CONFIGURATION GUIDE

Ruckus FastIron Stacking Configuration Guide, 08.0.70

Supporting FastIron Software Release 08.0.70

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Document Conventions

The following tables list the text and notice conventions that are used throughout this guide.

TABLE 1 Text conventions

Convention	Description	Example
`monospace`	Identifies command syntax examples.	`device(config)# interface ethernet 1/1/6`
bold	User interface (UI) components such as screen or page names, keyboard keys, software buttons, and field names	On the **Start** menu, click **All Programs**.
italics	Publication titles	Refer to the *Ruckus Small Cell Release Notes* for more information

Notes, Cautions, and Warnings

Notes, cautions, and warning statements may be used in this document. They are listed in the order of increasing severity of potential hazards.

NOTE
A NOTE provides a tip, guidance, or advice, emphasizes important information, or provides a reference to related information.

CAUTION
A CAUTION statement alerts you to situations that can be potentially hazardous to you or cause damage to hardware, firmware, software, or data.

DANGER
A DANGER statement indicates conditions or situations that can be potentially lethal or extremely hazardous to you. Safety labels are also attached directly to products to warn of these conditions or situations.

Command Syntax Conventions

Bold and italic text identify command syntax components. Delimiters and operators define groupings of parameters and their logical relationships.

Convention	Description
bold text	Identifies command names, keywords, and command options.
italic text	Identifies a variable.
[ ]	Syntax components displayed within square brackets are optional.
	Default responses to system prompts are enclosed in square brackets.
{ **x** | **y** | **z** }	A choice of required parameters is enclosed in curly brackets separated by vertical bars. You must select one of the options.
x | **y**	A vertical bar separates mutually exclusive elements.
< >	Nonprinting characters, for example, passwords, are enclosed in angle brackets.
...	Repeat the previous element, for example, *member*[*member*...].
\	Indicates a "soft" line break in command examples. If a backslash separates two lines of a command input, enter the entire command at the prompt without the backslash.

Document Feedback

Ruckus is interested in improving its documentation and welcomes your comments and suggestions.

You can email your comments to Ruckus at: docs@ruckuswireless.com

When contacting us, please include the following information:

- Document title and release number
- Document part number (on the cover page)
- Page number (if appropriate)
- For example:
  - Ruckus Small Cell Alarms Guide SC Release 1.3
  - Part number: 800-71306-001
  - Page 88

Ruckus Product Documentation Resources

Visit the Ruckus website to locate related documentation for your product and additional Ruckus resources.

Release Notes and other user documentation are available at https://support.ruckuswireless.com/documents. You can locate documentation by product or perform a text search. Access to Release Notes requires an active support contract and Ruckus Support Portal user account. Other technical documentation content is available without logging into the Ruckus Support Portal.

White papers, data sheets, and other product documentation are available at https://www.ruckuswireless.com.

Online Training Resources

To access a variety of online Ruckus training modules, including free introductory courses to wireless networking essentials, site surveys, and Ruckus products, visit the Ruckus Training Portal at https://training.ruckuswireless.com.

Contacting Ruckus Customer Services and Support

The Customer Services and Support (CSS) organization is available to provide assistance to customers with active warranties on their Ruckus Networks products, and customers and partners with active support contracts.

For product support information and details on contacting the Support Team, go directly to the Support Portal using https://support.ruckuswireless.com, or go to https://www.ruckuswireless.com and select **Support**.

What Support Do I Need?

Technical issues are usually described in terms of priority (or severity). To determine if you need to call and open a case or access the self-service resources use the following criteria:

- Priority 1 (P1)—Critical. Network or service is down and business is impacted. No known workaround. Go to the **Open a Case** section.
- Priority 2 (P2)—High. Network or service is impacted, but not down. Business impact may be high. Workaround may be available. Go to the **Open a Case** section.
- Priority 3 (P3)—Medium. Network or service is moderately impacted, but most business remains functional. Go to the **Self-Service Resources** section.
- Priority 4 (P4)—Low. Request for information, product documentation, or product enhancements. Go to the **Self-Service Resources** section.

Open a Case

When your entire network is down (P1), or severely impacted (P2), call the appropriate telephone number listed below to get help:

- Continental United States: 1-855-782-5871
- Canada: 1-855-782-5871
- Europe, Middle East, Africa, and Asia Pacific, toll-free numbers are available at https://support.ruckuswireless.com/contact-us and Live Chat is also available.

Self-Service Resources

The Support Portal at https://support.ruckuswireless.com/contact-us offers a number of tools to help you to research and resolve problems with your Ruckus products, including:

- Technical Documentation—https://support.ruckuswireless.com/documents
- Community Forums—https://forums.ruckuswireless.com/ruckuswireless/categories
- Knowledge Base Articles—https://support.ruckuswireless.com/answers

- Software Downloads and Release Notes—https://support.ruckuswireless.com/software
- Security Bulletins—https://support.ruckuswireless.com/security

Using these resources will help you to resolve some issues, and will provide TAC with additional data from your troubleshooting analysis if you still require assistance through a support case or RMA. If you still require help, open and manage your case at https://support.ruckuswireless.com/case_management

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Supported hardware

This guide supports the following Ruckus products:

- Ruckus ICX 7750 Series
- Ruckus ICX 7650 Series
- Ruckus ICX 7450 Series
- Ruckus ICX 7250 Series
- Ruckus ICX 7150 Series

For information about what models and modules these devices support, see the hardware installation guide for the specific product family.

What's new in this document

The following tables provide descriptions of new information added to this guide for FastIron software release 08.0.70.

TABLE 2 Summary of enhancements in FastIron release 08.0.70 Version 4

Feature	Description	Location
ICX 7150 stacking ports	The text has been updated to clarify that 1-Gbps ports must be converted to 10-Gbps ports to support stacking.	ICX 7150 stack configuration overview on page 45

TABLE 3 Summary of enhancements in FastIron release 08.0.70 Version 3

Feature	Description	Location
show stack command updates	The show stack command has been updated to show the rear-module operating mode for ICX 7650 stacks.	Updates occur throughout the guide.

TABLE 4 Summary of enhancements in FastIron release 08.0.70 Version 2

Feature	Description	Location
Updates	Minor editorial updates	Updates occur throughout the guide.
Stack role transition	Considerations for role transition from member to standby controller	Refer to Stacking unit role transition considerations on page 203.

TABLE 5 Summary of enhancements in FastIron release 08.0.70

Feature	Description	Location
ICX 7650 stacking	Stacking support has been added for all FastIron ICX 7650 models.	Refer to ICX 7650 stack configuration overview on page 90.

TABLE 5 Summary of enhancements in FastIron release 08.0.70 (continued)

Feature	Description	Location
ICX 7750 LR4 support	Beginning with this release, all stacking ports on all ICX 7750 models support LR4 40-Gbps optics.	Refer to FastIron stacking distances and optics by device on page 20, Long-distance stacking ports on page 21, and ICX 7750 stack configuration overview on page 123.

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Traditional stacking

A stack is a group of devices that operate as a single chassis.

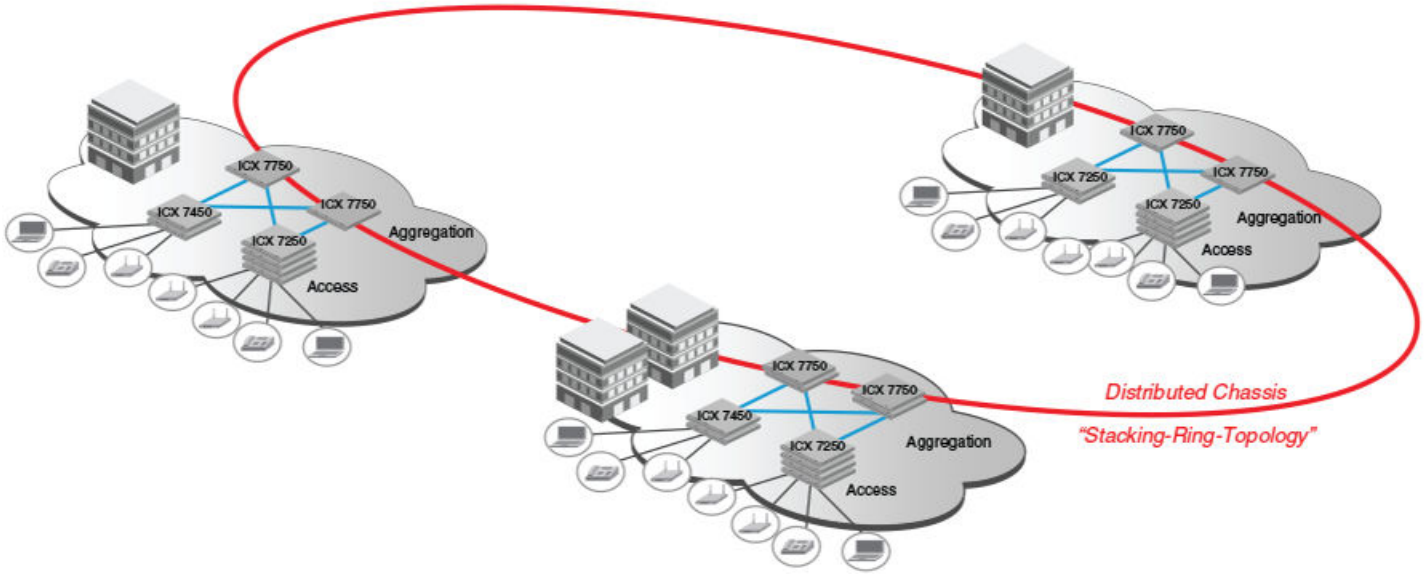
A Ruckus traditional stack contains from two to 12 units configured in a ring or linear topology. The units in a traditional stack are from the same model family; that is, a traditional stack can be an ICX 7150 stack, an ICX 7250 stack, an ICX 7450 stack, and ICX 7650 stack, or an ICX 7750 units.

The members of a traditional stack may be located together. For example, Top-of-rack switches can form a stack that acts as a single switch to manage data center access. Stack members can be physically separated, and the distance between stacking members depends on the type of connector cables used.

Certain fiber optic options increase the potential distance between stacks, which allows members of the same stack to reside in different wiring closets, on different floors of one building, or in different buildings across the campus as illustrated in the following figure. Refer to FastIron stacking distances and optics by device on page 20 for more information.

Ruckus stackable devices are connected either through dedicated stacking ports or through ports that can be configured for either stacking or data. The location of stacking ports and configuration options differ by device type. Refer to the section on each device type for more information.

FIGURE 1 Distributed campus stacking topology



Network management and stack configuration

Even when all the switches within a stack are physically distributed, you can manage them as a single entity, enabling one-touch configuration changes via a single IP address.

The active controller manages the other stack units. It maintains the information database for all stack members and downloads software images as needed to all stack units. Each stack also has a standby controller for stack redundancy, and the stack can fail over seamlessly to the standby.

Configuring the stack through the stack secure-setup utility is straightforward and secure. Custom configuration can be combined with automated setup if, for example, you want to add units, move stacking ports, create trunks, or transform a default stacking port into a data uplink port.

Switching and routing advantages

Packet switching between ports on stack units is handled by the hardware. All protocols operate with traditional stacking in the same way as on a chassis system.

You can use stack connections to link distributed switches instead of standard inter-switch links with Layer 2 Spanning Tree Protocol (STP) or Layer 3 routing. Using stack connections has significant advantages:

- Layer 2 simplicity. Stack links do not need to be considered as part of the overall network topology, which means that they can be used to provide resiliency, and Layer 3 routing is not needed to manage traffic flows.
- No closed links. Because the stack links are internal to the switches, they are not seen as part of a Layer 2 network. This means that all links can remain open and can be used to carry traffic simultaneously, maximizing throughput.
- Fast failover. The rapid detection and recovery techniques used on stack links mean that failure of a link or a switch results in hitless failover, with no impact on user services.

The next section describes Switch Port Extender technology, which is based on an ICX 7650 or an ICX 7750 core stack. Refer to the *Ruckus FastIron Campus Fabric Configuration Guide* for more information.

Campus Fabric

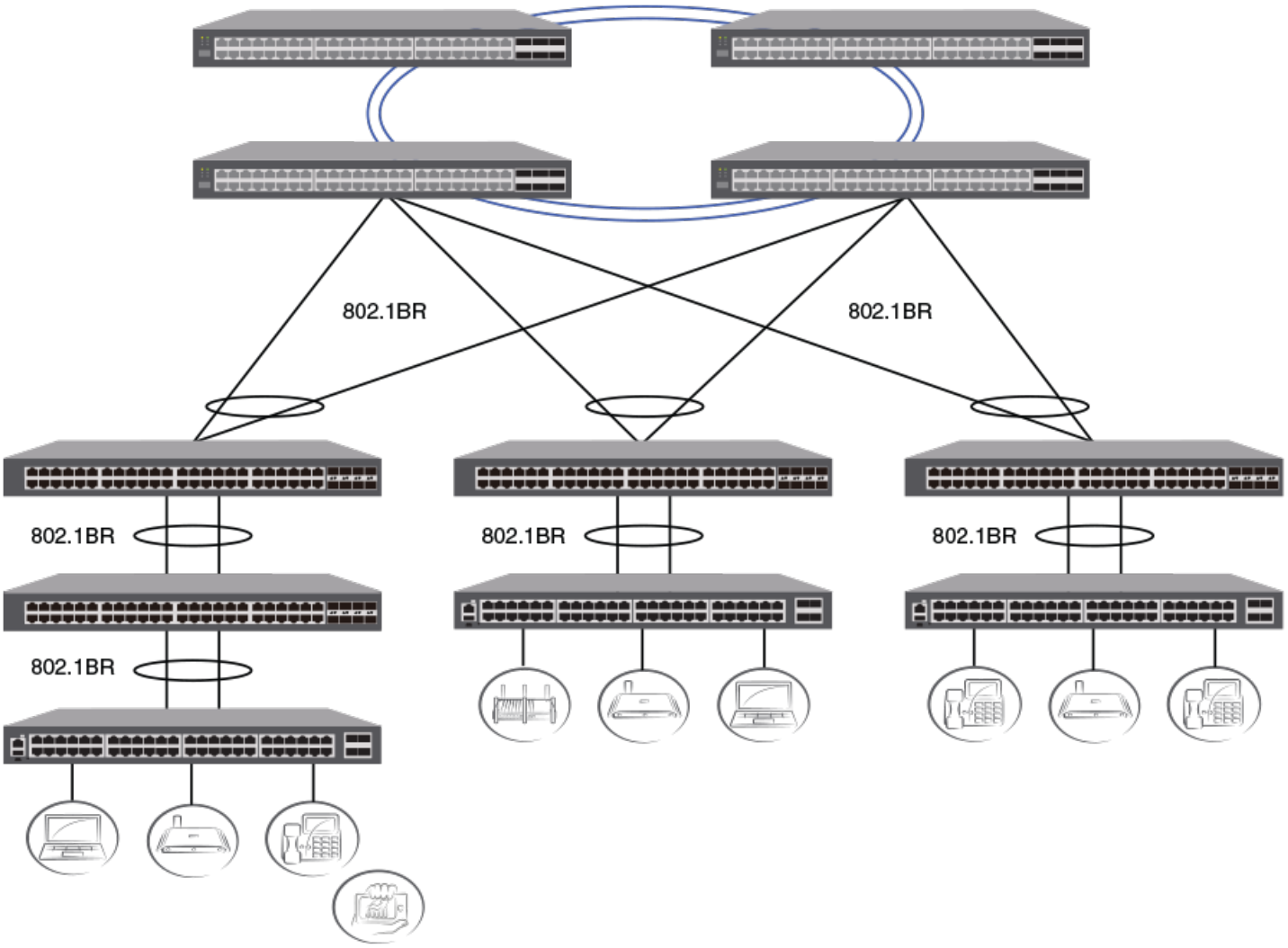
Campus Fabric is sometimes referred to as Switch Port Extender (SPX).

