)
- 802.3 MAU MIB (RFC 2239)
- 802.3AB LLDP
- 802.1AE- MACsec (hardware-capable)
- 802.3az-2010 - EEE (hardware-capable)

### RFC Compliance

#### Protocol Support

- DNS Client
- RFC 1812 IP Requirements
- RFC 2338 VRPP
- VRRPE (Brocade VRRP Enhanced)
- PVST/PVST+/PVRST
- BGPv4
  - RFC 1269 BGP-3 MIB
  - RFC 1657 BGP-4 MIB
  - RFC 1745 OSPF Interactions
  - RFC 1771 BGP-4
  - RFC 1965 BGP-4 Confederations
  - RFC 1997 Communities Attribute
  - RFC 2385 TCP MD5
  - Authentication of BGP Session
  - RFC 2439 Route Flap Dampening
  - RFC 2796 Route Reflection
  - RFC 2842 BGP4 Capabilities Advertisement
  - RFC 2918 Route Refresh Capability
  - Draft-ietf-idr-restart-10 Graceful Restart Mechanism for BGP
- OSPF
  - RFC 1583 and 2328 OSPF v2
  - RFC 1587 OSPF NSSA Option
  - RFC 1745 OSPF Interactions
  - RFC 1765 OSPF Database Overflow
  - RFC 1850 OSPF Traps
  - RFC 1850 OSPF v2 MIB
  - RFC 2154 OSPF w/Digital Signatures (Password, MD-5)
  - RFC 2178 OSPF v2
  - RFC 2370 OSPF Opaque LSA Option
  - RFC 3623 Graceful OSPF Restart
- RIP
  - RFC 1058 RIP v1
  - RFC 1723 RIP v2
- IP Multicast
  - RFC 1112 IGMP
  - RFC 2236 IGMP v2
  - RFC 3376 IGMP v3
  - IGMP Proxy
  - DVMRP v3-07
  - RFC 1075 DVMRP
- IP Multicast (continued)
  - RFC 1122 Host Extensions
  - RFC 1256 ICMP Router Discovery Protocol
  - PIM-DM v1
  - RFC 2362 PIM-SM
  - PIM-SSM
- General Routing Protocols
  - RFC 768 UDP
  - RFC 783 TFTP
  - RFC 791 IP
  - RFC 792 ICMP
  - RFC 793 TCP
  - RFC 826 ARP
  - RFC 854 TELNET
  - RFC 894 IP over Ethernet
  - RFC 903 RARP
  - RFC 906 TFTP Bootstrap
  - RFC 1027 Proxy ARP
  - RFC 1519 CIDR
  - RFC 1541 and 2121 DHCP
  - RFC 1591 DNS (client)
  - RFC 1812 General Routing
  - RFC 2338 VRPP
  - RFC 1212 Concise MIB definitions
  - RFC 2579 Textual Conventions for SMv2
  - RFC 2580 Conformance Statements for SMv2
  - RFC 2453 RIP Version 2

#### Quality of Service

- MAC Address Mapping to Priority Queue
- ACL Mapping to Priority Queue
- ACL Mapping to ToS/DSCP
- DiffServ Support
- QoS Queue Management Using Weighted Round Robin (WRR), Strict Priority (SP), and a combination of WRR and SP

#### IPv6 Support

- RFC 1886 DNS Extensions to Support IPv6
- RFC 1887 IPv6 Unicast Address Allocation Architecture
- RFC 1981 IPv6 Path MTU Discovery
- RFC 2373 IPv6 Addressing Architecture
- RFC 2374 IPv6 Aggregatable Global Unicast Address Format
- RFC 2460 IPv6 Specification
- RFC 2461 IPv6 Neighbor Discovery
- RFC 2462 IPv6 Stateless Address Auto-configuration
- RFC 2464 Transmission of IPv6 over Ethernet Networks
- RFC 3513 IPv6 Addressing Architecture
- RFC 3587 IPv6 Global Unicast Address Format
- RFC 4443 ICMPv6
- RFC 2080 RIPv6 for IPv6
- RFC 2740 OSPFv3 for IPv6
- RFC 2893 Transition Mechanisms for IPv6 Hosts and Routers
- RFC 3056 Connection of IPv6 Domains via IPv4 Clouds

