BROCADE ICX 7750 SWITCH

ENTERPRISE LAN SWITCHING

10/40 GbE Distributed Chassis Switch for Campus Aggregation/Core

HIGHLIGHTS

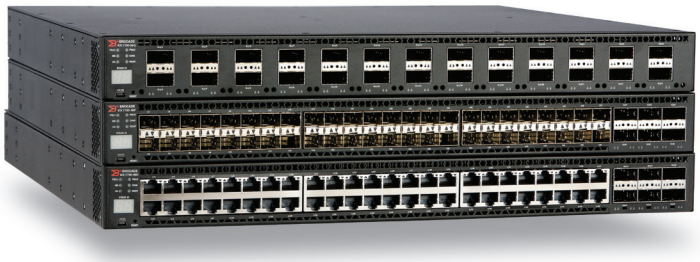
- Provides unprecedented stacking density and performance with up to 12 switches per stack and up to 480 Gbps of stacking bandwidth, limiting inter-switch bottlenecks and supporting large-scale distributed chassis deployments
- Enables a single point of management across the campus by leveraging open-standards QSFP+ ports built on a distributed chassis architecture with long-distance stacking
- Offers industry-leading 10/40 GbE port density and flexibility in a 1U form factor with up to 32 40 GbE or 96* 10 GbE ports per unit, saving valuable rack space and power in wiring closets
- Provides chassis-class high availability with six full-duplex 40 Gbps stacking ports per switch, hitless stacking failover, and hot-swappable power supplies and fan assemblies
- Delivers superior value by incorporating enterprise-grade advanced features such as BGP Multi-Chassis Trunking (MCT)† and Virtual Routing and Forwarding (VRF)
- Provides OpenFlow support in true hybrid port mode, enabling Software-Defined Networking (SDN) for programmatic control of network data flows‡

Today's enterprise network core and aggregation layers are quickly moving to 10 and 40 Gigabit Ethernet (GbE) switching as enterprises rapidly adopt applications such as High-Definition (HD) video, Bring Your Own Device (BYOD), and Virtual Desktop Infrastructure (VDI), which drive the need for resilient, high-bandwidth access networks. To meet these challenges, campus network solutions must provide better performance, port density, reliability, security, Quality of Service (QoS), and Total Cost of Ownership (TCO).

The Brocade® ICX® 7750 Switch delivers industry-leading 10/40 GbE port density, advanced high-availability capabilities, and flexible stacking architecture, making it the most robust Brocade aggregation and core distributed chassis switch offering for enterprise LANs. In addition to rich Layer 3 features, the Brocade ICX 7750 supports 12-unit distributed-chassis stacking or Multi-Chassis Trunking (MCT)† and is an integral part of the Brocade HyperEdge® Architecture for campus LANs.

Today's data centers are also expanding as the demand for data and storage continues to grow exponentially. Moreover, requirements such as application convergence, non-stop operation, scalability, high availability, and power efficiency are placing even greater demands on the network infrastructure.

Part of the Brocade ICX family of Ethernet switches for campus LAN and classic Ethernet data center environments, the Brocade ICX 7750 Switch is a 1U high-performance, high-availability, and market-leading-density 10/40 GbE solution that meets the needs of business-sensitive campus deployments and classic Ethernet data center environments. With industry-leading price/performance and



* Planned for future availability with QSFP+ breakout cables support.
† For Layer 3, static routes and VRRP across MCT are supported. Layer 3 multicast and dynamic routing protocols will be available in a future release.
‡ Planned for future availability.

BROCADE

Figure 1.
The Brocade ICX 7750-48F features 48 10 GbE SFP+ ports and 6 40 GbE QSFP+ ports that can be split into 24* 10 GbE SFP+ ports. The front panel also displays the unit stacking ID.

Figure 2.
The Brocade ICX 7750-48C features 48 10GBASE-T ports and 6 40 GbE QSFP+ ports that can be split into 24* 10 GbE SFP+ ports.

a low-latency, cut-through, non-blocking architecture, the Brocade ICX 7750 provides a cost-effective, robust solution for the most demanding deployments.

LEADING-EDGE FLEXIBILITY AND RELIABILITY

The Brocade ICX 7750 provides a highly flexible 10/40 GbE aggregation solution that offers the highest levels of reliability and port density available in a 1U form factor. The Brocade ICX 7750 is available in three models: the Brocade ICX 7750-48F, 7750-48C, and 7750-26Q. The Brocade ICX 7750-48F and 7750-48C both offer 48 10 GbE ports (SFP+ and 10GBASE-T, respectively) and up to 12 40 GbE ports (six optional) (see Figures 1 and 2). The Brocade ICX 7750-26Q offers up to 32 40 GbE QSFP+ ports (six optional) (see Figure 3).

All models support stacking, which allows organizations to buy only the ports they need now and expand later by adding switches to the stack where and when they are needed. This eliminates the need for a forklift upgrade and helps avoid provisioning an underutilized, centralized chassis. In addition, the Brocade ICX 7750 supports redundant, hot-swappable AC or DC power supplies and fans, reversible airflow, and advanced software.

DISTRIBUTED CHASSIS ARCHITECTURE FOR ULTIMATE FLEXIBILITY

The Brocade ICX 7750 Switch redefines the economics of enterprise networking by delivering a unique 10/40 GbE campus aggregation solution in a fixed form factor and new levels of performance, availability, and flexibility. It provides the capabilities of a chassis with the flexibility and cost-effectiveness of a stackable switch.