Campus Fabric creates a more scalable architecture based on IEEE 802.1BR standards. Ruckus Campus Fabric architecture adds ICX 7450, ICX 7250, or ICX 7150 devices configured as port extenders (PEs), or PE units, to a set of ICX 7750 stack units configured as the control bridge. The ICX 7750 control bridge (CB) provides a single point of management for the extended network. Active and standby controller functions are retained and continue to provide hitless recovery as well as extended administrative functions. Campus Fabric greatly increases the number of access devices that the network can support. The distributed CB at the center of Campus Fabric architecture manages PE units and hundreds to thousands of ports at the network edge.

PE units are standards-based devices. Typically lower in cost, PE units rely on the CB for most network functions. As the network expands, new PE units can be detected and added to the network automatically using defined Campus Fabric communication protocols. PE units also inherit Premium-license features from the CB, which further reduces cost.

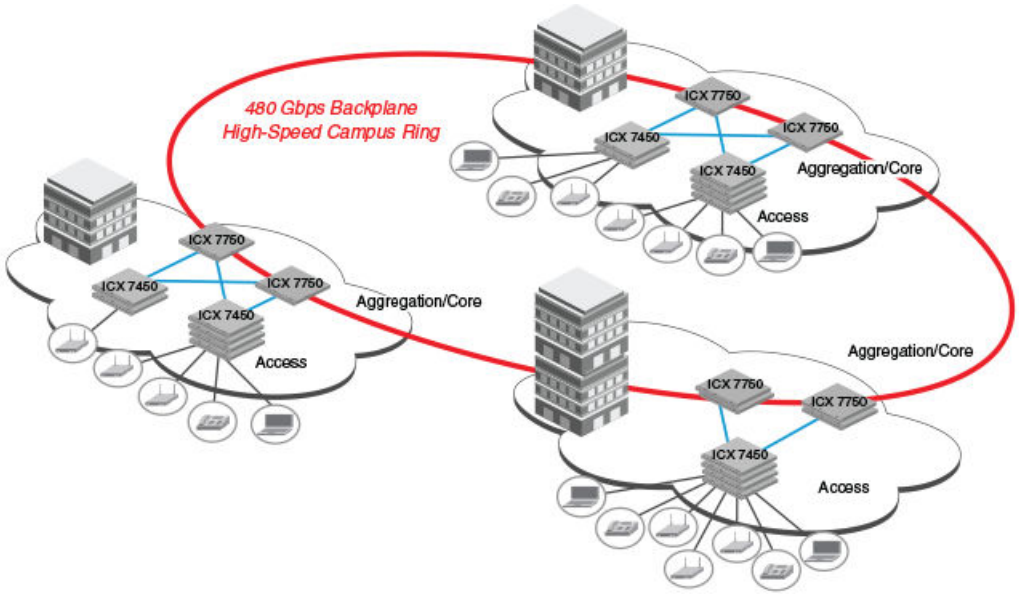
Campus Fabric architecture simplifies network management by unifying core, aggregation, and access functions. As illustrated in the following figure, a core stack (distributed chassis) serving as the CB connects to downstream Campus Fabric (PE) units that aggregate large numbers of access devices.

FIGURE 2 Campus Fabric domain build-out from an ICX 7750 CB stack



The following figure depicts three separate campuses, each with its own Campus Fabric domain, interconnected with a high-speed backbone.

FIGURE 3 Distributed campus network formed from connected Campus Fabric domains



Ruckus stackable models

All ICX 7450, ICX 7650, and ICX 7750 devices and some ICX 7250 and ICX 7150 devices can be members of a Ruckus traditional stack. ICX 7750 devices installed in a traditional stack can also be configured as an 802.1br control bridge that manages ICX 7450, ICX 7250, or ICX 7150 devices configured as port extender (PE) units. Refer to the *Ruckus FastIron Campus Fabric Configuration Guide* for information on 802.1br configuration.

Refer to the following sections for information on the ICX 7150:

- ICX 7150 stack configuration overview on page 45
- ICX 7150 stacking topologies on page 48
- Planning to build a stack with 802.1br switch port extender capability on page 25.

Refer to the following sections for information on the ICX 7250:

- ICX 7250 stack configuration overview on page 61
- ICX 7250 stacking topologies on page 62
- Planning to build a stack with 802.1br switch port extender capability on page 25.

Refer to the following sections for information on the ICX 7450:

- ICX 7450 stack configuration overview on page 70
- ICX 7450 stacking topologies on page 71
- Planning to build a stack with 802.1br switch port extender capability on page 25.

Refer to the following sections for information on the ICX 7650:

- ICX 7650 stack configuration overview on page 90
- ICX 7650 stacking topologies on page 92.

Refer to the following sections for information on the ICX 7750:

- ICX 7750 stack configuration overview on page 123
- ICX 7750 stacking topologies on page 124
- Configuring an ICX 7750 traditional stack on page 123
- Planning to build a stack with 802.1br switch port extender capability on page 25.

For information about physical installation of each type of device, refer to the appropriate hardware installation guide.

Traditional stacking terminology

Certain terms and roles specific to stacking are used throughout this guide. This section describes the roles stack units may assume as well as terms key to understanding stacking.

NOTE
Refer to the *Ruckus FastIron Campus Fabric Configuration Guide* for terms specific to IEEE 802.1br and switch port extender (SPX) capability.

Stack unit roles

- Active controller: Handles stack management and configures all system- and interface-level features.
  - Future active controller: The unit that will take over as active controller after the next reload, if its priority has been changed to the highest priority. When a priority for a stack unit is changed to be higher than the existing active controller, the takeover does not occur immediately to prevent disruptions in stack operation.
- Standby controller: The stack member with the highest priority after the active controller. The standby controller takes over if the current active controller fails.
- Stack member: A unit functioning in the stack in a capacity other than active controller or standby controller.
- Stack unit: Any device functioning within the stack, including the active controller and standby controller.
  - Upstream stack unit: An upstream unit is connected to the first stacking port on the active controller. (The left port as you face the stacking ports.)
  - Downstream stack unit: A downstream unit is connected to the second stacking port on the active controller. (The right port as you face the stacking ports.)

NOTE
The terms "upstream port" and "downstream port" have special meanings in an 802.1br SPX configuration. Refer to the *Ruckus FastIron Campus Fabric Configuration Guide* for more information.

Stacking terms

- Bootup role: The role a unit takes during the boot sequence. This role can be standalone, active controller, standby controller, or stack member. The active controller or a standalone unit can access the full range of the CLI. Until a stack is formed, the local consoles on the standby controller and stack members provide access to a limited form of the CLI, such as the **show stack** command and a few **debug** commands. When the stack is formed, all local consoles are directed to the active controller, which can access the entire CLI. The last line of output from the **show version** command indicates the role of a unit (except for standalone units) as shown in the following example:

```
My stack unit ID = 1, bootup role = active
```

- Clean unit: A unit that contains no startup flash configuration or runtime configuration. To erase old configuration information, enter the **erase startup-config** command and reset the unit.
- Control path: A path across stacking links dedicated to carrying control traffic such as commands to program hardware or software image data for upgrades. A stack unit must join the control path to operate fully in the stack.
- Default ports: FastIron devices use the **default-ports** command to define stacking port candidates.
- Dynamic configuration: A unit configuration that is dynamically learned by a new stack unit from the active controller. A dynamic configuration disappears when the unit leaves the stack.
- Interprocessor Communications (IPC): The process by which proprietary packets are exchanged between stack unit CPUs.
- IronStack: A set of Ruckus stackable units (maximum of twelve) and their connected stacking links so that all units can be accessed through their common connections. A single unit can manage the entire stack, and configurable entities, such as VLANs and trunk groups, can have members on multiple stack units.
- Non-Functioning stack unit: A stack unit that is recognized as a stack member, and is communicating with the active controller over the Control Path, but is in a non-functioning state. A non-functioning stack unit will drop or discard traffic from non-stacked ports. This may be caused by an image or configuration mismatch.
- Reserved / provisional unit: A unit configuration number that has no physical unit associated with it.
- Secure-setup: A software utility that establishes a secure stack.
- Sequential connection: Stack unit IDs, beginning with the active controller, are sequential. For example, 1, 3, 4, 6, 7 is sequential if active controller is 1. 1, 7, 6, 4, 3 are non-sequential in a linear topology, but become sequential in a ring topology when counted from the other direction as: 1, 3, 4, 6, 7. Gaps in numbering are allowed.
- Stack path: A data path formed across the stacking links to determine the set of stack members that are present in the stack topology, and their locations in the stack.
- Stack slot: A *slot* in a stack is synonymous with a *line model* in a chassis.
- Stack topology: A contiguously-connected set of stack units in an IronStack that are currently communicating with each other. All units that are present in the stack topology appear in output from the **show stack** command.
- Stacking link: A cable that connects a stacking port on one unit to a stacking port on another unit.
- Stacking port: A physical interface on a stack unit that connects a stacking link. Stacking ports are point-to-point links that exchange proprietary packets. Stacking ports cannot be configured for any other purpose while operating as stacking ports. The number of available stacking ports depends on the platform. Some ports can be configured as either stacking ports or regular data ports. Refer to the hardware installation guide for the specific device for more information.
- Standalone unit: A unit that is not enabled for stacking, or an active controller without any standby controller or stack members.
- Static configuration: A configuration that remains in the database of the active controller even if the unit it refers to is removed from the stack. Static configurations are derived from the startup configuration file during the boot sequence, are manually entered, or are converted from dynamic configurations after a **write memory** command is issued.
- Trunked stacking port (trunk): A trunk consists of multiple stacking ports and is treated as one logical link. It provides more bandwidth and better resilience than individually connected ports.
- Unit replacement: The process of swapping out a unit with a clean unit. No configuration change is required.

Building a Stack

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Planning to build a traditional stack

Before you begin to build a traditional stack, you should be familiar with supported stacking software requirements, topologies, and recommendations.

Software requirements

All units in a traditional stack must be running the same software version.

Maximum configuration file size for any stack is 1 MB.

Traditional stack requirements

Traditional stacks must contain devices of the same type or product line. For example, a traditional stack cannot combine ICX 7150, ICX 7250, ICX 7450, ICX 7650, or ICX 7750 devices. However, a traditional stack can contain any combination of devices from the same product line, for example, any combination of ICX 7250 devices.

NOTE
A core stack for an 802.1br (SPX) configuration is a traditional stack that contains only ICX 7750 devices, although the stack may contain different types of ICX 7750 devices. Refer to the *Ruckus FastIron Campus Fabric Configuration Guide* for more information.

Ruckus traditional stacking topologies

Ruckus traditional stacking technology supports linear and ring topologies.

Although Ruckus stackable units may be connected in a simple linear topology, Ruckus recommends a ring topology because it offers the best redundancy and the most resilient operation. Unicast switching follows the shortest path in a ring topology. When the ring is broken, the stack recalculates the forwarding path and then resumes the flow of traffic within a few seconds.

In a ring topology, all stack members must have two stacking ports; however, in a linear topology, both end units use only one stacking port, leaving the other port available as a data port.

FastIron stacking distances and optics by device

Because Ruckus devices use Ethernet for the inter-switch stack connections, the deployment options are greatly increased. If standard copper stacking cables are used, the inter-switch connections can be up to 5 meters, which is usually sufficient for locally distributed stacks, such as in Top-of-Rack (ToR) applications. For broader distribution, fiber-optic cables should be used, allowing a stack to be deployed across multiple physical locations, such as in the wiring closets of an office building, or in different buildings on a campus.

Cables that support different distances can be combined in the same stack. For example, you can use LR4 Single Mode Fiber (SMF) optics at both ends of a stacking connection, and the maximum distance is extended to 10 kilometers. Other stacking ports in the same stack can use other optics, such as SR4, at both ends. The maximum distance for such a connection is 100 meters.

NOTE
The same optics (for example, LR4) must be used on both ends of a connection. If the optics do not match on both ends, the ports will not come up.

The following table shows copper and fiber-optic options approved for stacking and stacking distance combinations.

TABLE 6 Copper and fiber-optic options and stacking distances

Device	Stacking port	Copper options	Fiber-optic options	Fiber-optic maximum stacking distance
ICX 7750	6 X 40-Gbps Front and rear stacking and uplink	0.5- or 1-meter passive copper 1-, 3-, or 5-meter QSFP-QSFP active direct-attach copper, 10-meter QSFP-QSFP AOC	40G-QSFP-SR4	100 meters
			40G-QSFP-BiDi	
			40G-QSFP-LM4	140 meters
			40G-QSFP-eSR4	300 meters
			40G-QSFP-LR4	10 kilometers
			40G-QSFP-ER4	40 kilometers
ICX 7650	4 X 40-Gbps stacking or uplink, or 2 X 100-Gbps stacking or uplink on slot 3	40 Gbps: 0.5- or 1-meter passive copper 1-, 3-, or 5-meter QSFP-QSFP active direct-attach copper 100 Gbps: [1] 0.5-, 1-, 3-, or 5-meter QSFP28 to QSFP28 Passive Copper Cable	40G-QSFP+-SR4	100 meters
			40G-QSFP+-BiDi	
			40G-QSFP+-LR4	10 kilometers
			100G-QSFP28-LR4-10KM, 3.5W	
			100G-QSFP28-LR4-10KM, 4.5W	
			100G-QSFP28-LR4L-2KM, 4W	2 kilometers
			100G-QSFP28-CWDM4-2KM	
			100G-QSFP28-SR4[2]	100 meters
ICX 7450 (rear)	1 X 40-Gbps stacking and uplink on slots 3 and 4 [3]	0.5- or 1-meter SFP+ passive copper 1-, 3-, or 5-meter QSFP-QSFP active direct-attach copper	40G-QSFP-SR4	100 meters
			40G-QSFP-eSR4	300 meters
			40G-QSFP-LR4[4]	10 kilometers
ICX 7450 (front)	4 X 10-Gbps stacking on slot 2 with the icx7400-4x10GF module only	1-, 3-, or 5-meter SFP+ passive cables	10G-SFPP-USR	100 meters
			10G-SFPP-SR	300 meters
			10G-SFPP-LR	10 kilometers

[1] For data uplink only, the10-meter QSFP28 to QSFP28 AOC Cable is supported on ICX 7450 and ICX 7650 devices.
[2] Finisar Supplier only for Stacking with MPN # FTLC9551REPM-B3
[3] For data uplink only, the following 40-Gbps optics are available on ICX 7450 devices: 40G-QSFP-BiDi, 40G-QSFP-LM4.
[4] Refer to "Long-distance stacking ports" in this guide for more information.

TABLE 6 Copper and fiber-optic options and stacking distances (continued)

Device	Stacking port	Copper options	Fiber-optic options	Fiber-optic maximum stacking distance
		1-, 3-, or 5-meter SFP+ active direct-attach copper, 7- or 10-meter SFP+ AOC		
ICX 7250	4 X 10-Gbps stacking from dedicated or uplink ports 4 X 10F SFP+ Uplink Ports: No-PHY 4 X 10F SFP+ Stacking Ports: With re-timer capability	1-, 3-, or 5-meter SFP+ passive cables 1-, 3-, or 5-meter active cables	10GE SR SFP+	300 meters
			10GE USR SFP+	100 meters
			10GE LR SFP+	10 kilometers
ICX 7150	Standard 2 X 10-Gbps stacking 4 X 10-Gbps stacking from dedicated or uplink ports if an ICX 7150-48ZP is present 2 X 10-Gbps stacking only on ICX 7150-C12P devices Up to 4 X 10F SFP+ uplink Ports: No-PHY Up to 4 X 10F SFP+ stacking ports: With re-timer capability	1- or 3-meter SFP+ passive cables 1-, 3-, or 5-meter active cables	10GE SR SFP+	300 meters
			10GE USR SFP+	100 meters
			10GE LR SFP+	10 kilometers

NOTE
Do not use 3-meter passive cables for ICX 7150 stacking port cross-connections (for example, n/3/1 to n/3/3); however, the cables can be used for same-port connections (for example, n/3/1 to n/3/1).

Long-distance stacking ports

Only certain FastIron stacking devices support long-distance stacking. The following table lists FastIron devices and ports that support 100-Gbps long-distance data and stacking connections.