#### Management and Control

- RFC 1157 SNMPv1
- RFC 1191 Path MTU Discovery
- RFC 951 BootP
- RFC 1542 BootP Extensions
- RFC 1493 Bridge MIB
- RFC 1215 SNMP Generic Traps
- RFC 1354 IP Forwarding MIB
- RFC 1573 SNMP MIB II
- RFC 1757 RMON Groups 1,2,3,9
- RFC 1905, 1906 SNMPv2c
- RFC 2030 SNTP
- RFC 2068 HTTP

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*Multi-Chassis Trunking (MCT) available for purchase the first half of 2012.*
### Physical Dimensions

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions (H × W × D)</th>
<th>Weight (Fully Loaded)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FastIron SX 800</td>
<td>10.46 in. × 17.45 in. × 26.6 cm (19.5 in. × 49.5 cm)</td>
<td>97 lb (43.9 kg)</td>
</tr>
<tr>
<td>FastIron SX 1600</td>
<td>24.46 in. × 17.45 in. × 62.1 cm (22.55 in. × 57.3 cm)</td>
<td>196 lb (88.6 kg)</td>
</tr>
</tbody>
</table>

### 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:** 6600 ft (2000 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

### MTBF

**Chassis**
- SX 800 Chassis, Fan Tray, 1 P/S: 142,786 hrs
- SX 800 Chassis, Fan Tray, 2 P/S: 230,584 hrs
- SX 1600 Chassis, Fan Tray, 2 P/S: 99,908 hrs
- SX 1600 Chassis, Fan Tray, 4 P/S: 213,865 hrs

**Management Modules**
- IPv4/IPv6 Management Module, no ports: 534,522 hrs
- IPv4 Management Module, 2×10 Gbe ports: 269,436 hrs
- IPv6 Management Module, 2×10 Gbe, no optics: 304,109 hrs

**Interface Modules (IPv4, IPv6-capable versions and third generation)**
- 48-port 10/100/1000 Mbps copper module: 340,000 hrs
- 24-port 10/100/1000 Mbps copper module: 352,103 hrs
- 24-port SFP module: 348,204 hrs
- 2-port 10 Gbe module: 464,938 hrs

### Power Requirements

**System Power Supply (SX-ACPWR, SX-DCPWR)**
- −40 to −60 VDC Consumption (Amps): 36 A
- 100–120 VAC Consumption (Amps): 14.3 A
- 200–240 VAC Consumption (Amps): 7.2 A
- AC Frequency: 50–60 Hz
- Max BTU: 4874 BTU/Hr
- Max Watts (Output): 1200 W
- Max Watts (Input): 1428 W

- 1250 W PoE Power Supply
  - 100–120 VAC Consumption (Amps): 14 A
  - 200–240 VAC Consumption (Amps): 7 A
  - AC Frequency: 50–60 Hz
  - Max BTU: 4736 BTU/Hr
  - Max Watts (Output): 1250 W
  - Max Watts (Input): 1388 W

- 2500 W PoE Power Supply (SX-ACPWR-2500-POE)
  - 200–240 VAC Consumption (Amps): 14 A
  - AC Frequency: 50–60 Hz
  - Max BTU: 9471 BTU/Hr
  - Max Watts (Output): 2500 W
  - Max Watts (Input): 2775 W

### Safety Certifications

- CAN/CSA-C22.2 No. 60950-1-03
- Information Technology Equipment
- Safety—Part 1: General Requirement
- UL 60950-1, Information Technology Equipment—Safety—Part 1: General Requirement
- EN 60950-1, Information Technology Equipment—Safety—Part 1: General Requirement
- IEC 60950-1, Information Technology Equipment—Safety—Part 1: General Requirement
- EN 60825-1, Safety of Laser Products. Equipment Classification, Requirements and User Guide
- EN 60825-2, Safety of Laser Products, Safety of Optical Fibre Communications Systems

### Environmental Regulatory Compliance

- RoHS Compliant (5 of 6)
- WEEE compliant

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*Multi-Chassis Trunking (MCT) available for purchase the first half of 2012.*
### Electromagnetic Emission Certifications

