

# Brocade ICX 6610 Switches Frequently Asked Questions

## Introduction

The Brocade<sup>®</sup> ICX<sup>®</sup> 6610 Switch redefines the economics of enterprise networking by providing unprecedented levels of performance and availability in a stackable form factor. It delivers the capabilities of a chassis with the flexibility and cost-effectiveness of a stackable switch.

The Brocade ICX 6610 delivers wire-speed, non-blocking performance across all ports to support high-bandwidth and latency-sensitive applications such as voice/video streaming and Virtual Desktop Infrastructure (VDI). Up to eight Brocade ICX 6610 Switches can be stacked using four standards-based full-duplex 40 Gbps stacking ports, providing an unprecedented 320 Gbps of backplane stacking bandwidth with full redundancy, eliminating inter-switch bottlenecks. Additionally, each switch can provide up to eight 10 Gigabit Ethernet (GbE) ports activated through a software license for high-speed connectivity to the aggregation or core layers.

Brocade ICX 6610 Switches support the Power over Ethernet Plus (PoE+) standard (802.3at) to provide up to 30 watts of power to each connected device. This high-powered solution simplifies wiring for next-generation edge devices such as video conferencing phones, pan/tilt surveillance cameras, and 802.11n wireless Access Points (APs). With a 1500-watt power budget per switch (with two power supplies), the Brocade ICX 6610 24- and 48-port PoE models can supply full Class 3 (15.4 watts) or full Class 4 PoE+ (30 watts) power to every port.

For more information, visit: [www.brocade.com/icx6610](http://www.brocade.com/icx6610).

## General Questions and Answers

### Q. How many models are available in the Brocade ICX 6610 family?

A. Five models are available in the Brocade ICX 6610 family. Each model is orderable with either power supply side intake (-I) or power supply side exhaust (-E) airflow:

- Brocade ICX 6610-24-I /ICX 6610-24-E with 24 10/100/1000 Mbps RJ-45 ports
- Brocade ICX 6610-48-I /ICX 6610-48-E with 48 10/100/1000 Mbps RJ-45 ports
- Brocade ICX 6610-24P-I/ICX 6610-24P-E with 24 10/100/1000 Mbps RJ-45 PoE+ ports
- Brocade ICX 6610-48P-I/ICX 6610-48P-E with 24 10/100/1000 Mbps RJ-45 PoE+ ports
- Brocade ICX 6610-24F-I/ICX 6610-24F-E with 24 100/1000 Mbps Small Form-Factor Pluggable (SFP) ports

All Brocade ICX 6610 models have eight dual-mode 1 GbE/10 GbE SFP+ ports and four 40 Gbps QSFP ports used exclusively for stacking. In addition, these ports are compliant with the 40 GbE IEEE 802.3ba standard.

### Q. What environment is the Brocade ICX 6610 primarily designed for?

A. Brocade ICX 6610 Switches are designed to be deployed at the access and aggregation layers of an enterprise campus LAN network and as Top-of-Rack (ToR) switches in the data center. As a high-performance campus access solution, the Brocade ICX 6610 can be deployed in wiring closets, providing Ethernet connectivity to workstations, phones, wireless APs, security cameras, and other network devices within close proximity.

In addition, its class-leading 10 GbE port count makes the Brocade ICX 6610 an ideal solution as a ToR switch in a mixed 1 GbE/10 GbE server connectivity environment. It is designed to fit in server racks, consuming only one rack unit and offering dual integrated power supplies and fan assemblies with reversible front-to-back/back-to-front airflow for flexible cooling options. In data center environments where most servers have 1 GbE and some 10 GbE network interfaces, the Brocade ICX 6610 provides a compact and cost-effective 1 GbE/10 GbE ToR switch.

The Brocade ICX 6610-24F also provides 24 SFP ports, making it very well suited as an aggregation solution for small to medium-size campus networks. Thanks to unprecedented stacking bandwidth (320 Gbps) and uplink bandwidth (up to eight 10 Gbps per switch), four Brocade ICX 6610-24F switches stacked together as a virtual chassis can deliver the performance required for an aggregation solution with 96 1 GbE SFP fiber ports and 32 10 GbE SFP+ fiber ports—and with no over-subscription.

### Q. Does the Brocade ICX 6610 have Layer 3 capabilities?

A. All Brocade ICX 6610 models have IPv4 and IPv6 Layer 3 capabilities:

- **Base Layer 3 routing:** Available in base models with no license required and includes IPv4 static routes and routing between directly connected subnets.
- **Premium Layer 3 routing:** Adds IPv4/IPv6 static and dynamic routes with RIPv1/v2/RIPng announce, VRRP, and OSPFv2/v3. It also includes multicast routing protocols, such as PIM, and rich Layer 3 features, such as Policy-Based Routing (PBR), VRRP, and VRRP-E.
- **Advanced Layer 3 routing:** Adds BGP, VRE capabilities, and IPv4 over IPv6 tunnels.