The Brocade ICX 7750 delivers wire-speed, non-blocking performance across all ports to support latency-sensitive applications such as real-time voice/video streaming and Virtual Desktop Infrastructure (VDI). Up to 12 Brocade ICX 7750 Switches can be stacked together using up to six full-duplex 40 Gbps standard QSFP+ stacking ports that provide an unprecedented maximum of 480 Gbps of backplane stacking bandwidth with full redundancy, eliminating inter-switch bottlenecks (see Figure 4).

High Availability with Hitless Failover

Organizations can count on Brocade ICX 7750 Switches to deliver continuous availability for an optimized user experience. Brocade stacking technology helps provide high availability, performing real-time state synchronization across the stack and enabling instantaneous hitless failover to a standby controller in the unlikely event of a failure of the master stack controller. Organizations also can use hot-insertion/removal of stack members to avoid interrupting service when adding a switch to increase the capacity of a stack or replacing a switch that needs servicing. These features provide another level of availability for the campus wiring closet in a compact form factor. Additional design features include intake and exhaust temperature sensors and fan spin detection to quickly identify abnormal or failed operating conditions—helping to minimize mean time to repair.

* Planned for future availability with QSFP+ breakout cables support.

Figure 3.
The Brocade ICX 7750-26Q features 26 40 GbE QSFP+ ports that can be split into as many as 96* 10 GbE SFP+ ports.

Increased Reliability through Redundancy and Intelligence

The Brocade ICX 7750 includes dual-internal redundant power supplies. These power supplies are hot-swappable and load-sharing with auto-sensing and auto-switching capabilities, which are critical for power redundancy and deployment flexibility (see Figure 5).

The hot-swappable power supplies (1+1) and fan assembly (3+1) allow organizations to replace components without service disruption. In addition, several high-availability and fault-detection features help in failover of critical data flows, enhancing overall system availability and reliability. Organizations can use Brocade Network Advisor and sFlow-based network monitoring and trending to proactively monitor risk areas and optimize network resources.

Brocade Multi-Chassis Trunking (MCT)† supports dual homing of wiring closet access switches, or servers in a rack, to two Brocade ICX 7750 stacks in an MCT peer group, eliminating the risk of a single point of failure. In conjunction with MCT, VRRP-E (the Brocade extension to VRRP for MCT) provides redundancy and sub-second failover for both Layer 2 and Layer 3†. For metro or campus deployments in a ring topology, the Brocade Metro Ring Protocol (MRP-I and MRP-II) prevents Layer 2 loops and enables faster re-convergence than Spanning Tree Protocol (STP) with sub-second failover.

Figure 4.
Up to 12 Brocade ICX 7750 Switches can be stacked using up to six standard full-duplex 40 Gbps QSFP+ ports per switch, providing up to 480 Gbps of stacking bandwidth. Two 1 Gbps ports on each switch can be used to create a dedicated path for forwarding system health and control information across the stack for maximum reliability.

Figure 5.
The Brocade ICX 7750 features hot-swappable redundant power supplies (1+1) and fans (3+1), and an optional 6 40 GbE ports module that can be used for stacking or as additional 40 GbE data ports.

SDN-ENABLED PROGRAMMATIC CONTROL OF THE NETWORK

Software-Defined Networking (SDN) is a powerful new network paradigm designed for the world's most demanding networking environments and promises breakthrough levels of customization, scale, and efficiency. The Brocade ICX 7750 enables SDN by supporting the OpenFlow 1.0 and 1.3 protocols, which allow communication between an OpenFlow controller and an OpenFlow-enabled switch*. Using this

Flexible, Long-Distance Stacking

Up to 12 Brocade ICX 7750 Switches can be stacked together to form a single logical switch, providing STP-free traffic forwarding, a single point of management, and Link Aggregation Groups (LAGs) across the stack.

Six full-duplex standard QSFP+ 40 Gbps stacking ports (front six or optional rear six ports may be used) provide a class-leading 480 Gbps of backplane bandwidth with full redundancy, essentially eliminating the need to work around inter-switch bottlenecks.

A selection of standard QSFP+ copper cables or standard QSFP+ optics can be used to stack Brocade ICX 7750 Switches together, enabling stacking over distance and thereby eliminating the need for stacked switches to be colocated in the same wiring closet.

* Planned for future availability.
† For Layer 3, static routes and VRRP across MCT are supported. Layer 3 multicast and dynamic routing protocols will be available in a future release.

approach, organizations can control their networks programmatically, transforming the network into a platform for innovation through new network applications and services. The Brocade ICX 7750 delivers OpenFlow in true hybrid port mode. With Brocade hybrid port mode, organizations can simultaneously deploy traditional Layer 2/3 forwarding with OpenFlow on the same port. This unique capability provides a pragmatic path to SDN by enabling network administrators to progressively integrate OpenFlow into existing networks, giving them the programmatic control offered by SDN for specific flows while the remaining traffic is forwarded as before. Brocade ICX 7750 hardware support for OpenFlow enables organizations to apply these capabilities at line rate in 10 GbE and 40 GbE networks.

GREENER CAMPUS AND DATA CENTER NETWORKS WITH LOWER TCO

As application data and storage requirements continue to rise exponentially, demand for higher port density and bandwidth grows, along with the number of network devices and power consumption. Organizations seeking to reduce TCO need solutions that can provide higher scalability and density per rack unit, thereby reducing power consumption and heat dissipation.