- ICES-003, Electromagnetic Emission
- FCC Class A
- EN 55022/CISPR 22 Class A
- VCCI Class A
- EN 61000-3-2, Power Line Harmonics
- EN 61000-3-3, Voltage Fluctuation and Flicker
- EN 61000-6-3, Electromagnetic Compatibility
- AS/NZS CISPR 22, Electromagnetic Compatibility

### Immunity

EN 61000-6-1, Electromagnetic Compatibility, Generic Standard

### 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, Power Frequency Magnetic Field

### Mounting Options

- 19 in. Universal EIA (Telco) Rack or Tabletop

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### BROCADE FASTIRON SX FEATURE/MODEL COMPARISON

<table>
<thead>
<tr>
<th>Chassis</th>
<th>FastIron SX 800</th>
<th>FastIron SX 1600</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>10.4 in. (6RU)</td>
<td>24.5 in. (14RU)</td>
</tr>
<tr>
<td>Interface slots</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>Backplane switching capacity</td>
<td>600 Gbps</td>
<td>1080 Gbps</td>
</tr>
<tr>
<td>Data switching capacity</td>
<td>464 Gbps</td>
<td>848 Gbps</td>
</tr>
<tr>
<td>Packet forwarding capacity</td>
<td>348 Mpps</td>
<td>636 Mpps</td>
</tr>
<tr>
<td>Management redundancy</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Switch fabric redundancy</td>
<td>1+1</td>
<td>1+1</td>
</tr>
<tr>
<td>Management processor</td>
<td>667 MHz</td>
<td>667 MHz</td>
</tr>
<tr>
<td>Memory options</td>
<td>512 MB</td>
<td>512 MB</td>
</tr>
<tr>
<td>Maximum port density per unit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100BaseFX</td>
<td>192</td>
<td>384</td>
</tr>
<tr>
<td>1000BaseT, 10/100/1000 Mbps (RJ-45)(^2)</td>
<td>192</td>
<td>384</td>
</tr>
<tr>
<td>IEEE 802.3af Class 3 10/100/1000 Mbps</td>
<td>192</td>
<td>384</td>
</tr>
<tr>
<td>IEEE 802.3af Class 3 10/100/1000 Mbps with N+1 PoE power redundancy(^3)</td>
<td>140</td>
<td>384</td>
</tr>
<tr>
<td>IEEE 802.3at Class 5 10/100/1000 Mbps</td>
<td>162</td>
<td>324</td>
</tr>
<tr>
<td>IEEE 802.3at Class 5 10/100/1000 Mbps with N+1 PoE power redundancy(^3)</td>
<td>81</td>
<td>244</td>
</tr>
<tr>
<td>1000BaseX ports (SFP)</td>
<td>192</td>
<td>384</td>
</tr>
<tr>
<td>10GBaseX ports (XFP)</td>
<td>20</td>
<td>36</td>
</tr>
<tr>
<td>10GBaseX ports (SFP+)</td>
<td>64</td>
<td>128</td>
</tr>
<tr>
<td>Power supply redundancy</td>
<td>N+1</td>
<td>N+2</td>
</tr>
<tr>
<td>System power</td>
<td>N+1</td>
<td>N+3</td>
</tr>
<tr>
<td>PoE power</td>
<td>AC/DC</td>
<td>AC/DC</td>
</tr>
<tr>
<td>Power supply options</td>
<td>AC/DC</td>
<td>AC/DC</td>
</tr>
</tbody>
</table>

\(^1\) The two switch fabric modules in the FastIron SX 800 and FastIron SX 1600 operate in a load-sharing fashion. Upon failure of one of the switch modules, some system capacity will be lost. In this event, some traffic flows may experience reduced capacity through the remaining operational switch fabric during periods of high traffic loading.

\(^2\) FastIron SX-FI424C and SX-FI624C 1000BaseT modules are field-upgradable to PoE with a PoE daughter card.

\(^3\) Computation is based on the 2500 W, 220 VAC PoE power supply.