TABLE 7 FastIron long-distance 100-Gbps ports

Product and model	Ports that support 1 X 100-Gbps optics	Long-distance stacking ports
ICX 7650 (all models)	1/3/1, 1/3/2[5]	1/3/1, 1/3/2

NOTE
For a list of 100-Gbps optics available for FastIron devices, refer to "FastIron stacking distances and optics by device" in this guide.

[5] When ICX 7650-48F/P/ZP devices are configured in stacking mode, front panel slot 2 also supports 2 X 40-Gbps or 1 X 100-Gbps modules with their respective Ruckus-qualified optical hardware.

FastIron models and 40-Gbps ports that can be used for long-distance data and stacking connections are listed in the following table.

TABLE 8 FastIron long-distance 40-Gbps ports

Product and model	Ports that support 1 X 40-Gbps optics	Long-distance stacking ports
ICX 7450 (all models)	1/3/1, 1/4/1[6]	1/3/1, 1/4/1
ICX 7650 (all models)	1/3/1, 1/3/2, 1/3/3, 1/3/4[7]	1/3/1, 1/3/2, 1/3/3, 1/3/4
ICX 7750-26Q	1/1/1 through 1/1/20; 1/2/1 through 1/2/6; 1/3/1 through 1/3/6	1/2/1 through 1/2/6; 1/3/1 through 1/3/6
ICX 7750-48F	1/2/1 through 1/2/6; 1/3/1 through 1/3/6	1/2/1 through 1/2/6; 1/3/1 through 1/3/6
ICX 7750-48C	1/2/1 through 1/2/6; 1/3/1 through 1/3/6	1/2/1 through 1/2/6; 1/3/1 through 1/3/6

NOTE
For a list of 40-Gbps optics available per FastIron device, refer to FastIron stacking distances and optics by device on page 20.

NOTE
Not all long-distance stacking ports are default stacking ports. If you are using only long-distance stacking ports, you may not be able to use the stack secure-setup utility to configure your stack because the secure-setup utility probes for other potential stack members only on default stacking ports. Check device-specific information.

LR optics can be used on ICX 7450 4 X 10-Gbps ports when a 4X10GF module is present. LR optics can also used on ICX 7150 ports when either a 4X10GF module or 2X10GF module is present. LR optics can support distances up to 10 kilometers for data or stacking. The following table summarizes LR support on ICX 7150 and ICX 7450 devices.

TABLE 9 FastIron long-distance 2X10-Gbps and 4X10-Gbps ports

Product and model	10-Gbps ports that support LR optics	Long-distance stacking ports
ICX 7150-48ZP	1/2/1 through 1/2/8	1/2/1 through 1/2/4
ICX 7150-48, ICX 7150-48P, ICX 7150-48PF, ICX 7150-24, ICX 7150-24P	1/3/1 through 1/3/4	1/3/1 through 1/3/4
ICX 7150-C12P (2X10GF module)	1/3/1 and 1/3/2	1/3/1 and 1/3/2
ICX 7450 front (all models, with 4X10GF module)	1/2/1 through 1/2/4	1/2/1 through 1/2/4
ICX 7450 back (all models, with 4X10GF module)	1/3/1 through 1/3/4 and 1/4/1 through 1/4/4 (data only)	1/3/1 through 1/3/4 and 1/4/1 through 1/4/4

For general information on all long-distance stacking options for all FastIron stacking models, refer to FastIron stacking distances and optics by device on page 20. For details on setting up for long-distance stacking on ICX 7750 devices, refer to Installing the ICX 7750 in a remote stack on page 128.

[6] ICX 7450-24/24P devices also support a 1 X 40-Gbps module in front panel slot 2 (port 1/2/1).
[7] When ICX 7650-48F/P/ZP devices are configured in stacking mode, front panel slot 2 also supports 2 X 40-Gbps or 1 X 100-Gbps modules with their respective Ruckus-qualified optical hardware.

Displaying information on supported distances

Use the **show media** command to display information on stacking connections and supported distances. You can specify any interface within a stack or SPX configuration as shown in the following examples. You can also designate a stack to display all media attached to the stack. Without parameters, the **show media** command displays all media attached to the device.

The following example displays information for an interface with an LR4 optic.

```
ICX7750-48F Router# show media ethernet 4/2/6
Port   4/2/6: Type  : 40GE-LR4  10km (QSFP+ LC)
             Vendor: RUCKUS            Version: 2
             Part# : 57-1000263-01      Serial#: LDJ21325C230002
```

The following command output is for an interface with a 40-Gbps active copper optic with a maximum distance of 10 meters.

```
ICX7750-48F Switch# show media ethernet 3/2/1
Port    3/2/1: Type  : 40GE-Active Copper 10m (QSFP+)
             Vendor: RUCKUS            Version: A
             Part# : 57-1000306-01      Serial#: NEA11510000003S
```

The following output is for an interface with a 40-Gbps ESR4 optic.

```
ICX7750-48F Switch# show media ethernet 1/2/3
Port    1/2/3: Type  : 40GE-ESR4 300m (QSFP+)
             Vendor: RUCKUS            Version: A
             Part# : 57-1000296-01      Serial#: LVA115150000004
```

The following example displays information about the media attached to the device.

```
device# show media

Port 1/1/1 :     Type : 1G M-C (Gig-Copper)
Port 1/1/2 :     Type : 1G M-C (Gig-Copper)
Port 1/1/3 :     Type : 1G M-C (Gig-Copper)
Port 1/1/4 :     Type : 1G M-C (Gig-Copper)
Port 1/1/5 :     Type : 1G M-C (Gig-Copper)
Port 1/1/6 :     Type : 1G M-C (Gig-Copper)
Port 1/1/7 :     Type : 1G M-C (Gig-Copper)
Port 1/1/8 :     Type : 1G M-C (Gig-Copper)
Port 1/1/9 :     Type : 1G M-C (Gig-Copper)
Port 1/1/10:     Type : 1G M-C (Gig-Copper)
Port 1/1/11:     Type : 1G M-C (Gig-Copper)
Port 1/1/12:     Type : 1G M-C (Gig-Copper)
Port 1/1/13:     Type : 1G M-C (Gig-Copper)
Port 1/1/14:     Type : 1G M-C (Gig-Copper)
Port 1/1/15:     Type : 1G M-C (Gig-Copper)
Port 1/1/16:     Type : 1G M-C (Gig-Copper)
Port 1/1/17:     Type : 1G M-C (Gig-Copper)
Port 1/1/18:     Type : 1G M-C (Gig-Copper)
Port 1/1/19:     Type : 1G M-C (Gig-Copper)
Port 1/1/20:     Type : 1G M-C (Gig-Copper)
Port 1/1/21:     Type : 1G M-C (Gig-Copper)
Port 1/1/22:     Type : 1G M-C (Gig-Copper)
Port 1/1/23:     Type : 1G M-C (Gig-Copper)
Port 1/1/24:     Type : 1G M-C (Gig-Copper)
Port 1/2/1 :     Type : 10GE SR 300m (SFP +)
Port 1/2/2 :     Type : EMPTY
Port 1/2/3 :     Type : 1G Twinax 1m (SFP)
Port 1/2/4 :     Type : 1G Twinax 1m (SFP)
```

The following example shows output for the specified stack.

```
device# show media stack 1

Port 1/1/1   :  Type  : EMPTY
Port 1/1/2   :  Type  : EMPTY
Port 1/1/3   :  Type  : EMPTY
Port 1/1/4   :  Type  : EMPTY
Port 1/1/5   :  Type  : EMPTY
```

```
Port 1/1/6    :  Type  : EMPTY
Port 1/1/7    :  Type  : EMPTY
Port 1/1/8    :  Type  : EMPTY
Port 1/1/9:1  :  Type  : 4x10GE Active Copper 1m (QSFP+)
Port 1/1/9:2  :  Type  : 4x10GE Active Copper 1m (QSFP+)
Port 1/1/9:3  :  Type  : 4x10GE Active Copper 1m (QSFP+)
Port 1/1/9:4  :  Type  : 4x10GE Active Copper 1m (QSFP+)
Port 1/1/10   :  Type  : EMPTY
Port 1/1/11:1:  Type  : 4x10GE Active Copper 1m (QSFP+)
Port 1/1/11:2:  Type  : 4x10GE Active Copper 1m (QSFP+)
Port 1/1/11:3:  Type  : 4x10GE Active Copper 1m (QSFP+)
Port 1/1/11:4:  Type  : 4x10GE Active Copper 1m (QSFP+)
Port 1/1/12   :  Type  : EMPTY
Port 1/1/13   :  Type  : EMPTY
Port 1/1/14   :  Type  : EMPTY
Port 1/1/15   :  Type  : EMPTY
Port 1/1/16   :  Type  : EMPTY
Port 1/1/17   :  Type  : EMPTY
Port 1/1/18   :  Type  : EMPTY
Port 1/1/19   :  Type  : EMPTY
Port 1/1/20   :  Type  : EMPTY
Port 1/2/1    :  Type  : EMPTY
Port 1/2/2    :  Type  : EMPTY
Port 1/2/3    :  Type  : EMPTY
Port 1/2/4    :  Type  : EMPTY
Port 1/2/5    :  Type  : EMPTY
Port 1/2/6    :  Type  : EMPTY
Port 1/3/1    :  Type  : 40GE-SR4 100m (QSFP+)
Port 1/3/2    :  Type  : EMPTY
Port 1/3/3    :  Type  : EMPTY
Port 1/3/4    :  Type  : EMPTY
Port 1/3/5    :  Type  : EMPTY
Port 1/3/6    :  Type  : EMPTY
```

Traditional stacking configuration guidelines

Before you configure your traditional stack, consider the following guidelines:

- Plan the number of units and how the stacking ports on the units will be connected. For more information, refer to the hardware installation guide for your device.
- The stack should be physically cabled in a linear or ring topology. Connect only those units that will be active in the stack.
- Make sure all units intended for the stack are running the same software version. On any of the console ports in the stack, use the **show version** command to view all units, or the **show version unit** *unit-number* command to view an individual unit.

  NOTE
  If you are running a router image and there is a potential loop in your topology, you must configure the Spanning Tree Protocol in the would-be active controller. Otherwise, excessive looping packets may affect stack formation. The Spanning Tree Protocol is enabled by default in switch images.

NOTE
If STP is not enabled, there may be a loop issue when multiple cables are used to connect a standalone unit to a stack. The loop does not affect stack formation. The loop issue disappears after the multiple links are converted to stacking trunks when the standalone unit is integrated to the stack. However, temporary looping may cause some data traffic interruption. If you are concerned about potential traffic interruption due to looping, you can connect a single cable to the new unit. After the unit reloads and becomes a member, you can connect all cables and then run the stack secure-setup utility to make sure these links are converted to stacking trunks.

- When you have a stack of eight or more units, you may need to increase the trap hold time from the default (60 seconds) to five minutes (300 seconds). This will prevent the loss of initial boot traps. To increase the trap hold time, use the following command.

```
device# configure terminal
device(config)# snmp-server enable traps holddown-time 300
```

Planning to build a stack with 802.1br switch port extender capability

If you are planning to create an 802.1br SPX configuration with an ICX 7750 core stack, there are a few considerations.

In general, Ruckus traditional stacking and 802.1br SPX configuration are independent. Here are a few details to keep in mind:

- Only ICX 7750 devices can serve as the control bridge (CB). The CB can be a standalone unit or a stack of multiple units.
- ICX 7150, ICX 7250, and ICX 7450 devices can be configured as PE units attached to the CB. PE units can be attached to any CB unit.
- While a traditional stack may include up to 12 units, a CB stack of no more than four units is recommended.
- ICX 7750 breakout ports can be used with an 802.1br SPX configuration; however, they can be enabled only in a standalone ICX 7750 unit.
- SPX runs over LLDP protocol at Layer 2. When you enable SPX with the **spx cb-enable** command, the **lldp run** command is also executed if LLDP has not previously been enabled.
- You will need to plan a server location from which images and manifest files can be downloaded to PE units.
- In general, ICX 7750 devices in the CB retain all capabilities. The feature set of ICX 7450 devices operating as PE units, however, may be affected.

For detailed information on 802.1br SPX configuration, including protocol considerations, refer to the *Ruckus FastIron Campus Fabric Configuration Guide*.

Traditional stack construction methods

NOTE
The principles outlined in stack construction scenarios apply to all ICX devices. Figures used to illustrate a certain stack topology are not necessarily representative of other devices. For illustrations specific to a particular device, refer to the stack configuration section for that device, which also contains device-specific stacking considerations and configuration examples.

There are three ways to build a traditional stack.

1. The secure-setup utility. Secure-setup gives you control over the design of your stack topology and provides security through password verification. For the secure-setup procedure, refer to Using secure-setup to configure a traditional stack in a ring topology on page 27.
2. Automatic stack configuration. With this method, you enter all configuration information, including the module type and the priorities of all members into the unit you decide will be the active controller and set its priority to be the highest. When you enable stacking on the active controller, the stack then forms automatically. This method requires that you start with clean units (except for the active controller) that do not contain startup or runtime configurations. Refer to Scenario 2 - Automatically configuring a three-member traditional stack in a ring topology on page 35.
3. Manual stack configuration. With this method, you configure every unit individually and enable stacking on each unit. Once the units are connected together, they automatically operate as a traditional stack. With this method, the unit with the highest priority becomes the active controller, and ID assignment is determined by the sequence in which you physically connect the units. Refer to Scenario 3 - Manually configuring a three member traditional stack in a ring topology on page 39.

The secure-setup utility

NOTE
Secure-setup works for units within a single stack. It does not work across stacks.

NOTE
Long distance stacking ports are not default stacking ports. If you are using only long distance stacking ports, you cannot use the stack secure-setup utility to configure your stack because the secure-setup utility probes for other potential stack members only on default stacking ports.

Secure-setup lets you easily configure your entire stack through the active controller, which propagates the configuration to all stack members. Secure-setup is the most secure way to build a traditional stack. It gives you the most control over how your stack is built. For example, secure-setup offers three security features that prevent unauthorized devices from accessing or joining a traditional stack:

- Authentication of secure-setup packets provides verification that these packets are from a genuine Ruckus stack unit. MD5-based port verification confirms stacking ports.
- A superuser password is required to allow password-protected devices to become members of a traditional stack.
- The **stack disable** command prevents a unit from listening for or sending stacking packets. When a unit is stack-disabled, no other device in the network can force the unit to join a traditional stack.

Secure-setup can also be used to add units to an existing traditional stack and to change the stack IDs of stack members.

Secure-setup and the active controller

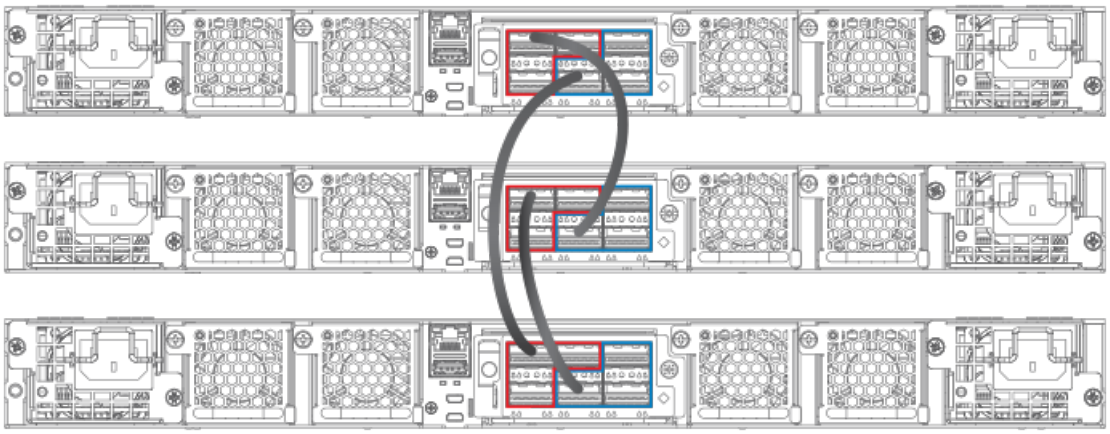
When secure-setup is issued on a unit that is not already the active controller, the unit becomes the active controller. If this unit does not already have an assigned priority and if no other unit in the stack has a priority higher than 128, secure-setup assigns the unit a priority of 128 by default. However, if another unit in the stack has a priority of 128 or higher, secure-setup gives the active controller a priority equal to the highest priority unit in the stack (which is by default the standby controller). When the active controller and the standby controller have identical priorities, during a reset, the old active controller cannot reassume its role from the standby controller (which became the active controller at the reset).