The Brocade ICX 7750 addresses those needs with a state-of-the-art ASIC, reversible airflow, automatic fan-speed control, and power-efficient optics to ensure the most efficient use of power and cooling. For low-cost, low-latency, and low-energy-consuming cabling within and between the racks, the Brocade ICX 7750 supports SFP+ Direct Attach copper cables at up to 5 meters. For switch-to-switch connectivity, the Brocade ICX 7750 supports low-power-consuming SFP+ and 40GBASE-SR4 QSFP+ optical transceivers at up to 100 meters. In high-port-density deployments, these features save significant operating costs.

SUPERIOR ROI AND INVESTMENT PROTECTION

The Brocade ICX 7750 combines strategic performance, availability, and scalability advantages with investment protection for existing LAN environments. It utilizes the same Brocade FastIron® operating system used by other Brocade Ethernet/IP products. This helps ensure full forward and backward compatibility among the product family while simplifying software maintenance and field upgrades.

Moreover, the use of the same industry-standard Command Line Interface (CLI), common to all Brocade ICX switches, eliminates the need for staff retraining. As a result, the Brocade ICX 7750 enables organizations to better leverage their current training, tools, devices, and processes.

SIMPLIFIED, STANDARDS-BASED MANAGEMENT

Deploying more switches in a data center infrastructure can increase overall network performance, but it can also prevent organizations from gaining a complete view of network capacity, bandwidth consumption, utilization, and overall health.

To overcome this challenge, the Brocade ICX 7750 utilizes sFlow, a unique solution that helps simplify network management and monitoring. By providing real-time visibility into the network, sFlow helps organizations effectively manage transactions flowing throughout the network. This open standards-based approach integrates with a wide range of management, monitoring, and trending utilities. For example, organizations can use Brocade Network Advisor to manage all Brocade data center Ethernet/IP switches and routers, including Brocade VDX® switches, Brocade ICX switches, Brocade FCX Series switches, Brocade ServerIron® ADX® Series application delivery switches, and Brocade MLXe core routers.

* Planned for future availability.

The Brocade ICX 7750 also supports the IEEE 802.1AB LLDP standard, enabling organizations to build open, converged, and advanced multivendor networks. LLDP greatly simplifies and enhances network management, asset management, and network troubleshooting.

With the resulting insight, organizations can quickly and accurately review overall data center operations, identify hot spots, and quickly diagnose and troubleshoot issues before they develop into widespread problems. The Brocade ICX 7750 also provides accurate SNMP/RMON statistics to Brocade Network Advisor, reducing the administrative burden normally associated with proactive network management, design, and capacity planning.

PURPOSE-BUILT FEATURE SET

The Brocade ICX 7750 combines a wide range of unique features to help organizations overcome the most challenging business requirements.

Industry-Leading Advanced Layer 2 and Layer 3 Features

To provide self-healing topologies in Layer 2 configurations, the Brocade ICX 7750 supports industry-standard Ethernet protocols, including multiple varieties of STP and link aggregation as well as optic-, link-, and switch-level fault detection and correction features. The advanced Layer 2 and Layer 3 feature set is leveraged from Brocade FastIron switches that have been field-proven in enterprise and data center networks for more than a decade. With rich Layer 3 features enabled, organizations can utilize the Brocade ICX 7750 in multiple applications.

Data Protection through Robust Security

Security is a critical requirement in today's data centers and branch offices, and the Brocade ICX 7750 provides robust security through a wide range of advanced features. Organizations can use both regular and extended Access Control Lists (ACLs) to control access to and through data center networks.

Organizations can use control policies that permit or deny traffic based on a wide variety of identification characteristics—such as source/destination MAC addresses, source/destination IP addresses, TCP/UDP ports/sockets, and well-known port numbers—further protecting and restricting network access. In addition, for maximum security the Brocade ICX 7750 also leverages 802.1x security, MAC authentication, port MAC security, and MAC filter enhancements.

The Brocade ICX 7750 implements hardware-based ACL, so security does not adversely affect switching performance. In addition, the Brocade ICX 7750 provides hardware-based protection against Distributed Denial of Service (DDoS) attacks (ICMP flood and TCP SYN) as well as hardware-based private VLAN attacks—with no impact on CPU utilization. Also, BPDU Guard and Root Guard prevent rogue hijacking of the spanning tree root and maintain a contention-free—and loop-free—environment, especially during dynamic network deployments.

Advanced QoS to Improve Data Traffic Integrity

The Brocade ICX 7750 offers superior QoS features designed to ensure high-reliability services throughout the data center. It can identify, mark, classify, reclassify, and manage traffic based on specific criteria. This enables organizations to classify bandwidth-critical application traffic, discriminating among various traffic flows and enforcing bandwidth policies.

After the traffic is classified, organizations have complete control over the method the system uses to service the queues: Weighted Round Robin (WRR), Strict Priority (SP), or a mix of both. For granular control to regulate bandwidth utilization, the Brocade ICX 7750 can also perform ingress rate limiting and egress rate shaping.