### Q. Can Brocade ICX 6610 Switches be upgraded to support Layer 3 features in the field?

A. Yes. Brocade ICX 6610 Switches support key-based software upgrade activation. Customers can purchase a software upgrade license to upgrade any Brocade ICX 6610 Switch to premium and advanced Layer 3 capabilities.

**Q. Can Brocade ICX 6610 Switches support Software-Defined Networking (SDN)?**

**A.** Yes. The Brocade ICX 6610 enables SDN by supporting the OpenFlow 1.0 and 1.3 protocol, which allows communication between an OpenFlow controller and an OpenFlow-enabled switch. The Brocade ICX 6610 delivers OpenFlow in true hybrid port mode. This unique capability enables organizations to simultaneously deploy traditional Layer 2/3 forwarding with OpenFlow on the same port.

**Q. What type of SDN controllers are supported by the Brocade ICX 6610?**

**A.** The Brocade ICX 6610 operates seamlessly under the Brocade SDN Controller. This controller is a quality-assured edition of the OpenDaylight controller code supported by an established networking provider and its leaders within the OpenDaylight community. The Brocade ICX 6610 also interoperates with SDN controllers that support the OpenFlow 1.0 and 1.3 protocols.

**Q. Does the Brocade ICX 6610 support SDN/OpenFlow when stacked?**

**A.** Yes. In a stacked configuration, the OpenFlow controller controls the whole stack as a single logical switch by interacting with the stack controller.

**Q. Does the Brocade ICX 6610 support SDN/OpenFlow in a mixed-stack configuration with the Brocade ICX 6450?**

**A.** Yes. In a mixed-stack configuration, the OpenFlow controller controls the whole mixed stack as a single logical switch by interacting with the stack controller.

**Q. How many 802.1x sessions can the Brocade ICX 6610 support?**

**A.** The software supports 250 sessions per port. There is no pre-set system-wide maximum number of 802.1x sessions per switch; rather, the number is limited by the amount of TCAM space available. The Brocade ICX 6610 has been tested with 1,000 802.1x sessions per unit as a 1-D scaling.

**Q. What feature advantages does the Brocade ICX 6610 offer compared to Brocade FCX Series switches?**

**A.** The Brocade ICX 6610 offers many capabilities not found in the Brocade FCX Series, including:

- **Five times the stacking bandwidth:** With four 40 Gbps stacking ports compared to the Brocade FCX Series' two 16 Gbps ports, the Brocade ICX 6610 delivers five times the stacking bandwidth.
- **Four times the number of 10 GbE ports:** With eight 10 GbE ports compared to the Brocade FCX Series' two 10 GbE ports, the Brocade ICX 6610 delivers four times the uplink bandwidth.
- **PoE+ on all ports:** With a PoE budget of 1,500 W (with two power supplies), the Brocade ICX 6610 can deliver up to 30 W to all connected devices. The Brocade FCX Series can deliver 30 W to a maximum of 26 PoE+ ports.
- **Greater buffering capabilities:** With an 8 MB packet buffer, the Brocade ICX 6610 has deeper packet-forwarding buffers than the Brocade FCX Series.
- **Better future-proofing:** The Brocade ICX 6610 provides support for 40 GbE for stacking and MACsec.
- **Lower noise level and shorter depth:** With a software-controlled power supply and main unit fans, the Brocade ICX 6610 produces sound as low as 40 db with a single power supply unit and fan trays, compared to 51 to 63 db for the Brocade FCX Series.
- **Increased CPU processing power:** For highly scalable real-time encryption on management data.
- **Redundant fan trays:** For higher availability.

**Q. Does the Brocade ICX 6610 come standard with 10 GbE ports?**

**A.** Each Brocade ICX 6610 Switch comes standard with eight 1 GbE SFP ports that can be easily upgraded to 10 GbE SFP+ ports through a software license. Each license enables four ports, so two licenses are required to enable all eight ports.

**Q. Are the eight dual-mode 1 GbE/10 GbE ports combo ports?**

**A.** The eight dual-mode ports are additional to the 24 or 48 1 GbE switch ports. The Brocade ICX 6610 provides up to 48 ports to connect edge devices, plus eight additional ports that can be used for uplinks.