If the previous active controller again becomes active and you want it to resume the role of active controller, you should set the priority for the standby controller to a priority lower than 128. If you do not want the previous active controller to remain the active controller, you can set the same priority for both active and standby controllers (equal to or higher than128).

Using secure-setup to configure a traditional stack in a ring topology

The following figure shows three ICX 7750 stacking units connected in a ring. The secure-setup example that follows is for 12 ICX 7750 units in a ring topology. However, the procedure can be used for any stackable ICX device and any size traditional stack.

FIGURE 4 Traditional stack with ring topology



1. Connect the devices using the stacking ports and stack cabling. For more information, refer to the appropriate hardware installation guides.
2. Power on the units.
3. Connect your console to the intended active controller. The unit through which you run secure-setup becomes the active controller by default.
4. Issue the **stack enable** command on the intended active controller.

```
device# configure terminal
device(config)# stack enable
device(config)# exit
```

5. Enter the **stack secure-setup** command. As shown in the following example, this command triggers a Ruckus proprietary discovery protocol that begins the discovery process in both upstream and downstream directions. The discovery process produces a list of upstream and downstream devices that are available to join the stack. Secure-setup can detect up to 11 units in each direction (22 units total); however, you must select a total number of units that is less than the maximum stack size for the device because the controller is also part of the stack.

   NOTE
   During the secure-setup process, after one minute of inactivity, authentication for stack members expires, forcing you to restart the process.

   NOTE
   To exit the secure-setup, enter **^C** at any time.

The following example shows the suggested discovered topology.

```
ICX7750-48F Router# stack secure-setup
ICX7750-48F Router# Discovering the stack topology...

Current Discovered Topology - RING

Available UPSTREAM units
Hop(s)  Id      Type          Mac Address
 1       new  ICX7750-48XGF   cc4e.246d.8d80
 2       new  ICX7750-48XGF   cc4e.246d.9b00
 3       new  ICX7750-48XGF   cc4e.246d.9c80
 4       new  ICX7750-20QXG   cc4e.2439.2a80
 5       new  ICX7750-20QXG   cc4e.2439.3700
 6       new  ICX7750-20QXG   cc4e.2439.3880
 7       new  ICX7750-20QXG   cc4e.2439.2d00
 8       new  ICX7750-48XGC   cc4e.2439.1a00
 9       new  ICX7750-48XGC   cc4e.2439.1680
10       new  ICX7750-48XGC   cc4e.2439.1d80
11       new  ICX7750-48XGC   cc4e.2439.1280

Available DOWNSTREAM units
Hop(s)  Id      Type          Mac Address
 1       new  ICX7750-48XGC   cc4e.2439.1280
 2       new  ICX7750-48XGC   cc4e.2439.1d80
 3       new  ICX7750-48XGC   cc4e.2439.1680
 4       new  ICX7750-48XGC   cc4e.2439.1a00
 5       new  ICX7750-20QXG   cc4e.2439.2d00
 6       new  ICX7750-20QXG   cc4e.2439.3880
 7       new  ICX7750-20QXG   cc4e.2439.3700
 8       new  ICX7750-20QXG   cc4e.2439.2a80
 9       new  ICX7750-48XGF   cc4e.246d.9c80
10       new  ICX7750-48XGF   cc4e.246d.9b00
11       new  ICX7750-48XGF   cc4e.246d.8d80

Do you accept the topology (RING) (y/n)?: y
```

You are prompted to accept the topology.

6. Enter **y** to accept the topology. You should see output similar to the following.

```
Selected Topology:
Active  Id      Type          Mac Address
        1    ICX7750-48XGF    cc4e.246d.9e00

Selected UPSTREAM units
Hop(s)  Id      Type          Mac Address
 1       2    ICX7750-48XGF   cc4e.246d.8d80
 2       3    ICX7750-48XGF   cc4e.246d.9b00
 3       4    ICX7750-48XGF   cc4e.246d.9c80
 4       5    ICX7750-20QXG   cc4e.2439.2a80
 5       6    ICX7750-20QXG   cc4e.2439.3700
 6       7    ICX7750-20QXG   cc4e.2439.3880
 7       8    ICX7750-20QXG   cc4e.2439.2d00
 8       9    ICX7750-48XGC   cc4e.2439.1a00
 9       10   ICX7750-48XGC   cc4e.2439.1680
10       11   ICX7750-48XGC   cc4e.2439.1d80
11       12   ICX7750-48XGC   cc4e.2439.1280

Selected DOWNSTREAM units
Hop(s)  Id      Type          Mac Address
 1       12   ICX7750-48XGC   cc4e.2439.1280
 2       11   ICX7750-48XGC   cc4e.2439.1d80
 3       10   ICX7750-48XGC   cc4e.2439.1680
 4       9    ICX7750-48XGC   cc4e.2439.1a00
 5       8    ICX7750-20QXG   cc4e.2439.2d00
 6       7    ICX7750-20QXG   cc4e.2439.3880
 7       6    ICX7750-20QXG   cc4e.2439.3700
 8       5    ICX7750-20QXG   cc4e.2439.2a80
 9       4    ICX7750-48XGF   cc4e.246d.9c80
10       3    ICX7750-48XGF   cc4e.246d.9b00
11       2    ICX7750-48XGF   cc4e.246d.8d80
```

7. If the Ruckus device supports stacking trunks, the system next displays available trunk options in turn and requests your input on how many ports to include. The range is presented in parentheses, and the current setting is presented in square brackets. For example, (1-3) [1] indicates that the current connection is a single-port link, and you have the option of electing a 2-port or a 3-port trunk instead. When prompted, enter the desired trunk size as shown in the following example.

```
Confirm Stacking Links...

UPSTREAM Unit: Id new at 4 hop(s) ICX7750-20QXG cc4e.2439.2a80

Enter the desired links(1-3)[1]: 3

UPSTREAM Unit: Id new at 6 hop(s) ICX7750-20QXG cc4e.2439.3880

Enter the desired links(1-3)[1]: 3

UPSTREAM Unit: Id new at 10 hop(s) ICX7750-48XGC cc4e.2439.1d80

Enter the desired links(1-2)[1]: 2

UPSTREAM Unit: Id new at 11 hop(s) ICX7750-48XGC cc4e.2439.1280

Enter the desired links(1-2)[1]: 2
```

Once you have specified trunk sizes, you should see system output similar to the following example, and you are prompted to confirm the stack unit IDs.

```
Selected Topology:
Active  Id      Type          Mac Address
        1    ICX7750-48XGF    cc4e.246d.9e00

Selected UPSTREAM units
Hop(s)  Id      Type          Mac Address
 1       2    ICX7750-48XGF   cc4e.246d.8d80
 2       3    ICX7750-48XGF   cc4e.246d.9b00
 3       4    ICX7750-48XGF   cc4e.246d.9c80
 4       5    ICX7750-20QXG   cc4e.2439.2a80
 5       6    ICX7750-20QXG   cc4e.2439.3700
 6       7    ICX7750-20QXG   cc4e.2439.3880
 7       8    ICX7750-20QXG   cc4e.2439.2d00
 8       9    ICX7750-48XGC   cc4e.2439.1a00
 9       10   ICX7750-48XGC   cc4e.2439.1680
10       11   ICX7750-48XGC   cc4e.2439.1d80
11       12   ICX7750-48XGC   cc4e.2439.1280

Selected DOWNSTREAM units
Hop(s)  Id      Type          Mac Address
 1       12   ICX7750-48XGC   cc4e.2439.1280
 2       11   ICX7750-48XGC   cc4e.2439.1d80
 3       10   ICX7750-48XGC   cc4e.2439.1680
 4       9    ICX7750-48XGC   cc4e.2439.1a00
 5       8    ICX7750-20QXG   cc4e.2439.2d00
 6       7    ICX7750-20QXG   cc4e.2439.3880
 7       6    ICX7750-20QXG   cc4e.2439.3700
 8       5    ICX7750-20QXG   cc4e.2439.2a80
 9       4    ICX7750-48XGF   cc4e.246d.9c80
10       3    ICX7750-48XGF   cc4e.246d.9b00
11       2    ICX7750-48XGF   cc4e.246d.8d80

Do you accept the unit id's (y/n)?: y
```

8. Review the topology and the unit IDs that are displayed. When prompted, enter **y** if you want to accept the assigned unit IDs.

   NOTE
   You can also enter **n** to decline the assigned unit IDs. The system then prompts you to enter different IDs, warns that changing the unit IDs manually may modify stack configuration, and recommends that you save the configuration and reload it after the stack is ready.

9. The active controller automatically checks all prospective stack members to see if they are password-protected. If a unit is password- protected, enter the password before you to add the unit. If you do not know the password, take one of the following actions:
   - Discontinue secure-setup by entering **^C**.
   - Obtain the device password from the administrator.
   - Skip this unit and continue the secure-setup for your stack. The password-protected device and all devices connected behind it will not be included in the setup process.

   In the following example, the second unit is password-protected, so you are asked for the password.

```
device# stack secure-setup
device# Discovering the stack topology...
Verifying password for the password protected units...
Found UPSTREAM units
Hop(s)  Id   Type            MAC Address
1       2    ICX7750-48XGF   cc4e.246d.8d80
2       3    ICX7750-48XGF   cc4e.246d.9b00


Enter password for ICX7750-48XGF located at 2 hop(s): ****
Enter the number of the desired UPSTREAM units (1-2)[1]: 2
Selected Topology:
Active  Id   Type            MAC Address
        1    ICX7750-48XGF   cc4e.246d.9e00
Selected UPSTREAM units
Hop(s)  Id   Type            MAC Address
1       2    ICX7750-48XGF   cc4e.246d.8d80
2       3    ICX7750-48XGF   cc4e.246d.9b00
Do you accept the unit id's (y/n)?: y
```

10. Enter **y** to accept these recommendations, or enter **n** to reject the recommendations.

    NOTE
    You can use secure-setup to renumber the units in your stack. Refer to Renumbering stack units on page 179.

After you accept the unit IDs, an active controller is elected, the stack is formed, and a standby controller is designated. You should see output similar to the following example.

```
ICX7750-48F Router#T=18m45.7: Election, was alone --> active, ID=1, pri=128,
12U(1-12), A=u1, nbr#=11 11, reason: u6: SecureS, ,
T=18m49.7: Election, was active, no change, ID=1, pri=128, 12U(1-12), A=u1,
nbr#=11 11, reason: u1: stk-po-chg, ,
T=18m52.3: reset unit  2: u2 bo-id=1
T=18m52.3: reset unit  3: u3 bo-id=1
T=18m52.3: reset unit  5: u5 bo-id=1
T=18m52.3: reset unit  6: u6 bo-id=1
T=18m52.3: reset unit  7: u7 bo-id=1
T=18m52.3: reset unit  8: u8 bo-id=1
T=18m52.3: reset unit  9: u9 bo-id=1
T=18m52.3: reset unit 10: u10 bo-id=1
T=18m52.3: reset unit 11: u11 bo-id=1
T=18m52.3: reset unit 12: u12 bo-id=1
Reset extra units due to path: 4

Config changed due to add/del units. Do write mem if you want to keep it
T=18m55.3: Unit 1 loses all neighbors.
T=18m55.4: Active U1 deletes U2 and its config because it is learned.
T=18m55.6: Active U1 deletes U3 and its config because it is learned.
T=18m55.8: Active U1 deletes U4 and its config because it is learned.
T=18m55.9: Active U1 deletes U5 and its config because it is learned.
T=18m56.0: Active U1 deletes U6 and its config because it is learned.
T=18m56.1: Active U1 deletes U7 and its config because it is learned.
T=18m56.2: Active U1 deletes U8 and its config because it is learned.
T=18m56.3: Active U1 deletes U9 and its config because it is learned.
T=18m56.4: Active U1 deletes U10 and its config because it is learned.
T=18m56.6: Active U1 deletes U11 and its config because it is learned.
T=18m56.7: Active U1 deletes U12 and its config because it is learned.
ICX7750-48F Router# T=19m55.7: Election, was active, no change, ID=1, pri=128,
3U(1-3), A=u1, nbr#=2 0, reason: u3: port-dw, ,
T=19m55.8: Synchronize webauth files to u2
T=19m55.8: Synchronize webauth files to u3
T:19m57.1: Done hot swap: active controller u1 sets u2 to Ready.
T:19m57.1: Done hot swap: active controller u1 sets u3 to Ready.

Config changed due to add/del units. Do write mem if you want to keep it
Stack unit 2 Power supply 1 is up
Stack unit 2 Power supply 2 is down
Stack unit 3 Power supply 1 is up
Stack unit 3 Power supply 2 is down
T=20m2.4: Election, was active, no change, ID=1, pri=128, 3U(1-3), A=u1, nbr#=2 0,
reason: u1: port-up, ,
T=20m3.6: 1/2/4 goes down. delete direction 1, trigger election
T=20m7.3: Election, was active, no change, ID=1, pri=128, 12U(1-12), A=u1,
nbr#=11 11, reason: u12: port-up, ,
T=20m7.6: Synchronize webauth files to u10
T=20m7.6: Synchronize webauth files to u11
Detect stack unit 12 has different startup config flash, will synchronize it
T=20m7.6: Synchronize webauth files to u12
Detect stack unit 4 has different startup config flash, will synchronize it
T=20m7.6: Synchronize webauth files to u4
T=20m7.6: Synchronize webauth files to u5
T=20m7.6: Synchronize webauth files to u6
T=20m7.6: Synchronize webauth files to u7
T=20m7.7: Synchronize webauth files to u8
T=20m8.3: Synchronize webauth files to u9
T:20m8.8: Done hot swap: active controller u1 sets u10 to Ready.
T:20m9.0: Done hot swap: active controller u1 sets u11 to Ready.
T:20m9.3: Done hot swap: active controller u1 sets u12 to Ready.
T:20m9.9: Done hot swap: active controller u1 sets u4 to Ready.
```

```
T:20m10.2: Done hot swap: active controller u1 sets u5 to Ready.
T:20m10.5: Done hot swap: active controller u1 sets u6 to Ready.
T:20m10.9: Done hot swap: active controller u1 sets u7 to Ready.
T:20m11.4: Done hot swap: active controller u1 sets u8 to Ready.
Stack unit 12 Power supply 1 is up
Stack unit 12 Power supply 2 is down
Stack unit 10 Power supply 1 is up
Stack unit 10 Power supply 2 is down

Config changed due to add/del units. Do write mem if you want to keep it
T:20m13.1: Done hot swap: active controller u1 sets u9 to Ready.
T=20m16.9: Election, was active, no change, ID=1, pri=128, 12U(1-12), A=u1,
nbr#=11 11, reason: u1: stk-po-chg, ,

Config changed due to add/del units. Do write mem if you want to keep it

ICX7750-48F Router#T=21m16.9: Assigned unit 2 to be standby
cT=21m18.9: start running config sync to standby u2
T=21m19.3: Running config sync to standby u2 is complete
```

11. Enter the **show stack** command to verify that all units are in the ready state.

    The following **show stack** command output shows the resulting 12-unit ICX 7750 ring topology. All units are ready.

```
ICX7750-48F Router#  show stack
T=23m12.5: alone: standalone, D: dynamic cfg, S: static, A=10, B=11, C=12
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7750-48XGF active  cc4e.246d.9e00 128 local   Ready
2  D ICX7750-48XGF standby cc4e.246d.8d80   0 remote  Ready
3  D ICX7750-48XGF member  cc4e.246d.9b00   0 remote  Ready
4  D ICX7750-48XGF member  cc4e.246d.9c80   0 remote  Ready
5  D ICX7750-20QXG member  cc4e.2439.2a80   0 remote  Ready
6  D ICX7750-20QXG member  cc4e.2439.3700   0 remote  Ready
7  D ICX7750-20QXG member  cc4e.2439.3880   0 remote  Ready
8  D ICX7750-20QXG member  cc4e.2439.2d00   0 remote  Ready
9  D ICX7750-48XGC member  cc4e.2439.1a00   0 remote  Ready
10 D ICX7750-48XGC member  cc4e.2439.1680   0 remote  Ready
11 D ICX7750-48XGC member  cc4e.2439.1d80   0 remote  Ready
12 D ICX7750-48XGC member  cc4e.2439.1280   0 remote  Ready

    active
     +---+        +---+        +---+        +---+        +---+        +---+
 -2/1| 1 |2/4--2/1| C |2/4==2/1| B |2/4==2/1| A |2/4--2/1| 9 |2/4--2/1| 8 |2/4-
 |   +---+        +---+        +---+        +---+        +---+        +---+   |
 |                                                                             |
 |  standby                                                                    |
 |   +---+        +---+        +---+        +---+        +---+        +---+   |
 -2/4| 2 |2/1--2/4| 3 |2/1--2/4| 4 |2/1==2/4| 5 |2/1--2/4| 6 |2/1==2/4| 7 |2/1-
     +---+        +---+        +---+        +---+        +---+        +---+
Standby u2 - protocols ready, can failover
Current stack management MAC is cc4e.246d.9e00
```

    For ICX devices, an equal sign (=) is used to indicate connections between trunk ports as shown in the previous example.