Multicast-based Applications

The use of video, financial, and other one-to-many applications requires support for scalable multicast services. The Brocade ICX 7750 supports IGMPv1/2/3, PIM-SM/SSM/DM, MSDP, Anycast RP, and PIM and IGMP/MLD Snooping for optimized multicast forwarding. In addition, the Brocade ICX 7750 provides storm-control features to contain and intelligently switch rather than broadcast multicast traffic.

KEY SOLUTION AREAS

The Brocade ICX 7750 provides a high-performance, cost-effective solution for many types of campus and data center environments, including 10/40 GbE core and aggregation of campus access switches, Top-of-Rack (ToR) server connectivity, and HPC environments.

Campus Aggregation for Enterprise Networks

The Brocade ICX 7750 provides the necessary advanced Layer 2 and Layer 3 features, high 10/40 GbE port density, and high-availability capabilities to be deployed as a campus aggregation solution. A stack of Brocade ICX 7750 Switches interconnected with 40 GbE links makes a cost-effective, highly available campus aggregation solution.

Collapsed Campus Aggregation/Core

Traditional three-tier network design, with "big-box" chassis at the aggregation and core layers, requires a significant up-front investment and offers limited deployment flexibility and future-proofing. In contrast, a distributed "multi-box" architecture at the aggregation and core layers can deliver much greater scalability and future-proofing with an easier "upgrade as you go" model. This type of architecture enables network architects to add capacity exactly where it is needed in the network, unlike a big-box chassis approach, with all ports located in the same closet.

Thanks to rapid technology evolution and innovative thinking, Brocade is able to offer the first stackable solution for campus aggregation and small core that delivers higher performance and port density than a traditional midsize chassis, while offering the same level of reliability and availability. Brocade long-distance stacking technology enables a ring of Brocade ICX 7750 Switches interconnected with 40 GbE stacking links and separated by up to 10 km each to be used as a combined aggregation and core layer for a midsize campus (see Figure 6).

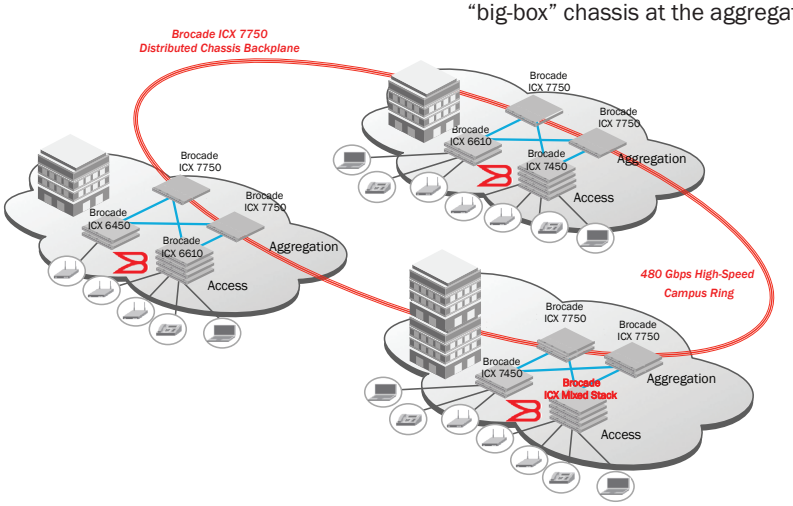


Figure 6.
The stackable Brocade ICX 7750 is ideal for deployment as a cost-effective, high-performance solution, forming a single campus wide ring and combining the aggregation and core layers in a single logical device.

Data Center ToR Server Connectivity

The Brocade ICX 7750 is designed to fit in server racks, and it consumes only one rack unit. To simplify cabling, the 10 GbE Network Interface Cards (NICs) in the servers connect to the Brocade ICX 7750 10 GbE ports by using fiber and SFP+ optical transceivers, SFP+ Direct Attach copper cable, or standard copper Ethernet twisted pair cables with 10GBASE-T (see Figure 7).

If any servers in the rack have only 1 GbE-capable NICs, organizations can connect them to the same Brocade ICX 7750 Switch by using a 10 GbE port as a 1 GbE port through an SFP or copper port. The Brocade ICX 7750 ToR switch can connect to the data center middle-of-row/end-of-row aggregation chassis with either 10 GbE or 40 GbE, usually through link aggregation.

The Brocade ICX 7750 provides data center ToR access while Brocade MLXe routers provide an aggregation/core solution.

Cost-Effective 10 GbE Aggregation

In data center environments where most servers are 1 GbE-capable, the Brocade ICX 7750 provides a compact and cost-effective 10 GbE aggregation switch. It connects to the data center core through 10 GbE or 40 GbE ports, and it uses 10 GbE links to connect to Brocade ICX ToR switches at the edge of the network (see Figure 8).