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*Multi-Chassis Trunking (MCT) available for purchase the first half of 2012.*
### FastIron SX Chassis and Power Supplies

<table>
<thead>
<tr>
<th>Description</th>
<th>Chassis and Power Supplies</th>
</tr>
</thead>
<tbody>
<tr>
<td>FastIron SX 800 bundle with 8-slot chassis, fan tray, two switch fabrics, and one AC power supply</td>
<td>FI-SX800-AC</td>
</tr>
<tr>
<td>FastIron SX 800 bundle with 8-slot chassis, fan tray, two switch fabrics, and one DC power supply</td>
<td>FI-SX800-DC</td>
</tr>
<tr>
<td>FastIron SX 1600 bundle with 16-slot chassis, fan tray, two switch fabrics, and two AC power supplies</td>
<td>FI-SX1600-AC</td>
</tr>
<tr>
<td>FastIron SX 1600 bundle with 16-slot chassis, fan tray, two switch fabrics, and two DC power supplies</td>
<td>FI-SX1600-DC</td>
</tr>
<tr>
<td>FastIron SX 800/SX 1600 system AC power supply, 1200 W</td>
<td>SX-ACPWR-SYS</td>
</tr>
<tr>
<td>FastIron SX 800/SX 1600 system DC power supply, 1200 W</td>
<td>SX-DCPWR-SYS</td>
</tr>
<tr>
<td>FastIron SX 800/SX 1600 PoE AC power supply, 1250 W</td>
<td>SX-ACPWR-POE</td>
</tr>
<tr>
<td>FastIron SX 800/SX 1600 PoE DC power supply, 1250 W</td>
<td>SX-DCPWR-POE</td>
</tr>
<tr>
<td>FastIron SX 800/SX 1600 PoE AC power supply, 2500 W</td>
<td>SX-ACPWR-2500-POE</td>
</tr>
</tbody>
</table>

### IPv6-Capable Modules

<table>
<thead>
<tr>
<th>Description</th>
<th>IPv6-Capable Modules</th>
</tr>
</thead>
<tbody>
<tr>
<td>FastIron SX 800/SX 1600 Management Module with no ports and base Layer 3 software</td>
<td>SX-FI2ZMR</td>
</tr>
<tr>
<td>FastIron SX 800/SX 1600 Management Module with no ports. The loaded software image supports advanced Layer 2 and full Layer 3 IPv4 services in systems configured with all IPv6 or third-generation line modules.</td>
<td>SX-FI2ZMR-6-PREM</td>
</tr>
<tr>
<td>FastIron SX 800/SX 1600 Management Module with no ports. The loaded software image supports advanced Layer 2 and Layer 3 IPv4 and IPv6 services in systems configured with all IPv6 or third-generation line modules.</td>
<td>SX-FI2ZMR-6-PREM6</td>
</tr>
<tr>
<td>2-port 10 GbE Management Module with base Layer 3 (IPv4 only) for the FastIron SX 800/SX 1600 chassis in systems configured with all IPv6 or third-generation line modules</td>
<td>SX-FI2XGMR6</td>
</tr>
<tr>
<td>2-port 10 GbE Management Module with full Layer 3 (IPv4 only) for the FastIron SX 800/SX 1600 chassis in systems configured with all IPv6 or third-generation line modules</td>
<td>SX-FI2XGMR6-PREM</td>
</tr>
<tr>
<td>2-port 10 GbE Management Module with full Layer 3 (IPv4 only) for the FastIron SX 800/SX 1600 chassis in systems configured with all IPv6 or third-generation line modules</td>
<td>SX-FI2XGMR6-PREM6</td>
</tr>
<tr>
<td>Third-generation high-density 8-port SFP+ 10 GbE module with hardware support for MACsec</td>
<td>SX-FI-8XG</td>
</tr>
<tr>
<td>Third-generation 2-port SFP+ 10 GbE module with hardware support for MACsec</td>
<td>SX-FI-2XG</td>
</tr>
<tr>
<td>Third-generation 24-port 10/100/1000 Mbps Ethernet module with PoE/PoE+ and hardware support for MACsec and EEE</td>
<td>SX-FI-24GPP</td>
</tr>
<tr>
<td>Third-generation 24-port 100/1000 SFP-based fiber Ethernet module with hardware support for MACsec</td>
<td>SX-FI-24HF</td>
</tr>
<tr>
<td>24-port 10/100/1000 Mbps Ethernet module</td>
<td>SX-FI624C</td>
</tr>
<tr>
<td>2-port XFP 10 GbE module</td>
<td>SX-FI62XG</td>
</tr>
<tr>
<td>24-port 100/1000 SFP-based fiber IPv6 module</td>
<td>SX-FI624HF</td>
</tr>
<tr>
<td>Third-generation 48-port 10/100/1000 Mbps Ethernet module with PoE/PoE+ (use 2 vertical slots)</td>
<td>SX-FI48GPP</td>
</tr>
<tr>
<td>24-port 10/100/1000 Mbps Ethernet with PoE installed IPv6 module</td>
<td>SX-FI624P</td>
</tr>
<tr>
<td>24-port 100FX bundle, which includes SX-FI624HF and 24 E1MG-100FX optics</td>
<td>SX-FI624100FX</td>
</tr>
<tr>
<td>Layer 3 (IPv4 only) software upgrade kit for the FastIron SX IPv6-ready family. This software upgrade adds support for full Layer 3, including support for IPv4 routing protocols such as RIPv1/v2, OSPF, BGP4, and multicast routing, including PIM-SM, PIM-DM, and DVMRP. (Available as either an EPROM upgrade or as a Software License Key.)</td>
<td>SX-FIL3U-6-IPV4 (-SW)</td>
</tr>
<tr>
<td>Layer 3 (IPv4 and IPv6) software upgrade kit for the FastIron SX IPv6-ready family. This software upgrade, in addition to IPv4 routing, adds support for RIPvng and OSPFv3. (Available as either an EPROM upgrade or as a Software License Key.)</td>
<td>SX-FIL3U-6-IPV6 (-SW)</td>
</tr>
</tbody>
</table>