    NOTE
    In the previous example, D indicates a dynamic configuration. After you perform a **write memory**, the D changes to an S, for static configuration.

12. If you need additional information on individual ports, enter the **show stack stack-ports** command as shown in the following example.

```
device# show stack stack-ports
active
    +-+        +-+        +-+        +-+        +-+        +-+
=2/1|4|2/6==2/6|3|2/1==2/1|2|2/6==2/6|1|2/1==2/1|7|2/6==2/6|6|2/1=
|   +-+        +-+        +-+        +-+        +-+        +-+    |
|                                                                 |
|                                                          standby |
|                                                           +-+    |
-----------------------------------------------------------2/1|5|2/6=
                                                           +-+
U#  Stack-port1                                  Stack-port2
1   up (1/2/1-1/2/5)                            up (1/2/6-1/2/10)
up ports: 1/2/1, 1/2/2, 1/2/3, 1/2/4, 1/2/5

U# Stack-port1 Stack-port2
1 up (1/2/1-1/2/5) up (1/2/6-1/2/10)
up ports: 1/2/1, 1/2/2, 1/2/3, 1/2/4, 1/2/5
up ports: 1/2/6, 1/2/7, 1/2/8, 1/2/9, 1/2/10
2 up (2/2/1-2/2/5) up (2/2/6-2/2/10)
up ports: 2/2/1, 2/2/2, 2/2/3, 2/2/4, 2/2/5
up ports: 2/2/6, 2/2/7, 2/2/8, 2/2/9, 2/2/10
3 up (3/2/1-3/2/5) up (3/2/6-3/2/10)
up ports: 3/2/1, 3/2/2, 3/2/3, 3/2/4, 3/2/5
up ports: 3/2/6, 3/2/7, 3/2/8, 3/2/9, 3/2/10
4 up (4/2/1-4/2/5) up (4/2/6-4/2/10)
up ports: 4/2/1, 4/2/2, 4/2/3, 4/2/4, 4/2/5
up ports: 4/2/6, 4/2/7, 4/2/8, 4/2/9, 4/2/10
5 up (5/2/1-5/2/5) up (5/2/6-5/2/10)
up ports: 5/2/1, 5/2/2, 5/2/3, 5/2/4, 5/2/5
up ports: 5/2/6, 5/2/7, 5/2/8, 5/2/9, 5/2/10
6 up (6/2/1-6/2/5) up (6/2/6-6/2/10)
up ports: 6/2/1, 6/2/2, 6/2/3, 6/2/4, 6/2/5
up ports: 6/2/6, 6/2/7, 6/2/8, 6/2/9, 6/2/10
7 up (7/2/1-7/2/5) up (7/2/6-7/2/10)
up ports: 7/2/1, 7/2/2, 7/2/3, 7/2/4, 7/2/5
up ports: 7/2/6, 7/2/7, 7/2/8, 7/2/9, 7/2/10
```

13. Once all of the stack units are active, enter the **write memory** command on the active controller. This command initiates configuration synchronization, which copies the configuration file of the active controller to the rest of the stack units.

    NOTE
    The secure-setup process may modify your configuration with information about new units, stacking ports, and so on. For this reason, it is very important to save this information by issuing the **write memory** command. If you do not do this, you may lose your configuration information the next time the stack reboots.

    The secure-setup process for your stack is now complete.

Invalid stacking trunk errors and network loops

Invalid stacking trunk errors are displayed when stack ports have been assigned incorrectly or do not match physical connections, or when trunk connections are incorrect.

NOTE
You can verify the connections for each unit based on the MAC address.

When connecting a standalone unit to a stack using data ports, be sure to issue the **stack disable** command first on the standalone unit before using the secure-setup utility to add the unit. Otherwise, the secure-setup utility will issue an invalid stacking trunk error and will not be able to discover the unit.

When incorrect connections are detected, the secure-setup utility displays a message similar to the following.

```
ICX7750-48F Router# stack secure-setup
ICX7750-48F Router# Discovering the stack topology...

Invalid Stacking Trunk connection at Unit with mac cc4e.2439.1280, port 1/3/5

Please check connection and then re-try...

ICX7750-48F Router#
```

If a stack is incorrectly constructed and contains loop connections, secure-setup cannot be performed. A message similar to the following is displayed when this occurs.

```
ICX7750-48F Router# stack secure
CPU utilization too high: 81 percent. Check loops in the network and try again...
```

Scenario 2 - Automatically configuring a three-member traditional stack in a ring topology

If you are adding clean units without a startup or run-time configuration to a stack, you may elect to use the automatic setup process.

Complete the following steps to configure a three-member traditional stack in a ring topology using the automatic setup process.

NOTE
FastIron stackable devices determine stacking port candidates through the default-ports setting if configured. A FastIron stackable device with the default port configuration is still considered a clean unit. To ensure that the device remains a clean unit, do not enter the **write memory** command on the device.

1. Power on the devices.
2. This process requires clean devices (except for the active controller) that do not contain any configuration information. To change a device to a clean device, enter the **erase startup-config** command and reset the device. When all of the devices are clean, continue with the next step.

   NOTE
   The physical connections must be sequential and must match the stack configuration.

3. Log in to the device that you want to be the active controller.
4. Configure the rest of the units by assigning ID numbers and module information for each unit. The stack ID can be any number from 1 through 12 for ICX 7150, ICX 7250, ICX 7450, and ICX 7750 devices.

```
ICX7750-26Q Router# configure terminal
ICX7750-26Q Router(config)# stack unit 2
ICX7750-26Q Router(config-unit-2)# module 1 icx7750-20-qxg-port-management-module
ICX7750-26Q Router(config-unit-2)# module 2 icx7750-qsfp-6port-qsfp-240g-module
ICX7750-26Q Router(config-unit-2)# module 3 icx7750-6q-6port-qsfp-240g-module
ICX7750-26Q Router(config-unit-2)# stack unit 3
ICX7750-26Q Router(config-unit-3)# module 1 icx7750-20-qxg-port-management-module
ICX7750-26Q Router(config-unit-3)# module 2 icx7750-qsfp-6port-qsfp-240g-module
ICX7750-26Q Router(config-unit-3)# module 3 icx7750-6q-6port-qsfp-240g-module
ICX7750-26Q Router(config-unit-3)#
```

5. After configuring the last stack unit (unit 3 in this example), create any stacking trunks needed for your configuration.

   NOTE
   Each ICX 7750 stack unit can support two stacking trunks.

   NOTE
   If you configure stacking trunks on some, but not all, stack units, make sure both ends of a link have the same number of trunk ports. If the two ends do not have the same number of ports, the stack is likely to exhibit packet-forwarding problems.

   In the following example, the **stack-trunk** command is used to configure a trunk on stack unit 2 and stack unit 3.

```
ICX7750-20Q Router(config)# stack unit 2
ICX7750-20Q Router(config-unit-2)# module 1 icx7750-20-qxg-port-management-module
ICX7750-20Q Router(config-unit-2)# module 3 icx7750-6q-6port-qsfp-240g-module
ICX7750-20Q Router(config-unit-2)# stack-trunk 2/2/1 to 2/2/3
ICX7750-20Q Router(config-unit-2)# stack unit 3
ICX7750-20Q Router(config-unit-3)# module 1 icx7750-20-qxg-port-management-module
ICX7750-20Q Router(config-unit-2)# module 3 icx7750-6q-6port-qsfp-240g-module
ICX7750-20Q Router(config-unit-3)# stack-trunk 3/2/4 to 3/2/6
ICX7750-20Q Router(config-unit-3)# exit
```

   The **show running-config** command displays the configuration for all three stack units. Stack unit 1 has no trunks configured. By default, all the units have two stacking ports, x/2/1 and x/2/4. Stack units 2 and 3 are both configured with a three-port stack.

```
ICX7750-20Q Router(config)# show run
!
stack unit 1
  module 1 icx7750-20-qxg-port-management-module
  module 2 icx7750-qsfp-6port-qsfp-240g-module
  module 3 icx7750-6q-6port-qsfp-240g-module
  stack-port 1/2/1 1/2/4
stack unit 2
  module 1 icx7750-20-qxg-port-management-module
  module 2 icx7750-qsfp-6port-qsfp-240g-module
  module 3 icx7750-6q-6port-qsfp-240g-module
  stack-trunk 2/2/1 to 2/2/3
  stack-port 2/2/1 2/2/4
stack unit 3
  module 1 icx7750-20-qxg-port-management-module
  module 2 icx7750-qsfp-6port-qsfp-240g-module
  module 3 icx7750-6q-6port-qsfp-240g-module
  stack-trunk 3/2/4 to 3/2/6
  stack-port 3/2/1 3/2/4
```

6. Assign a priority to the active controller using the **priority** command. The priority may be set from 0 through 255, where 255 is the highest priority.

```
ICX7750-26Q Router(config)# stack unit 1
ICX7750-26Q Router(config-unit-1)# priority 255
Priority change needs 120 seconds to take effect.
```

7. Assign a priority to the unit that will act as standby controller.
8. Enter the **write memory** command to save your settings.
9. Enter the **stack enable** command.

```
ICX7750-26Q Router(config-unit-1)# stack unit 2
ICX7750-26Q Router(config-unit-2)# priority 240
ICX7750-26Q Router(config-unit-2)# exit
ICX7750-26Q Router(config)# write memory
ICX7750-26Q Router(config)# stack enable
```

10. Physically connect the devices in a stack topology. This triggers an election during which the stack is automatically configured. For more information about cabling the devices, refer to the appropriate hardware installation guide.

    NOTE
    When you are configuring individual stack units, you can skip ID numbers. However, the sequence in which the units are connected must match the order in which you configure them.

11. Verify your final stack configuration by entering the **show running-config** command.

```
ICX7750-26Q Router(config)# show running-config
Current configuration:
!
ver 08.0.40b1T203
!
stack unit 1
  module 1 icx7750-20-qxg-port-management-module
  module 2 icx7750-qsfp-6port-qsfp-240g-module
  module 3 icx7750-6q-6port-qsfp-240g-module
  priority 255
  stack-port 1/2/1 1/2/4
stack unit 2
  module 1 icx7750-20-qxg-port-management-module
  module 2 icx7750-qsfp-6port-qsfp-240g-module
  module 3 icx7750-6q-6port-qsfp-240g-module
  priority 240
  stack-trunk 2/2/1 to 2/2/3
  stack-port 2/2/1 2/2/4
stack unit 3
  module 1 icx7750-20-qxg-port-management-module
  module 2 icx7750-qsfp-6port-qsfp-240g-module
  module 3 icx7750-6q-6port-qsfp-240g-module
  stack-trunk 3/2/4 to 3/2/6
  stack-port 3/2/1 3/2/4
stack enable
stack mac 748e.f8f9.6300
```

12. To see information about your stack, enter the **show stack** command.

```
ICX7750-26Q Router# show stack
T=11h33m28.5: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7750-20QXG active  748e.f8f9.6300 255 local   Ready
2  S ICX7750-20QXG standby cc4e.2438.7280 240 remote  Ready
3  S ICX7750-20QXG member  cc4e.2438.7500   0 remote  Ready

    active                    standby
    +---+        +---+        +---+
-2/1| 1 |2/4--2/1| 3 |2/4==2/1| 2 |2/4-
|   +---+        +---+        +---+   |
|                                     |
|-------------------------------------|
Standby u2 - protocols ready, can failover
Current stack management MAC is 748e.f8f9.6300
```

13. To display detailed information on each stack unit, enter the **show version** command.

```
ICX7750-26Q Router# show version
  Copyright (c) 2017 Ruckus Wireless, Inc. All rights reserved.
    UNIT 1: compiled on Jul 31 2015 at 18:37:27 labeled as SWR08040b1
      (20197181 bytes) from Primary SWR08040b1.bin
        SW: Version 08.0.40b1T203
    UNIT 2: compiled on Jul 31 2015 at 18:37:27 labeled as SWR08040b1
      (20197181 bytes) from Primary SWR08040b1.bin
        SW: Version 08.0.40b1T203
    UNIT 3: compiled on Jul 31 2015 at 18:37:27 labeled as SWR08040b1
      (20197181 bytes) from Primary SWR08040b1.bin
        SW: Version 08.0.40b1T203
      Compressed Boot-Monitor Image size = 1835008, Version:10.1.01T205 (swz10101)
       Compiled on Fri Jun 27 22:01:35 2014

  HW: Stackable ICX7750-26Q
  Internal USB: Serial #: 40D509003CF9007D
      Vendor: UNIGEN, Total size = 1910 MB
==========================================================================
UNIT 1: SL 1: ICX7750-20QXG 20-port Management Module
      Serial  #:CRK2234J00J
      License: ICX7750_L3_SOFT_PACKAGE   (LID: etmHHIJlFFl)
      P-ASIC  0: type B850, rev 03  Chip BCM56850_A2
==========================================================================
UNIT 1: SL 2: ICX7750-QSFP 6-port QSFP 240G Module
==========================================================================
UNIT 1: SL 3: ICX7750-6Q 6-port QSFP 240G Module
      Serial  #:4J04N
==========================================================================
UNIT 2: SL 1: ICX7750-20QXG 20-port Management Module
      Serial  #:CRK2246J01Y
      License: ICX7750_L3_SOFT_PACKAGE   (LID: etmHHJLlFGa)
==========================================================================
UNIT 2: SL 2: ICX7750-QSFP 6-port QSFP 240G Module
==========================================================================
UNIT 2: SL 3: ICX7750-6Q 6-port QSFP 240G Module
      Serial  #:CRK2246J010
==========================================================================
UNIT 3: SL 1: ICX7750-20QXG 20-port Management Module
      Serial  #:CRK2246J023
      License: ICX7750_L3_SOFT_PACKAGE   (LID: etmHHJLlFHI)
==========================================================================
UNIT 3: SL 2: ICX7750-QSFP 6-port QSFP 240G Module
==========================================================================
UNIT 3: SL 3: ICX7750-6Q 6-port QSFP 240G Module
      Serial  #:CRK2246J01C
==========================================================================
1500 MHz Power PC processor (version 8023/0022) 88 MHz bus
8192 KB boot flash memory
2048 MB code flash memory
3840 MB DRAM
STACKID 1  system uptime is 11 hour(s) 33 minute(s) 33 second(s)
STACKID 2  system uptime is 13 minute(s) 38 second(s)
STACKID 3  system uptime is 11 minute(s) 40 second(s)
The system : started=warm start   reloaded=by "reload"
```

Configuration tips for building a stack using the automatic setup process

Remember the following tips when using the automatic setup process for building a stack:

- If a new unit configuration matches other unit configurations, the active controller gives this unit the lowest *sequential* ID. For example, in a stack configuration that contains eight ICX 7750 configurations, but only units 1, 4, and 8 are currently active, if you place a new ICX 7750 unit between units 4 and 8, the new unit will be assigned unit ID 5. This unit assignment occurs because unit 5 is the lowest *sequential* ID that comes directly after active unit 4, even though it might match unused inactive unit IDs 2, 3, 5, 6, and 7.