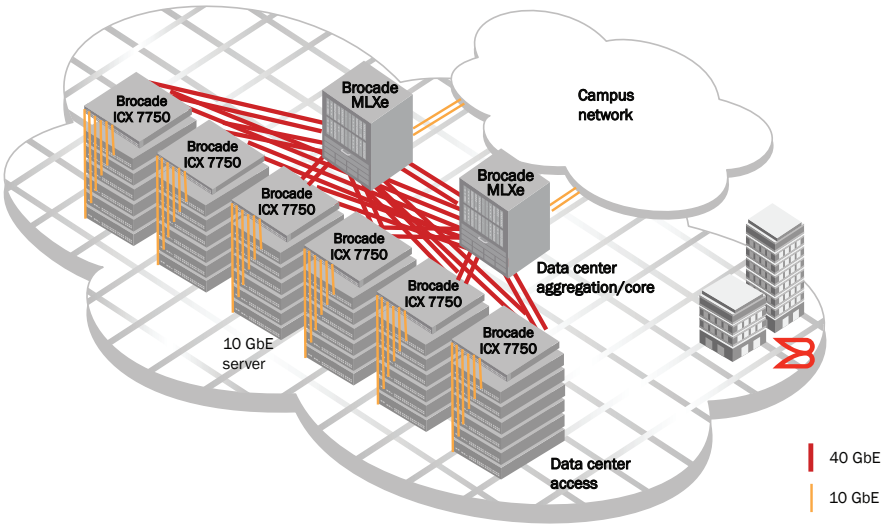


Figure 7.
The Brocade ICX 7750 provides data center ToR access while Brocade MLXe routers provide an aggregation/core solution.

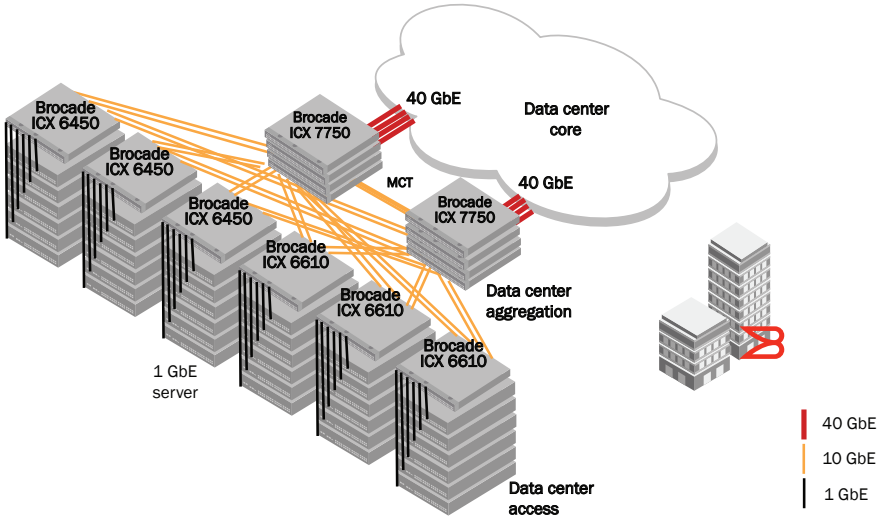


Figure 8.
The Brocade ICX 7750 provides data center aggregation with Brocade ICX 6610 and 6450 Switches providing ToR access.

WARRANTY

The Brocade ICX 7750 Switch is covered by the Brocade Assurance® Limited Lifetime Warranty. For details, visit www.brocade.com/warranty.

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.

AFFORDABLE ACQUISITION OPTIONS

Brocade Capital Solutions helps organizations easily address their IT requirements by offering flexible network acquisition and support alternatives. Organizations can select from purchase, lease, Brocade Network Subscription, and Brocade Subscription Plus options to align network acquisition with their unique capital requirements and risk profiles. To learn more, visit www.Brocade.com/CapitalSolutions.

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.