**Q. Does the Brocade ICX 6610 support 40 GbE?**

**A.** All Brocade ICX 6610 Switches are equipped with 40 GbE IEEE 802.3ba ports. The 40 GbE ports are exclusively used for high-performance/high-availability stacking between the switches.

**Q. How does the Brocade ICX 6610 expand when more than 24 or 48 ports are needed?**

**A.** All Brocade ICX 6610 Switches support stacking to facilitate port expansion while minimizing management overhead. Up to eight switches can be included in a stack, scaling the logical switch up to 384 1 GbE ports and 64 10 GbE ports.

**Q. Do the switches need to be physically stacked in order to grow the logical switch?**

**A.** No. When using the 40 Gbps stacking ports, the switches can be either situated on top of each other in a rack in a "daisy-chained ring" configuration, or stacked horizontally in a "braided ring" configuration, in which alternating switches are connected to each other. The latter configuration allows switches in the ring to be situated farther apart from each other.

**Q. What cabling options are available for stacking switches?**

**A.** Standard QSFP copper cables are used for stacking. Two 1-meter stacking cables are included with each unit. Stacking cables can also be ordered separately as accessories (1 meter cable: 40G-QSFP-C-0101; 5 meter cable: 40G-QSFP-C-0501).

In addition, 40GBASE-SR4 optics have been certified with the Brocade ICX 6610 for stacking. Visit [www.brocade.com/optics](http://www.brocade.com/optics) and [www.brocade.com/fastironstacking](http://www.brocade.com/fastironstacking) for details.

**Q. Can PoE and non-PoE Brocade ICX 6610 Switches be mixed in a stack?**

**A.** Yes. Brocade stacking technology provides the flexibility to mix and match PoE and non-PoE Brocade ICX 6610 Switches in a single stack.

**Q. Can fiber and copper versions of the Brocade ICX 6610 Switches be mixed in a stack?**

**A.** Yes. Brocade stacking technology provides the flexibility to mix and match the Brocade ICX 6610-24F with other Brocade ICX 6610 models. This provides a convenient way to add fiber ports to a Brocade ICX 6610 stack for distance extension and for deploying fiber to the desktop.

**Q. Can Brocade ICX 6610 Switches be stacked with Brocade ICX 6450 Switches?**

**A.** Yes. Brocade ICX 6610 Switches can be stacked together with Brocade ICX 6450 Switches using 10 GbE ports. Up to eight units can be connected together in that fashion.

Brocade ICX 6610 and 6450 Switches both support the Brocade HyperEdge® Architecture, enabling the propagation of advanced features and services from the Brocade ICX 6610 to the Brocade ICX 6450 when stacked together.

The HyperEdge Architecture is supported on Brocade ICX 6610 and 6450 Switches running FastIron® software release 8.0 or later, which is currently available from MyBrocade®.

## Q. What is the Brocade HyperEdge Architecture?

A. The Brocade HyperEdge Architecture brings campus networks into the modern era to better support mobility, security, and application agility. This evolutionary architecture integrates innovative wired and wireless technologies to streamline application deployment, simplify network management, and reduce operating costs.

The HyperEdge Architecture enables organizations to build networks that are:

- **Agile:** By eliminating Spanning Tree Protocol (STP) between HyperEdge Domain switches through a flatter Layer 2 design, the HyperEdge Architecture increases link utilization and reduces application deployment complexity. The Distributed AP Forwarding functionality of Brocade wireless Access Points (APs) efficiently secures and directs mobile traffic at the network edge without tunneling data back to a central controller at the network core.
- **Automated:** By grouping premium and entry-level switches with intelligent wireless APs into a consolidated management domain, HyperEdge Domains eliminate the need to provision and manage devices individually—simplifying network deployment and management.
- **Cost-effective:** The HyperEdge Architecture enables the propagation of advanced features and services from premium switches to entry-level switches, allowing IT organizations to purchase only what they need today and add intelligent services as the business evolves. Further cost savings is achieved with Brocade wireless solutions using controller-less or controller-shared license deployment options.

## Q. Is PoE+ standards-based?

A. Yes. PoE+ is being driven by the IEEE 802.3at standard. The Brocade ICX 6610 supports the 802.3at specification.

## Q. Is PoE+ backward-compatible with PoE?

A. Yes. 801.3at PoE+ is fully backward-compatible with 802.3af PoE. Leveraging LLDP-MED, the Brocade ICX 6610 auto-negotiates 802.3af Class 1, Class 2, and Class 3 power.