- In a ring topology, the same new unit might assume either ID if either direction produces sequential IDs. For example, in a four-member stack where IDs 2 and 4 are reserved, a new unit could assume the ID 2 or the ID 4, to create the ID sequence 1, 2, 3 or the sequence 1, 3, 4.

Scenario 3 - Manually configuring a three member traditional stack in a ring topology

If you are connecting units that have been individually configured for stacking and want unit IDs to be assigned based on physical sequence, you may want to configure the stack manually.

Complete the following steps to configure a three-member traditional stack in a ring topology using the manual configuration process. In this example, device 1 is the active controller, and device 2 is the standby controller. In this example, unit 3 boots up as a member, based on the configured priorities for units 1 and 2.

1. Power on the devices. Do not connect the stacking cables at this point.
2. Assign a priority of 255 to unit 1 and a priority of 240 to unit 2 using the **priority** command. It is not mandatory to set a lower priority for the third unit. Enter the **stack enable** command on each device.

   Unit 1

```
device# configure terminal
device(config)# stack unit 1
device(config-unit-1)# priority  255
device(config-unit-1)# stack  enable
Enable stacking. This unit actively participates in stacking
device(config-unit-1)# write memory
Write startup-config done.
Flash Memory Write (8192 bytes per dot) .Flash to Flash Done.
device(config-unit-1)# end
```

   Unit 2

```
device# configure terminal
device(config)# stack suggested-id 2
device(config)# stack unit 1
device(config-unit-1)# priority  240
device(config-unit-1)# stack enable
Enable stacking. This unit actively participates in stacking
device(config-unit-1)# end
```

   Unit 3

```
device# configure terminal
device(config)# stack suggested-id 3
device(config)# stack enable
Enable stacking. This unit actively participates in stacking
Write startup-config done.
Flash Memory Write (8192 bytes per dot) .Flash to Flash Done.
device(config-unit-1)# end
```

3. Connect the devices in a stack topology. The active controller retains its ID. The rest of the units are assigned unique ID numbers depending on the sequence in which you connected them.

   For more information about cabling the devices, refer to the appropriate hardware installation guide.

   NOTE
   This method does not guarantee sequential stack IDs if you do not configure the optional **stack suggested-id** command on each standalone unit. If you want to change stack IDs to make them sequential, you can use secure-setup. Refer to Renumbering stack units on page 179.

   NOTE
   You can configure the **stack suggested-id** command in a standalone unit before using the **stack enable** command to cause the unit to join the stack. A unit is assigned the suggested ID if no other unit in the stack has that ID.

Verifying a traditional stack configuration

Log in to the active controller and verify the stack information by entering the **show running-config** and **show stack** or **show stack detail** commands. If your stack is configured properly, you should see the following:

- One active controller, one standby controller, and stack members
- All stack members with a status of Ready

The following output shows a sample configuration of a traditional stack.

```
ICX7750-48C Router# show stack
T=11m47.4: alone: standalone, D: dynamic cfg, S: static
ID Type Role Mac Address Pri State Comment
1 S ICX7750-48XGC active cc4e.2439.1680 0 local Ready
2 D ICX7750-48XGC standby cc4e.2439.1a00 0 remote Ready
  active       standby
   +---+        +---+
2/1| 1 |2/4==2/4| 2 |2/1
   +---+        +---+
Standby u2 - protocols ready, can failover or manually switch over
Current stack management MAC is cc4e.2439.1680
ICX7750-48C Router#
ICX7750-48C Router# show run
Current configuration:
!
ver 08.0.30aT203
!
stack unit 1
module 1 icx7750-48-xgc-port-management-module
module 2 icx7750-qsfp-6port-qsfp-240g-module
stack-trunk 1/2/4 to 1/2/6
stack-port 1/2/1 1/2/4
stack unit 2
module 1 icx7750-48-xgc-port-management-module
module 2 icx7750-qsfp-6port-qsfp-240g-module
stack-trunk 2/2/4 to 2/2/6
stack-port 2/2/1 2/2/4
stack enable
stack mac cc4e.2439.1680
!!
ip dns domain-list englab.ruckuswireless.com
ip dns server-address 10.31.2.10
!!
hitless-failover enable
!!
interface management 1
```

```
ip address 10.21.242.124 255.255.255.128 dynamic
!!
end
ICX7750-48C Router#
```

The output from the **show stack** command contains a visual diagram of the stack. In the following example, the dashed line between ports 1/2/1 and 2/2/4 indicates that this stack is configured in a ring topology. The double dashed lines (equal signs) between all units indicate stack trunk connections. If a single dashed line were present, it would indicate a connection through a single stacking port.

```
      active
      +---+        +---+        +---+
 =2/1 | 1 |2/4==2/1| 3 |2/4==2/1| 2 |2/4=
  |   +---+        +---+        +---+   |
  |                                     |
  |-------------------------------------|
```

If the link between ports 1/2/1 and 2/2/4 is lost, the stack topology changes to linear, and the diagram changes to resemble the following diagram.

```
     active
     +---+        +---+        +---+
  2/1| 1 |2/4==2/1| 3 |2/4==2/1| 2 |2/4
     +---+        +---+        +---+
```

For more detailed information, you can enter the **show stack detail** command. The following example shows detailed information for a three-unit stack connected in a ring topology. Two of the units are connected by stack trunks.

```
ICX7750-26Q Router# show stack detail
T=18m33.4: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7750-20QXG active  748e.f8f9.6300   0 local   Ready
2  D ICX7750-20QXG member  cc4e.2438.7280   0 remote  Ready
3  D ICX7750-20QXG standby cc4e.2438.7500   0 remote  Ready

    active       standby
     +---+        +---+        +---+
=2/1| 1 |2/4==2/1| 3 |2/4--2/1| 2 |2/4=
|   +---+        +---+        +---+   |
|                                     |
|-------------------------------------|
Will assign standby in 11 sec due to all ready

Standby u3 - protocols ready, can failover
Current stack management MAC is 748e.f8f9.6300

Image-Auto-Copy is Enabled.

      Stack Port Status                        Neighbors
Unit# Stack-port1         Stack-port2          Stack-port1         Stack-port2
1     up (1/2/1-1/2/2)    up (1/2/4-1/2/6)     U2 (2/2/4-2/2/5)    U3 (3/2/1-3/2/3)
2     up (2/2/1)          up (2/2/4-2/2/5)     U3 (3/2/4)          U1 (1/2/1-1/2/2)
3     up (3/2/1-3/2/3)    up (3/2/4)           U1 (1/2/4-1/2/6)    U2 (2/2/1)

Unit# System uptime
1     18 minute(s) 33 second(s)
2     17 minute(s) 30 second(s)
3     18 minute(s) 46 second(s)
```

To check the software version installed on each stack unit, enter the **show version** command. The software versions should match. If they do not match, refer to "Stack mismatches."

```
ICX7750-26Q Router# show version
  Copyright (c) 2017 Ruckus Wireless, Inc. All rights reserved.
    UNIT 1: compiled on Jul 31 2015 at 18:37:27 labeled as SWR08040b1
      (20197181 bytes) from Primary SWR08040b1.bin
        SW: Version 08.0.40b1T203
```

```
UNIT 2: compiled on Jul 31 2015 at 18:37:27 labeled as SWR08040b1
  (20197181 bytes) from Primary SWR08040b1.bin
    SW: Version 08.0.40b1T203
UNIT 3: compiled on Jul 31 2015 at 18:37:27 labeled as SWR08040b1
  (20197181 bytes) from Primary SWR08040b1.bin
    SW: Version 08.0.40b1T203
  Compressed Boot-Monitor Image size = 1835008, Version:10.1.01T205 (swz10101)
   Compiled on Fri Jun 27 22:01:35 2014
```

NOTE
For field descriptions of the **show running-config** command, refer to “Displaying running configuration information.”

NOTE
For field descriptions of the **show stack** , **show stack detail** , and **show version** commands, refer to “Displaying traditional stack information.”

Displaying information on stack connections

You can check the data connections between stack units with the **show stack connection** command.

When the **show stack connection** command output includes the message `*** error: one-way`, this may indicate a stack port to non-stack-port connection. When this occurs, the side of the connection that is incorrectly configured as a stack port must be converted to a data port.

In the following example, the **show stack connection** command output indicates that CPU-to-CPU connections are working properly between all 12 members of the stack.

```
ICX7750-48F Router# show stack connection
Probing the topology. Please wait ...
ICX7750-48F Router#
    active
     +---+        +---+        +---+        +---+        +---+        +---+
 -2/1| 1 |2/4--3/1| C |3/4==2/1| B |2/4==2/1| A |2/4--2/1| 9 |2/4--2/1| 8 |2/4-
  |   +---+        +---+        +---+        +---+        +---+        +---+   |
  |                                                                             |
  |  standby                                                                    |
  |   +---+        +---+        +---+        +---+        +---+        +---+   |
 -2/4| 2 |2/1--2/4| 3 |2/1--2/4| 4 |2/1==2/4| 5 |2/1--2/4| 6 |2/1==2/4| 7 |2/1-
     +---+        +---+        +---+        +---+        +---+        +---+

trunk probe results: 12 links
Link 1: u1 -- u2, num=1
  1: 1/2/1 (P0) <---> 2/2/4 (P1)
Link 2: u1 -- u12, num=1
  1: 1/2/4 (P1) <---> 12/3/1 (P0)
Link 3: u2 -- u3, num=1
  1: 2/2/1 (P0) <---> 3/2/4 (P1)
Link 4: u3 -- u4, num=1
  1: 3/2/1 (P0) <---> 4/2/4 (P1)
Link 5: u4 -- u5, num=2
  1: 4/2/1 (T0) <---> 5/2/4 (T1)
  2: 4/2/2 (T0) <---> 5/2/5 (T1)
Link 6: u5 -- u6, num=1
  1: 5/2/1 (P0) <---> 6/2/4 (P1)
Link 7: u6 -- u7, num=3
  1: 6/2/1 (T0) <---> 7/2/4 (T1)
  2: 6/2/2 (T0) <---> 7/2/5 (T1)
  3: 6/2/3 (T0) <---> 7/2/6 (T1)
Link 8: u7 -- u8, num=1
  1: 7/2/1 (P0) <---> 8/2/4 (P1)
Link 9: u8 -- u9, num=1
  1: 8/2/1 (P0) <---> 9/2/4 (P1)
Link 10: u9 -- u10, num=1
  1: 9/2/1 (P0) <---> 10/2/4 (P1)
Link 11: u10 -- u11, num=2
  1: 10/2/1 (T0) <---> 11/2/4 (T1)
  2: 10/2/2 (T0) <---> 11/2/5 (T1)
Link 12: u11 -- u12, num=2
  1: 11/2/1 (T0) <---> 12/3/4 (T1)
  2: 11/2/2 (T0) <---> 12/3/5 (T1)
CPU to CPU packets are fine between 12 units.
```

Traditional Stacking by Device

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- ICX 7250 stack configuration overview..... 61
- ICX 7450 stack configuration overview..... 70
- ICX 7650 stack configuration overview..... 90
- ICX 7750 stack configuration overview..... 123

ICX 7150 stack configuration overview

The following table provides an overview of ICX 7150 stacking capabilities.

TABLE 10 ICX 7150 traditional stacking capabilities

Stacking capability	ICX 7150	Additional information
Topologies supported	Ring and linear	Refer to ICX 7150 stacking topologies on page 48.
Maximum stack size	12 (configured in a traditional stack)	Traditional stacking and SPX configurations. Any combination of eligible ICX 7150 devices may be stacked. When a stand-alone ICX 7150 is configured as a PE unit attached to a control bridge in an 802.1br SPX configuration, scaling is increased. Refer to the *Ruckus FastIron Campus Fabric Configuration Guide* for more information.
Maximum stacking distance	10 Kilometers	Refer to FastIron stacking distances and optics by device on page 20 for more information.
Stacking ports	Four 1-Gbps / 10-Gbps ports on fixed module on front panel that are available for stacking when configured for 10-Gbps operation. **NOTE** ICX 7150-C12P devices have two 1-Gbps / 10-Gbps ports that are available for stacking.	On most ICX 7150 models, module 3 on the front panel contains four ports that can be used as stacking or uplink ports. On ICX 7150-C12P devices, module 3 on the front panel contains two ports that can be used as stacking or uplink ports. On ICX 7150-48ZP devices, module 2 on the front panel contains four ports that can be used as stacking or uplink ports. Refer to ICX 7150 stacking topologies on page 48 for module and port locations.
Default-ports sets	On most models, (x/3/1, x/3/3, 2). On ICX 7150-C12P devices, (x/3/1, x/3/2, 1). On ICX 7150-48ZP devices, (x/2/1, x/2/3, 2). **NOTE** The third number in the set is the maximum number of ports in a stacking trunk. One indicates stack-port only.	Refer to ICX 7150 stacking topologies on page 48 for port locations.
Reconfigurable ports	Supported	Use the **no stack-port** command to reconfigure one stack port as a data uplink port.

TABLE 10 ICX 7150 traditional stacking capabilities (continued)

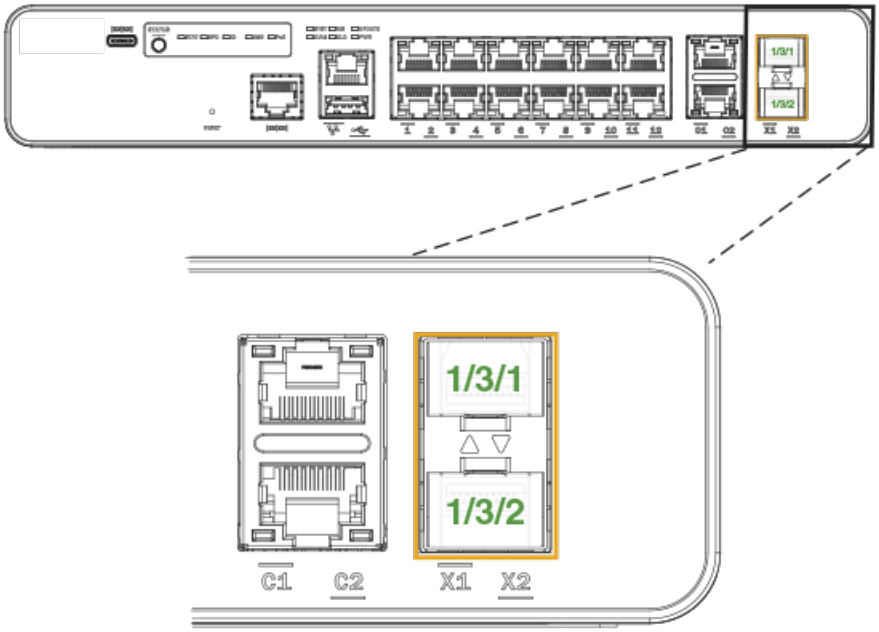
Stacking capability	ICX 7150	Additional information
		Default stacking ports cannot be changed. Once licensed, stacking ports will come up automatically as 10-Gbps. You can manually reconfigure 1-Gbps ports to licensed 10-Gbps ports and vice versa using the **speed-duplex** command. Refer to *Ruckus FastIron Software Licensing Guide* for information.
Stack trunks	Supported	Refer to ICX 7150 stacking trunks on page 53. ICX 7150-C12P devices do not support stacking trunks.
Linear-topology trunks	ICX7150-24P: stack-trunk x/3/1 to x/3/4 ICX7150-48P: no linear-topology trunk ICX7150-48ZP: stack-trunk x/2/1 to x/2/4 ICX7150-12C: stack-trunk x/3/1 to x/3/2	A linear-topology trunk is allowed only in a two-unit stack. It places the ports from both directions into one trunk.
Hitless switchover and hitless failover	Supported	Refer to Hitless stacking on page 139.
License requirements	A 10-Gbps license is required to support stacking, except on ICX 7150-48ZP devices.	Two 10-Gbps ports are standard on ICX 7150-48ZP devices, and any additional 10-Gbps ports require a license. On other ICX 7150 models, all 10-Gbps ports require a license. Licenses are available for additional 10-Gbps ports except on ICX 7150-C12P devices, which has only two available ports. Refer to the *Ruckus FastIron Software Licensing Guide* for information.
Configuration options	Manual and automatic, including interactive-setup and zero-touch provisioning	Refer to Traditional stack construction methods on page 25.
Access methods	TFTP, SCP	Software images, boot images, and signatures can be downloaded to a stack using TFTP and SCP. Refer to the *Ruckus FastIron Software Upgrade Guide* for more information.
Traditional stacking CLI	All stacking CLI is available on the ICX 7150 unless otherwise noted on the command reference page.	Refer to Traditional stack CLI commands on page 162.