BROCADE ICX 7750 SPECIFICATIONS

System Architecture	Brocade ICX 7750-26Q	Brocade ICX 7750-48F	Brocade ICX 7750-48C
Ports	26 ports 40 GbE QSFP+, optional plugin module for additional 6 ports QSFP+, up to 32 40 GbE or 96* 10 GbE ports total	48 ports 1/10 GbE SFP+, 6 ports 40 GbE QSFP+, optional plugin module for additional 6 40 GbE QSFP+ ports, up to 96* 10 GbE ports total	48 ports 1/10 GbE RJ-45, 6 ports 40 GbE QSFP, optional plugin module for additional 6 ports 40 GbE QSFP, up to 96* 10 GbE ports total
Performance			
Dynamic packet buffer size	12.2 MB	12.2 MB	12.2 MB
Fabric capacity	2.56 Tbps	1.92 Tbps	1.92 Tbps
Packet throughput	1.44 Bpps	1.44 Bpps	1.44 Bpps
Latency	550 ns	550 ns	40 GbE-40 GbE: 550 ns 10 GbE-10 GbE: 2.9 µs
Scalability	• VLANs: 4,095 • VRFs: 64 • MAC addresses: up to 294,912 (shared resource) • ACLs: 4,000/1,000 (ingress/egress) • QoS queues per port: 8 • Link aggregation: 8 links per group, 128 groups per switch • STP: 16 • RSTP: 254 • IPv4 routes: up to 131,072 (shared resource) • IPv6 routes: up to 7,168 (shared resource) • Hosts: up to 131,072 (shared resource) • Max ECMP: 8 • IGMP groups: 8,192		
Maximum frame size	• 10,220 byte Ethernet frame		
Data traffic types	• Unicast, multicast, and broadcast IP traffic		
Media types	• 1000BASE-TX SFP, RJ45 (Cat5, Cat6, Cat6a/7) • 1000BASE-SX SFP • 1000BASE-LX SFP • SFP+ Direct Attach copper cable, 10 GbE (1/3/5 m Twinax) • 10G SFPP-ER 10GBASE-ER SFP+ optic (LC), for up to 40 km over SMF • 10GBASE-USR SFP+ (MMF Ultra-Short Reach) • 10GBASE-SR SFP+ (MMF Short Reach) • 10GBASE-LR SFP+ (SMF 10 km reach) • 40GBASE-SR4 QSFP+ (MTP 1×8 or 1×12), MMF 100 m • 40GBASE-SR4-INT* QSFP+ (MTP 1×8 or 1×12), MMF 100 m • 40GBASE-LR4 QSFP+ optic (LC), for up to 10 km over SMF • 40G-QSFP-QSFP-C 40 GbE Direct Attach QSFP+ to QSFP+ active copper cable		
Licensing options	• There is no licensing on the Brocade ICX 7750. Customers who have purchased a Certificate of Entitlement may take advantage of the product's full routing capabilities.		
Management			
Supported management software	• SSHv2, SNMPv1/v2/v3, Telnet; Brocade Network Advisor; RADIUS, TACACS		
Management access	• One 10/100/1,000 Mbps (RJ-45) port and one mini-USB serial console port		
Diagnostics	• POST and embedded online/offline diagnostics		
Mechanical	**Brocade ICX 7750-26Q**	**Brocade ICX 7750-48F**	**Brocade ICX 7750-48C**
Enclosure	Reversible airflow; 1U; EIA-compliant		
Size	17.32 in. (440 mm)	17.32 in. (440 mm)	17.32 in. (440 mm)
Width	1.73 in. (43.6 mm)	1.73 in. (43.6 mm)	1.73 in. (43.6 mm)
Height	16.0 in. (406.4 mm)	16.0 in. (406.4 mm)	16.97 in. (431 mm)
Depth			
System weight with two power supplies, four fans, optional 6-port module, without transceivers	19.43 lb (8.83 kg)	19.98 lb (9.08 kg)	22.38 lb (10.17 kg)
Environmental	**Brocade ICX 7750-26Q**	**Brocade ICX 7750-48F**	**Brocade ICX 7750-48C**
Operating temperature	0°C to 45°C 50°C at sea level (0°F to 113°F, 122°F at sea level)	0°C to 45°C 50°C at sea level (0°F to 113°F, 122°F at sea level)	0°C to 40° C 40°C at sea level (0°F to 96°F, 96°F at sea level)
Non-operating temperature	–25°C to 70°C (–23°F to 158°F)	–25°C to 70°C (–23°F to 158°F)	–25°C to 70°C (–23°F to 158°F)

* Planned for future availability.

BROCADE ICX 7750 SPECIFICATIONS (CONTINUED)

Humidity	Operating: 5% to 95% non-condensing Non-operating: 5% to 80% non-condensing		
Operating noise	62 dBA average		
Altitude	Operating: Up to 9,842 feet above sea level (3,000 meters) Storage: Up to 39,370 feet above sea level (12,000 meters)		
Heat dissipation			
Maximum without module	1,122.5 BTU/hour	839.9 BTU/hour	1,122.5 BTU/hour
Maximum with module	1,202.1 BTU/hour	919.5 BTU/hour	1,202.1 BTU/hour
Typical without module	1,070.7 BTU/hour	770.6 BTU/hour	1,070.7 BTU/hour
Typical with module	1,138.4 BTU/hour	838.3 BTU/hour	1,138.4 BTU/hour
Power	**Brocade ICX 7750-26Q**	**Brocade ICX 7750-48F**	**Brocade ICX 7750-48C**
Output/consumption			
Maximum without module	282 W/329 W	211 W/246 W	477 W/556 W
Maximum with module	302 W/352 W	231 W/269 W	474 W/553 W
Typical without module	269 W/314 W	194 W/226 W	497 W/580 W
Typical with module	286 W/334 W	211 W/246 W	491 W/573 W
Input voltage	100 to 240 VAC nominal 40 to 60 VDC nominal		
Input line frequency	50 to 60 Hz		
Regulatory Compliance			
Safety	CAN/CSA-C22.2 NO. 60950-1-07; UL 60950-1 2nd Edition; IEC 60950-1 2nd Edition; EN 60950-1:2006 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 certification	CC Class A (Part 15); EN 55022/CISPR-22 Class A; VCCI Class A; ICES-003 Electromagnetic Emission; 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 (supersedes EN 50082-1); EN 55024 Immunity Characteristics (supersedes EN 61000-4-2 ESD); EN 61000-4-3 Radiated, Radio Frequency, Electromagnetic Field; EN 61000-4-4 Electrical Fast Transient; EN 61000-4-5 Surge; EN 61000-4-6 Conducted Disturbances Induced by Radio-Frequency Fields; EN 61000-4-8 Power Frequency Magnetic Field; EN 61000-4-11 Voltage Dips and Sags		
Environmental regulatory compliance	RoHS compliant (6 of 6) WEEE compliant		
RFC Compliance and Features	For a complete list of RFCs supported by the Brocade FastIron software platform, please go to www.brocade.com/FastIronRFC.		
Layer 1	• IEEE 802.3ad Link Aggregation • IEEE 802.3x Flow Control • IEEE 802.3 10BASE-T • IEEE 802.3u 100BASE-TX • IEEE 802.3z 1000BASE-SX/LX • IEEE 802.3ab 1000BASE-T • 802.3 CSMA/CD Access Method and Physical Layer Specifications • 802.3ae 10 Gigabit Ethernet • 802.3ba 40 Gigabit Ethernet • Jumbo Frame		
Layer 2	• IEEE 802.1D MAC Bridging/STP • IEEE 802.1p Mapping to Priority Queue • IEEE 802.1p Marking and DSCP • IEEE 802.1p Honoring QoS • IEEE 802.1Q VLAN Tagging • IEEE 802.1w Rapid Spanning Tree Protocol (RSTP) • IEEE 802.1s Multiple Spanning Tree Protocol (MSTP) • IEEE 802.1x Port Based Network Access Control • IEEE 802.1AB LLDP • 802.1AX Link Aggregation • PVST/RPVST/RPVST+ • Port Loop Detection • STP Port Fast • STP Root Guard • 802.1ad Q-in-Q • MCT† (Brocade Multi-Chassis Trunking) • Uni-Directional Link Detection (UDLD) • MRP-I, MRP-II (Brocade Metro Ring Protocol) • Topology and VLAN Groups		
Software-Defined Networking (SDN) ‡	• Support for OpenFlow v1.0 and v1.3 • OpenFlow support with true hybrid port mode • Operates seamlessly under the Brocade Vyatta® Controller		