## Q. How many PoE and PoE+ ports can the Brocade ICX 6610 deliver?

A. The Brocade ICX 6610 can deliver all 48 ports with full Class 3 power. The following chart shows how many ports can be driven with power, based on the number of power supplies that are installed:

Brocade ICX 6610 Model	PoE Class 3 Ports	PoE+ Ports
24-port model, single AC power supply	24	24
24-port model, dual AC power supply	24 fully redundant	24 fully redundant
48-port model, single AC power supply	48	25
48-port model, dual AC power supply	48 fully redundant	48

## Q. What is the Brocade ICX 6610 PoE power budget?

A. The total maximum PoE power budget is 1,500 W with two AC power supplies and 516 W with two DC power supplies. The Brocade ICX 6610 PoE models support two internal hot-swappable load-sharing 1,000 W AC or 510 W DC power supplies. Each AC or DC power supply delivers 750 W or 258 W of PoE power respectively and has 250 W reserved for system power.

## Q. Can the Brocade ICX 6610 be field-upgraded to support PoE?

A. No. Non-PoE Brocade ICX 6610 models cannot be upgraded to support PoE. The PoE design of the Brocade ICX 6610 requires different power supplies and a different chassis.

**Q. Can the Brocade ICX 6610 configure PoE power via a Cisco CDP packet?**

**A.** Yes. The Brocade ICX 6610 has the capability to configure the individual port power based on the content of a CDP packet sent from a Cisco phone. This is a useful feature to control power on a more granular basis than the class definitions allow.

**Q. Does the Brocade ICX 6610 offer both AC and DC power supplies?**

**A.** Yes. The Brocade ICX 6610 supports both AC and DC power supplies. A DC power supply option can be installed on any of the Brocade ICX 6610 models (24/48 copper ports models, 24/48 PoE ports models, the 24 SFP ports model) and is available with port-side exhaust and port-side intake airflow as the following SKUs:

- **RPS16DC-E:** 510 W DC power supply for all Brocade ICX 6610 models, port-side exhaust airflow
- **RPS16DC-I:** 510 W DC power supply for all Brocade ICX 6610 models, port-side intake airflow

Please note that, at this point, the DC power supply needs to be ordered separately as an option to an existing ICX6610 SKU. Also note that, when installed in a PoE-capable switch, the DC power supply delivers PoE power to the ports.

The DC power supply requires Brocade FastIron software release 7.3.00e or later.

**Q. Brocade ICX 6610 Switches have two removable fan trays. Can the fan tray be replaced while the unit is running?**

**A.** Yes. The fan unit can be hot-swapped while the unit is running.

**Q. How is the Brocade ICX 6610 managed?**

**A.** The Brocade ICX 6610 supports a wide range of management standards and features an industry-standard CLI and a Web-based interface. Additionally, it can be managed—along with the rest of the Brocade Ethernet network—by Brocade Network Advisor management software. The Brocade ICX 6610 offers a dedicated out-of-band 10/100/1000 Mbps management port so edge ports are not consumed by management traffic.

**Q. What does “hitless failover” mean?**

**A.** Hitless stacking failover is a critical high-availability feature provided by Brocade stacking technology. Hitless failover enables the standby stack controller to instantaneously take over in the event of a failure of the master stack controller, without any interruption of traffic forwarding.

In addition, if a stack controller (one of the switches in the stack) fails, it can be replaced while the stack is operating—without interrupting traffic forwarding—through hot insertion and removal of stacked units. This is another high-availability feature of Brocade stacking technology.

**Q. Does the Brocade ICX 6610 have the option for a redundant power supply?**

**A.** Yes. All Brocade ICX 6610 models allow for an optional second redundant power supply to be installed internally. These power supplies are hot-swappable and load-sharing.

**Q. How is the cooling airflow in the Brocade ICX 6610 directed?**

**A.** Airflow in all Brocade ICX 6610 Switches flows from either port side to power supply side, or power supply side to port side. Airflow can be specified at the time of order and can be reversed in the field by swapping the power supplies and fan assembly. Brocade ICX 6610 Switches, power supplies, and fan trays are orderable with either power supply side intake (SKUs ending with -I) or power supply side exhaust (SKUs ending with -E) airflow.

**Q. Is a lifetime warranty offered for Brocade ICX 6610 Switches?**

**A.** Yes. Brocade ICX 6610 Switches are covered by the Brocade Assurance® Limited Lifetime Warranty. For details, visit [www.brocade.com/warranty](http://www.brocade.com/warranty).

**Learn More**

**Q. How do I find out more about the Brocade ICX 6610?**

**A.** Navigate to the Brocade ICX 6610 product page on [www.brocade.com](http://www.brocade.com) for the latest data sheets, white papers, and solution briefs, or contact your Brocade sales representative or Brocade OEM Partner for more details.

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