ICX 7150 stacking ports

Depending on the model, up to eight SFP+ ports on the front panel of the ICX 7150 device support stacking. The ports can also be used as uplink (data) ports. The following figures show the location and numbering for stacking ports. The numbering for the ports is in three-tuple format (*x*/*y*/*z*) and refers to StackID/Slot/Port.

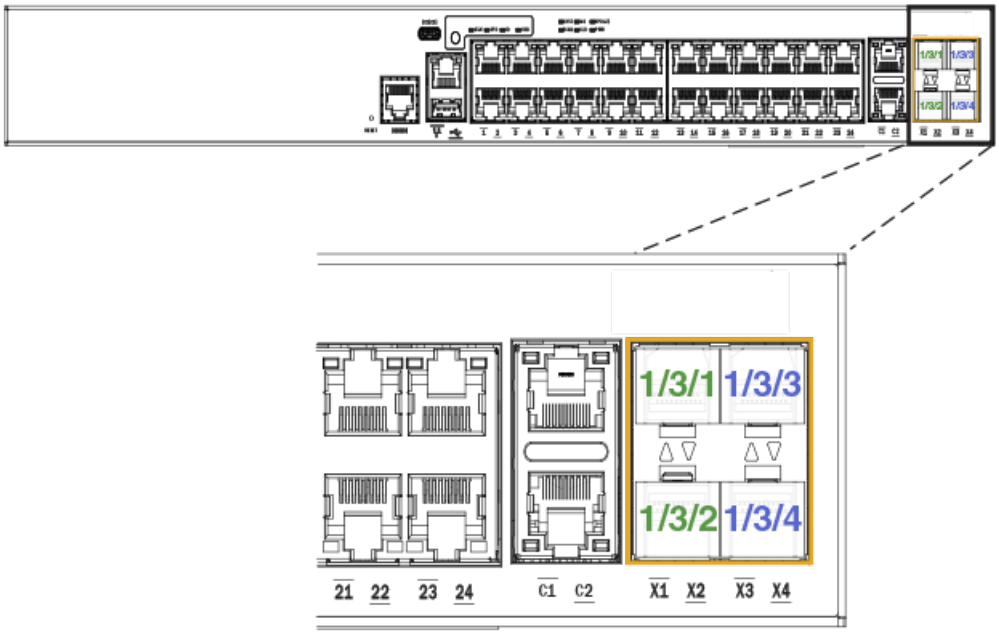
ICX 7150-C12P devices have two stacking ports on the front panel as shown in the following figure.

FIGURE 5 ICX 7150-C12P stacking ports



ICX 7150-24 and ICX 7150-24P devices have four stacking ports on the front panel as shown in the following figure.

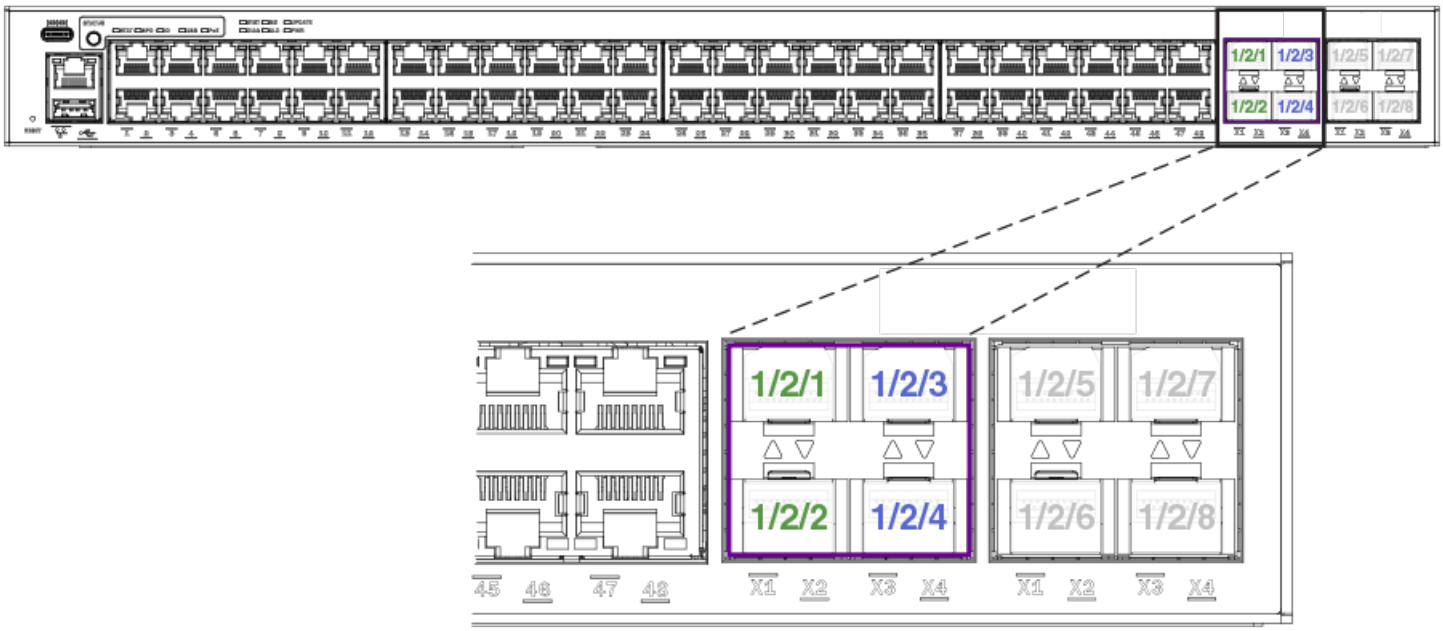
FIGURE 6 ICX 7150 stacking port location on 24-port and some 48-port models



ICX 7150-48, ICX 7150-48P, and ICX 7150-48PF devices have four stacking ports in the same location on the front panel as ICX 7150 24-port models.

The exception among 48-port models is the ICX 7150-48PZ, which has eight SPF+ ports on the front panel as shown in the following figure. Four of these ports, ports 1/2/1 through 1/2/4, can be used as stacking or data uplink ports. The remaining four, 1/2/5 through 1/2/8, can be used only as data uplink ports.

FIGURE 7 ICX 7150-48ZP stacking ports



ICX 7150 stacking topologies

The following figures show examples of supported stacking topologies for the ICX 7150-C12P.

FIGURE 8 ICX 7150-C12P linear stack

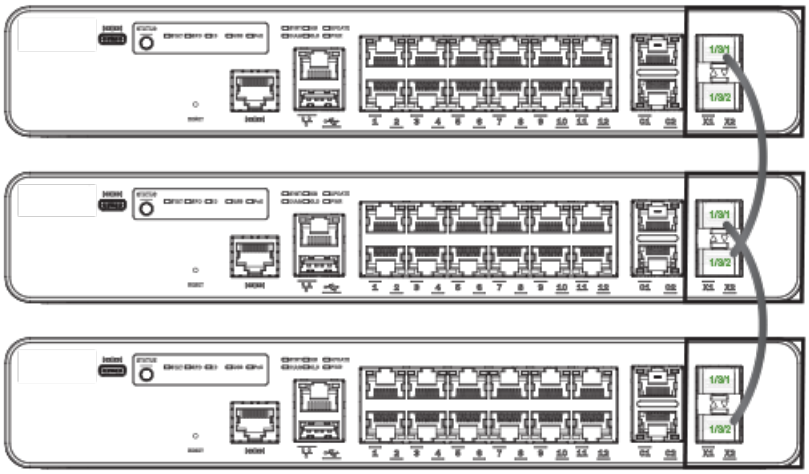
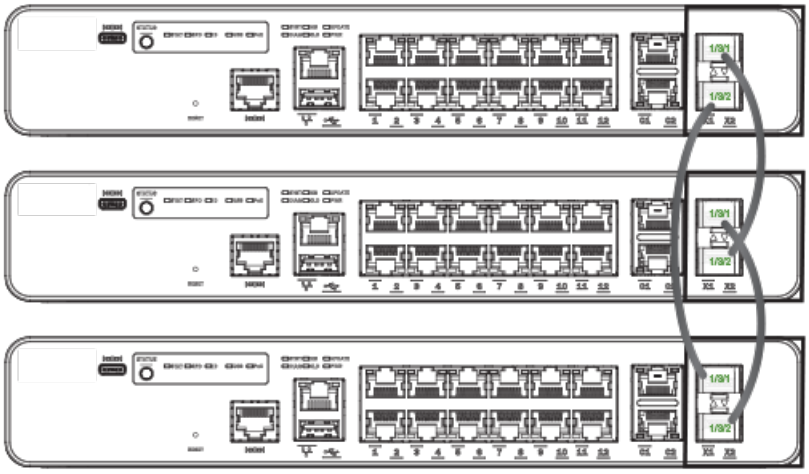


FIGURE 9 ICX 7150-C12P stack ring topology



The following figures show examples of supported topologies for ICX 7150 24-port models.

FIGURE 10 ICX 7150 24-port model, linear stack



FIGURE 11 ICX 7150 24-port stack ring topology



The following figures show examples of supported topologies for the ICX 7150-48ZP.

FIGURE 12 ICX 7150-48ZP linear stack

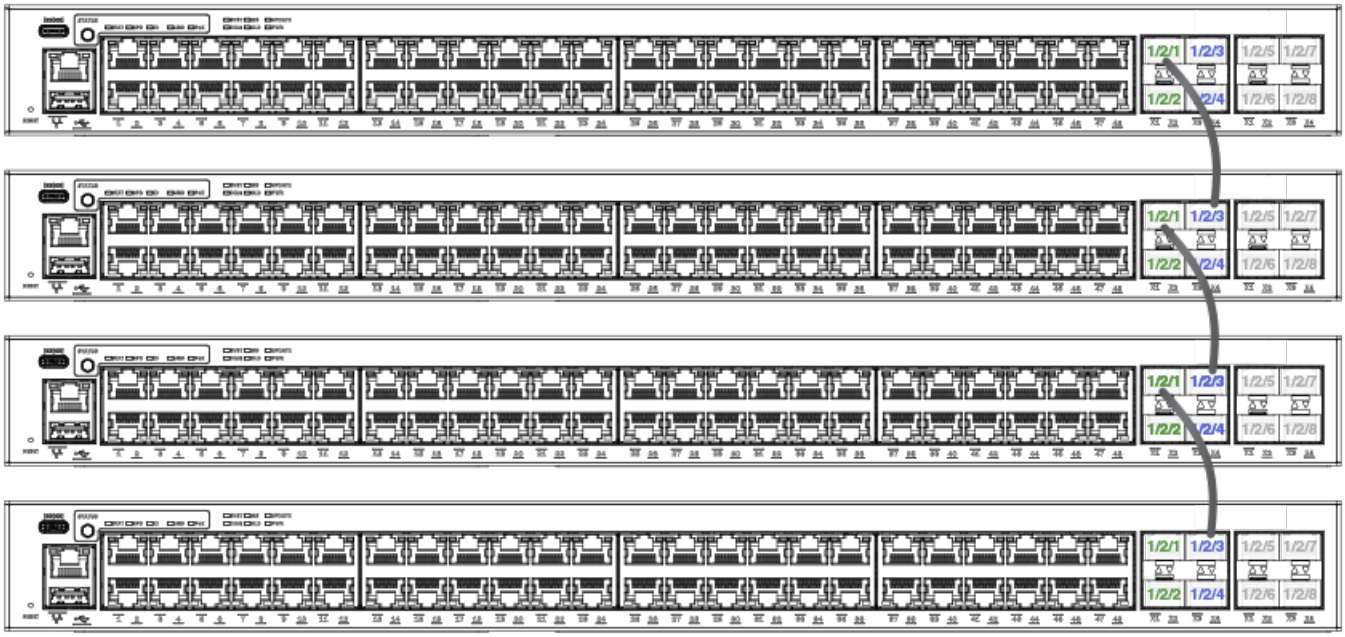
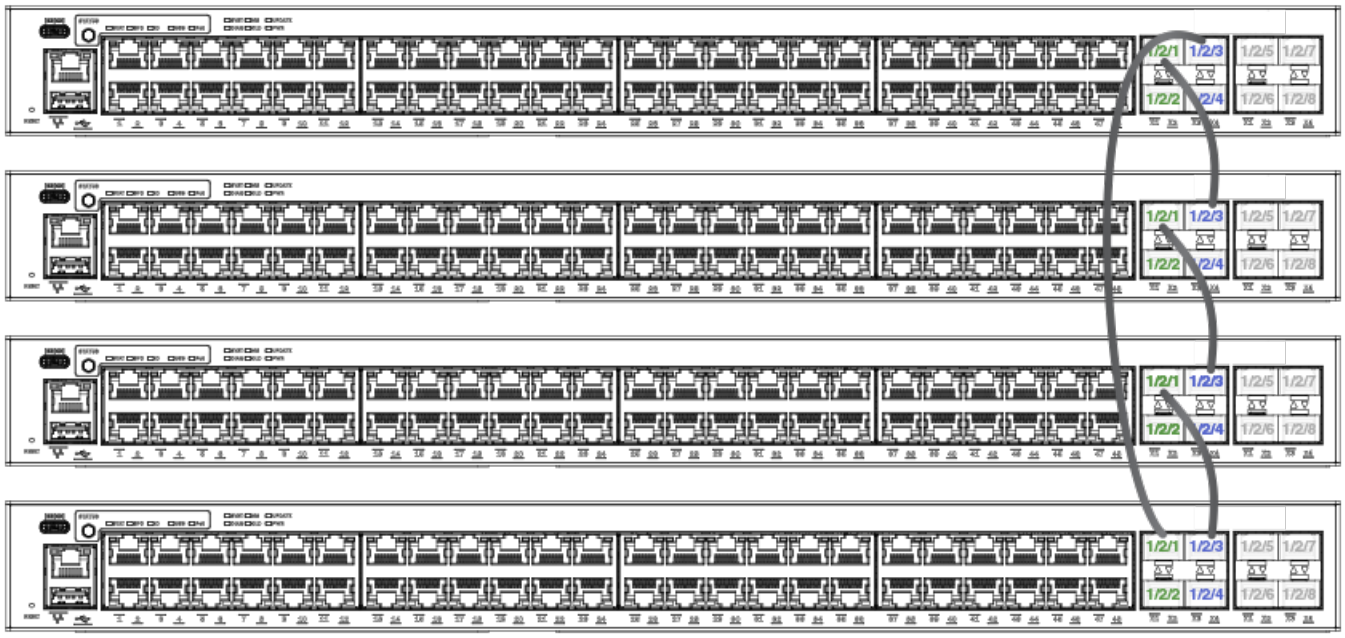


FIGURE 13 ICX 7150-48ZP stack ring topology



ICX 7150 configuration notes

In ICX 7150 devices, the LAG hashing scheme is different from other ICX platforms. As a result, the user may observe uneven distribution of packets when the traffic pattern is sequential or incremental in the same step, for example, when both the source and the destination IP address are incremented in the same step.

ICX 7150 secure-setup example

Use the **stack secure-setup** command to form a correctly connected stack automatically. For more information on stack construction, refer to Traditional stack construction methods on page 25.