† For Layer 3, static routes and VRRP across MCT are supported. Layer 3 multicast and dynamic routing protocols will be available in a future release.
‡ Planned for future availability.

BROCADE ICX 7750 SPECIFICATIONS (CONTINUED)

Security	• Access Control Lists (ACLs) for IPv4 and IPv6 • ACL for RP Candidate • AES Encryption for SSHv2, SNMPv3 • Port Mirroring (MAC-, VLAN-, and ACL-based) • sFlow • Authentication, Authorization, and Accounting (AAA) • Username/Password (Challenge and Response) • Bi-Level Access Mode (Standard and EXEC Level) • Secure Copy (SCP) • Secure Shell (SSHv2) • RFC 2865 RADIUS • TACACS/TACACS+ • MAC Filter and Authentication • Port MAC Security • MAC Locking • 802.1X Accounting • 802.1X Change of Authorization • 802.1X Dynamic VLAN assignment • 802.1X Dynamic ACL • 802.1X Multiple Host Authentication
IP protocols	• RFC 768 UDP • RFC 783 TFTP • RFC 791 IP • RFC 792 ICMP • RFC 793 TCP • RFC 826 ARP • RFC 894 IP over Ethernet • RFC 903 RARP • RFC 906 TFTP Bootstrap • RFC 951 BootP • RFC 1027 Proxy ARP • RFC 1112 Host Extensions for IP Multicasting • RFC 1519 CIDR • RFC 1541 and 2131 DHCP • RFC 1591 DNS (client) • RFC 1812 Requirements for IPv4 Routers • RFC 3768 VRRP • VRRP-E (Enhanced VRRP) • Brocade Virtual Switch Routing Protocol (VSRP) • VRF (IPv4 and IPv6) **RIP** • RFC 1058 RIP v1 • RFC 1723 RIP v2 **OSPF** • RFC 2328 OSPF v2 • RFC 3101 OSPF NSSA • RFC 1745 OSPF Interactions • RFC 1765 OSPF Database Overflow

BROCADE ICX 7750 SPECIFICATIONS (CONTINUED)

IP protocols (continued)	• RFC 1850 OSPF v2 MIB • RFC 2154 MD5 – Support • RFC 3137 Stub Router Advertisement • RFC 4222 Pri Treatment and Congestion Avoidance **BGP** • 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 • ECMP **IPv6** • IPv6 Host Support • RFC 2080 RIPng • RFC 2460 IPv6 • RFC 2526 Reserved IPv6 Subnet Anycast Address • RFC 2464/6085 IPv6 over Ethernet • RFC 4291 IPv6 Addressing Architecture • RFC 2710/3810 MLD v1/v2 for IPv6 • RFC 5340 OSPF for IPv6 (OSPFv3) • RFC 5798 VRRP v3 for IPv4 and IPv6
Quality of Service (QoS)	• Rate Limiting (per hardware queue) • BUM Rate Limiting • ACL-based Rate Limiting • Traffic Shaping • Symmetrical Flow Control • MAC Address Mapping to Priority Queue • ACL Mapping to Priority Queue • ACL Mapping to ToS/DSCP • ACL Mapping and Marking of ToS/DSCP • QoS Queue Management using Weighted Round Robin (WRR), Strict Priority (SP), and a combination of WRR and SP • RFC 2475 An Architecture for Differentiated Services • RFC 3246 An Expedited Forwarding PHB • RFC 2597 Assured Forwarding PHB Group • RFC 2698 A Two-Rate, Three-Color Marker
Multicast	• RFC 1112 IGMP • RFC 2236 IGMPv2 • RFC 3376 IGMPv3 • IGMP Proxy • RFC 1112 Host Extensions • RFC 3973 PIM-DM • RFC 2362 PIM-SM/SSM • RFC 3618 MSDP • RFC 4610 Anycast-RP using PIM

BROCADE ICX 7750 SPECIFICATIONS (CONTINUED)