### IPv4 Modules

<table>
<thead>
<tr>
<th>Description</th>
<th>IPv4 Modules</th>
</tr>
</thead>
<tbody>
<tr>
<td>FastIron SX 800/SX 1600 Management Module with no ports and base Layer 3 software</td>
<td>SX-FI2ZMR</td>
</tr>
<tr>
<td>FastIron SX 800/SX 1600 Management Module with no ports. The loaded software image supports advanced Layer 2 and full Layer 3 IPv4 services in systems configured with all IPv4 or third-generation line modules.</td>
<td>SX-FI2ZMR-PREM</td>
</tr>
<tr>
<td>FastIron SX 800/SX 1600 Management Module with base Layer 3 software, includes 2-port 10 GbE</td>
<td>SX-FI2XGMR4</td>
</tr>
<tr>
<td>FastIron SX 800/SX 1600 Management Module with full IPv4 Layer 3 software, includes 2-port 10 GbE</td>
<td>SX-FI2XGMR4PREM</td>
</tr>
<tr>
<td>FastIron SX 24-port mini-GBIC-based Gigabit Ethernet module</td>
<td>SX-FI424F</td>
</tr>
<tr>
<td>FastIron SX 24-port 10/100/1000 Mbps Ethernet module</td>
<td>SX-FI424C</td>
</tr>
<tr>
<td>FastIron SX 24-port 100/1000 Mbps combo fiber Ethernet module</td>
<td>SX-FI424HF</td>
</tr>
<tr>
<td>FastIron SX 2-port XFP 10 GbE module</td>
<td>SX-FI42XG</td>
</tr>
<tr>
<td>FastIron SX 24-port PoE add-in card for 24-port 10/100/1000 Mbps Ethernet module</td>
<td>SX-24GCP0E</td>
</tr>
<tr>
<td>FastIron SX 24-port 10/100/1000 Ethernet module with 802.3af PoE</td>
<td>SX-FI424P</td>
</tr>
<tr>
<td>FastIron SX chassis, full Layer 3 upgrade kit. (Available as either an EPROM upgrade or as a Software License Key.)</td>
<td>SX-FIL3U (-SW)</td>
</tr>
</tbody>
</table>

*Multi-Chassis Trunking (MCT) available for purchase the first half of 2012."