Management	• Industry-standard Command Line Interface (CLI) • Configuration logging • LLDP • LLDP-MED • Cisco Discovery Protocol (CDP) • Brocade Network Advisor integration with HP OpenView for Sun Solaris, HP-UX, IBM AIX, and Windows NT • IEEE 802.3 MAU MIB (RFC 2239) • RFC 2571 Architecture for Describing SNMP Framework • RFC 951 BootP • RFC 1542 BootP Extensions • RFC 2131 DHCP (client and server) • RFC 854 Telnet Client and Server • RFC 2865 RADIUS • RFC 1493 Bridge MIB • RFC 1643 Ethernet-like Interface MIB • RFC 3176 sFlow • RFC 1213 MIB-II • RFC 1516 Repeater MIB • RFC 1354 IP Forwarding Table MIB • RFC 1757 RMON MIB • RFC 2572 SNMP Message Processing and Dispatching • RFC 1573 SNMP MIB II • RFC 1157 SNMPv1/v2c • RFC 3411 SNMPv3 Framework • RFC 3412 SNMPv3 Processing • RFC 3414 SNMPv3 USM • RFC 5905 NTPv4
High availability	• Redundant hot-swappable internal power supplies (1+1) • Redundant hot-swappable fan trays (3+1) • Hot insertion and removal of optional 6×40 GbE module • L3 VRRP protocol redundancy • Hitless failover from master to standby stack • Controller • Dedicated ports on the back panel for forwarding system health and control information across the stack • Protected link groups • Hot insertion and removal of stacked units

BROCADE ICX 7750 ORDERING INFORMATION

Part Number	Description
Bare Switches and Port Modules	
ICX7750-48F	Brocade ICX 7750 with 48 1/10 GbE SFP+ ports, 6 40 GbE QSFP ports and modular interface slot. No power supplies or fan units (need to be ordered separately). No optics. Requires ICX7750-L3-COE Certificate of Entitlement to use advanced Layer 3 features.
ICX7750-48C	Brocade ICX 7750 with 48 1/10 GbE RJ-45 10GBASE-T ports, 6 40 GbE QSFP ports and modular interface slot. No power supplies or fan units (need to be ordered separately). No optics. Requires ICX7750-L3-COE Certificate of Entitlement to use advanced Layer 3 features.
ICX7750-26Q	Brocade ICX 7750 with 26 40 GbE QSFP ports and modular interface slot. No power supplies or fan units (need to be ordered separately). No optics. Requires ICX7750-L3-COE Certificate of Entitlement to use advanced Layer 3 features.
ICX7750-6Q	Brocade ICX 7750 6 40 GbE QSFP module for use in Brocade ICX7750-48F, 7750-48C, or 7750-26Q
Power Supplies and Fans	
RPS9+I	500 W AC power supply; power-supply-side intake (port-side exhaust) airflow
RPS9+E	500 W AC power supply; power-supply-side exhaust (port-side intake) airflow
RPS9DC+I	500 W DC power supply; power-supply-side intake (port-side exhaust) airflow
RPS9DC+E	500 W DC power supply; power-supply-side exhaust (port-side intake) airflow
ICX7750-FAN-I	Fan kit of 4; fan-side intake (port-side exhaust) airflow
ICX7750-FAN-E	Fan kit of 4; fan-side exhaust (port-side intake) airflow
ICX7750-FAN-I-SINGLE	Fan single unit; fan-side intake (port-side exhaust) airflow
ICX7750-FAN-E-SINGLE	Fan single unit; fan-side exhaust (port-side intake) airflow
Feature Licenses and Accessories	
ICX7750-L3-COE	Certificate of Entitlement to use routing and advanced functionality. Without the Certificate of Entitlement, customers may use base Layer 3 features: VRRP, RIP, and static routes. Other Layer 3 features are considered advanced and require the ICX7750-L3-COE. The Certificate of Entitlement is serialized paper that is not tied to a particular switch; no activation is required.
BR-NTWADV-IP-BASE	Brocade Network Advisor IP management software license for up to 50 devices; required for initial purchase of IP-only management; minimum of one year of support is required.
Optics and Copper Cables	
10Ge-SFPP-AOC-0701	10 GbE SFP+ Direct Attach active optical cable, 7 m, 1-pack
10Ge-SFPP-AOC-1001	10 GbE SFP+ Direct Attach active optical cable, 10 m, 1-pack
10G-SFPP-USR	10GBASE USR SFP+ optical transceiver, 100 m over MMF LC, 1-pack
10G-SFPP-SR	10GBASE-SR SFP+ optical transceiver, SMF LC
10G-SFPP-LR	10GBASE-LR SFP+ optical transceiver, SMF LC
10G-SFPP-ER	10GBASE-ER SFP+ optic (LC), for up to 40 km over SMF
E1MG-TX	1000BASE-TX SFP copper, RJ-45 connector
E1MG-SX-OM	1000BASE-SX SFP optical transceiver, MMF LC, optical monitoring capable
E1MG-LX-OM	1000BASE-LX SFP optical transceiver, MMF LC, optical monitoring capable
40G-QSFP-LR4	40GBASE-LR4 QSFP+ optic (LC), for up to 10 km over SMF, 1-pack
40G-QSFP-SR4	40GBASE-SR4 QSFP+ optic (MTP 1×8 or 1×12), 100 m over MMF, 1-pack
40G-QSFP-QSFP-C-0101	40 GbE Direct Attach QSFP+ to QSFP+ active copper cable, 1 m, 1-pack
40G-QSFP-QSFP-C-0301	40 GbE Direct Attach QSFP+ to QSFP+ active copper cable, 3 m, 1-pack
40G-QSFP-QSFP-C-0501	40 GbE Direct Attach QSFP+ to QSFP+ active copper cable, 5 m, 1-pack

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

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

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

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