The following example enables stacking and configures a three-unit ICX 7150 stack.

```
ICX7150-24 Router# configure terminal
ICX7150-24 Router(config)# stack enable
Enable stacking. This unit actively participates in stacking
ICX7150-24 Router(config)# end
ICX7150-24 Router# stack secure
ICX7150-24 Router# Discovering the stack topology...

Current Discovered Topology - RING

Available UPSTREAM units
Hop(s)  Id      Type          Mac Address
 1       new  ICX7150-48P     748e.f882.e418
 2       new  ICX7150-24P     cc4e.24b4.729c

Available DOWNSTREAM units
Hop(s)  Id      Type          Mac Address
 1       new  ICX7150-24P     cc4e.24b4.729c
 2       new  ICX7150-48P     748e.f882.e418

Do you accept the topology (RING) (y/n)?: y

Confirm Stacking Links...

DOWNSTREAM Unit: Id new at 1 hop(s) ICX7150-24P   cc4e.24b4.729c

Enter the desired links(1-2)[1]: 2

Selected Topology:
Active  Id      Type          Mac Address
        1    ICX7150-24      00e0.5200.0100

Selected UPSTREAM units
Hop(s)  Id      Type        Mac Address
 1       2    ICX7150-48P     748e.f882.e418
 2       3    ICX7150-24P     cc4e.24b4.729c

Selected DOWNSTREAM units
Hop(s)  Id      Type        Mac Address
 1       3    ICX7150-24P     cc4e.24b4.729c
 2       2    ICX7150-48P     748e.f882.e418

Do you accept the unit id's (y/n)?: y
ICX7150-24 Router#T=25m21.5: Election, was alone --> active, ID=1, pri=128, 3U(1-3), A=u1, nbr#=2 2,
reason: u2: port-up, ,
T=25m22.6: Election, was active, no change, ID=1, pri=128, 3U(1-3), A=u1, nbr#=2 2, reason: u1: stk-po-
chg, ,
T=25m25.6: reset unit 2: u2 bo-id=1
T=25m25.6: reset unit 3: u3 bo-id=1
T=25m30.7: Active U1 deletes U2 and its config because it is learned.
T=25m30.8: Active U1 deletes U3 and its config because it is learned.
T=28m55.2: Election, was active, no change, ID=1, pri=128, 3U(1-3), A=u1, nbr#=0 2, reason: u3: port-up, ,
T=28m56.4: Election, was active, no change, ID=1, pri=128, 3U(1-3), A=u1, nbr#=0 2, reason: u3: port-up, ,
T=28m58.5: Election, was active, no change, ID=1, pri=128, 3U(1-3), A=u1, nbr#=2 2, reason: u2: port-up, ,
Detect stack member 2 POE capable
Detect stack member 3 POE capable
T:29m2.0: Done hot swap: active controller u1 sets u2 to Ready.
2000 log entries of PoE Event Trace Log Buffer is allocated on unit 1 for unit 3
T:29m2.3: Done hot swap: active controller u1 sets u3 to Ready.
PoE: Stack unit 2 Power supply 1 with 370000 mwatts capacity is up
PoE: Stack unit 3 Power supply 1 with 370000 mwatts capacity is up
ICX7150-24 Router#T=30m2.6: Assigned unit 2 to be standby
```

ICX 7150 stacking trunks

All ports on both ends of a trunk must be configured at the same speed. The lead port in a stacking trunk must be a default stacking port. The default stacking ports come up automatically as 10-Gbps ports (assuming they are licensed). Additional 10-Gbps ports require a license.

NOTE
Two 10-Gbps stacking ports are standard on ICX 7150-48ZP devices.

Stacking trunks can be configured as part of the secure-setup process. Trunks can also be added when a link is down or on a production unit as described later in this section.

The following table lists ports that can be combined as stacking trunks.

TABLE 11 ICX 7150 stacking trunk options

Model	Default stacking ports	Additional stacking ports	Two-port trunks
ICX 7150-C12P	1/3/1, 1/3/2	None	Not supported
ICX 7150-24 ICX 7150-24P	1/3/1, 1/3/3	1/3/2, 1/3/4	1/3/1-1/3/2, 1/3/3-1/3/4
ICX 7150-48 ICX 7150-48P ICX 7150-48PF	1/3/1, 1/3/3	1/3/2, 1/3/4	1/3/1-1/3/2, 1/3/3-1/3/4
ICX 7150-48ZP	1/2/1, 1/2/3	1/2/2, 1/2/4	1/2/1-1/2/2, 1/2/3-1/2/4

Creating ICX 7150 stacking trunks while the link is down

Follow these steps to create a trunk while the link is down.

NOTE
Use the **stack-port** command while the link is down to remove stacking trunks and restore individual stacking ports.

1. Enter global configuration mode.

```
ICX7150-24 Router(config)# configure terminal
```

2. (Optional) Use the **show stack** command to check the stack topology and status.

```
ICX7150-24 Router(config)# show stack
T=36m46.7: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7150-24    active  00e0.5200.0100 128 local   Ready
2  S ICX7150-48P   standby 748e.f882.e418   0 remote  Ready

    standby      active
     +---+        +---+
  3/3| 2 |3/1==3/1| 1 |3/3
     +---+        +---+
Will assign standby in 56 sec due to all ready

Standby u2 - protocols ready, can failover
Current stack management MAC is 00e0.5200.0100
```

The example shows a two-unit stack with both units in the Ready state. The units are connected by a trunk through stack ports 1/3/1 and 2/3/1.

3. Enter stack unit configuration mode on the active controller.

```
ICX7150-24 Router(config)# stack unit 1
ICX7150-24 Router(config-unit-1)#
```

4. Enter the **stack-trunk** command followed by the range of ports to include in the trunk.

```
ICX7150-24 Router(config-unit-1)# stack-trunk 1/3/3 to 1/3/4
```

   The example creates a two-port stacking trunk containing ports 1/3/3 and 1/3/4.

5. Create a stacking trunk for the same number of ports at the other end of the planned connection if the trunk has not been created.

```
ICX7150-24 Router(config-unit-1)# stack-trunk 2/3/3 to 2/3/4
```

   The example creates a stacking trunk from ports 2/3/3 and 2/3/4.

6. (Optional) Enter the **show stack** command again to check the configuration.

```
ICX7150-24 Router(config-unit-1)# show stack
T=40m31.8: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7150-24    active  00e0.5200.0100 128 local   Ready
2  S ICX7150-48P   standby 748e.f882.e418   0 remote  Ready

    standby      active
     +---+        +---+
  3/3| 2 |3/1==3/1| 1 |3/3
     +---+        +---+
Standby u2 - protocols ready, can failover
Current stack management MAC is 00e0.5200.0100
ICX7150-24 Router(config-unit-1)#sh run
Current configuration:
!
ver 08.0.61b1T213
!
stack unit 1
  module 1 icx7150-24-port-management-module
  module 2 icx7150-2-copper-port-2g-module
  module 3 icx7150-4-sfp-plus-port-40g-module
  priority 128
  stack-trunk 1/3/1 to 1/3/2
  stack-trunk 1/3/3 to 1/3/4
  stack-port 1/3/1 1/3/3
stack unit 2
  module 1 icx7150-48p-poe-port-management-module
  module 2 icx7150-2-copper-port-2g-module
  module 3 icx7150-4-sfp-plus-port-40g-module
  stack-trunk 2/3/1 to 2/3/2
  stack-trunk 2/3/3 to 2/3/4
  stack-port 2/3/1 2/3/3
stack enable
stack mac 00e0.5200.0100
!
!
```

   The example shows the stack with the existing trunk (1/31 to 1/3/2 connected to 2/3/1 to 2/3/2) and the trunk added on each unit (1/3/3 to 1/3/4 and 2/3/3 to 2/3/4). To create a ring topology, the new trunk on the two stack units could be connected physically.

The following example creates a trunk on stack unit 1 while the link is down.

```
ICX7150-24 Router(config)# configure terminal
ICX7150-24 Router(config)# show stack
T=36m46.7: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7150-24    active  00e0.5200.0100 128 local   Ready
2  S ICX7150-48P   standby 748e.f882.e418   0 remote  Ready

    standby      active
     +---+        +---+
  3/3| 2 |3/1==3/1| 1 |3/3
     +---+        +---+
Will assign standby in 56 sec due to all ready

Standby u2 - protocols ready, can failover
Current stack management MAC is 00e0.5200.0100
ICX7150-24 Router(config)#Debug: Jan  1 00:38:24
Config changed due to add/del units. Do write mem if you want to keep it

ICX7150-24 Router(config)# stack unit 1
ICX7150-24 Router(config-unit-1)# stack-trunk 1/3/3 to 1/3/4
ICX7150-24 Router(config-unit-1)# show stack
T=40m31.8: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7150-24    active  00e0.5200.0100 128 local   Ready
2  S ICX7150-48P   standby 748e.f882.e418   0 remote  Ready

    standby      active
     +---+        +---+
  3/3| 2 |3/1==3/1| 1 |3/3
     +---+        +---+
Standby u2 - protocols ready, can failover
Current stack management MAC is 00e0.5200.0100
ICX7150-24 Router(config-unit-1)#sh run
Current configuration:
!
ver 08.0.61b1T213
!
stack unit 1
  module 1 icx7150-24-port-management-module
  module 2 icx7150-2-copper-port-2g-module
  module 3 icx7150-4-sfp-plus-port-40g-module
  priority 128
  stack-trunk 1/3/1 to 1/3/2
  stack-trunk 1/3/3 to 1/3/4
  stack-port 1/3/1 1/3/3
stack unit 2
  module 1 icx7150-48p-poe-port-management-module
  module 2 icx7150-2-copper-port-2g-module
  module 3 icx7150-4-sfp-plus-port-40g-module
  stack-trunk 2/3/1 to 2/3/2
  stack-port 2/3/1 2/3/3
stack enable
stack mac 00e0.5200.0100
!
!

disable-hw-ip-checksum-check  lag lg1 to lg64 lag lg65 to lg128 lag lg129 to lg192 lag lg193 to lg256 lag
lg257 to lg320 lag lg321 to lg384 lag lg385 to lg448 lag lg449 to lg512
hitless-failover enable
!
!

end
```

Creating ICX 7150 stacking trunks on a live system

Follow these steps to create a trunk on a live system.

NOTE
Use the **multi-stack-port** command to remove stacking trunks and restore stacking ports on a live system.

1. Enter global configuration mode.

```
ICX7150-24 Router(config)# configure terminal
```

2. (Optional) Use the **show stack** command to check the stack topology and status.

```
ICX7150-24 Router(config-unit-1)# show stack
T=35m51.5: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7150-24    active  00e0.5200.0100 128 local   Ready
2  S ICX7150-48P   standby 748e.f882.e418   0 remote  Ready
3  D ICX7150-24P   member  cc4e.24b4.729c   0 remote  Ready

    active                    standby
      +---+        +---+        +---+
 -3/1| 1 |3/3==3/3| 3 |3/1--3/3| 2 |3/1-
  |   +---+        +---+        +---+   |
  |                                      |
  |--------------------------------------|
Will assign standby in 56 sec due to all ready

Standby u2 - protocols ready, can failover
Current stack management MAC is 00e0.5200.0100
```

The example shows a three-unit stack with all units in the Ready state. The units are connected in a ring formation, but there is no trunk between units 1 and 2. The trunk is formed in the following steps.

3. Enter stack unit configuration mode.

```
ICX7150-24 Router(config)# stack unit 1
ICX7150-24 Router(config-unit-1)#
```

4. Enter the **multi-stack-trunk** command followed by the range of ports to include in the trunk on the connecting stack units.

```
ICX7150-24 Router(config-unit-1)# multi-stack-trunk 1/3/1 to 1/3/2 and 2/3/1 to 2/3/2
```

The example creates a two-port stacking trunk containing ports 1/3/1 and 1/3/2 on stack unit 1 and ports 2/3/1 and 2/3/2 on stack unit 2.

5. (Optional) Enter the **show stack** command and the **show stack connection** command to check the configuration.

```
ICX7150-24 Router(config-unit-1)# show stack
T=35m51.5: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7150-24    active  00e0.5200.0100 128 local   Ready
2  S ICX7150-48P   standby 748e.f882.e418   0 remote  Ready
3  D ICX7150-24P   member  cc4e.24b4.729c   0 remote  Ready

    active                    standby
     +---+        +---+        +---+
 =3/1| 1 |3/3==3/3| 3 |3/1--3/3| 2 |3/1=
  |   +---+        +---+        +---+   |
  |                                     |
  |-------------------------------------|
Will assign standby in 56 sec due to all ready

Standby u2 - protocols ready, can failover
Current stack management MAC is 00e0.5200.0100

ICX7150-24 Router# show stack connection
Probing the topology. Please wait ...
ICX7150-24 Router#
    active                    standby
     +---+        +---+        +---+
 =3/1| 1 |3/3==3/3| 3 |3/1--3/3| 2 |3/1=
  |   +---+        +---+        +---+   |
  |                                     |
  |-------------------------------------|

trunk probe results: 3 links
Link 1: u1 -- u2, num=1
  1: 1/3/1 (T0) <---> 2/3/1 (T0)
  2: 1/3/2 (T0) <---> 2/3/2 (T0)
Link 2: u1 -- u3, num=2
  1: 1/3/3 (T1) <---> 3/3/3 (T1)
  2: 1/3/4 (T1) <---> 3/3/4 (T1)
Link 3: u2 -- u3, num=1
  1: 2/3/3 (P1) <---> 3/3/1 (P0)
CPU to CPU packets are fine between 3 units.
```

The example shows the stack with the added trunk forming a ring through stacking ports 1/3/1 to 1/3/2 and 2/3/1 to 2/3/2.

The following example creates a trunk on a live link.

```
ICX7150-24 Router# configure terminal
ICX7150-24 Router(config)# stack unit 1
ICX7150-24 Router(config-unit-1)# multi-stack-trunk 1/3/1 to 1/3/2 and 2/3/1 to 2/3/2

ICX7150-24 Router(config-unit-1)# show stack
T=35m51.5: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7150-24    active  00e0.5200.0100 128 local   Ready
2  S ICX7150-48P   standby 748e.f882.e418   0 remote  Ready
3  D ICX7150-24P   member  cc4e.24b4.729c   0 remote  Ready

    active                    standby
     +---+        +---+        +---+
 =3/1| 1 |3/3==3/3| 3 |3/1--3/3| 2 |3/1=
  |   +---+        +---+        +---+   |
  |                                     |
  |-------------------------------------|
Will assign standby in 56 sec due to all ready

Standby u2 - protocols ready, can failover
Current stack management MAC is 00e0.5200.0100

ICX7150-24 Router# show stack connection
Probing the topology. Please wait ...
ICX7150-24 Router#
    active                    standby
     +---+        +---+        +---+
 =3/1| 1 |3/3==3/3| 3 |3/1--3/3| 2 |3/1=
  |   +---+        +---+        +---+   |
  |                                     |
  |-------------------------------------|

trunk probe results: 3 links
Link 1: u1 -- u2, num=1
  1: 1/3/1 (T0) <---> 2/3/1 (T0)
  2: 1/3/2 (T0) <---> 2/3/2 (T0)
Link 2: u1 -- u3, num=2
  1: 1/3/3 (T1) <---> 3/3/3 (T1)
  2: 1/3/4 (T1) <---> 3/3/4 (T1)
Link 3: u2 -- u3, num=1
  1: 2/3/3 (P1) <---> 3/3/1 (P0)
CPU to CPU packets are fine between 3 units.
```

Converting stacking ports to data ports on ICX 7150 devices

Follow these steps to convert a stacking port to a data port on an ICX 7150 device.

1. Enter global configuration mode.

   ```
   ICX7150-24 Router# configure terminal
   ```

2. Enter configuration mode for the stack unit.

   ```
   ICX7150-24 Router(config)# stack unit 1
   ICX7150-24 Router(config-unit-1)#
   ```

   The example enters configuration mode on stack unit 1.

3. Use the **no stack-port** command to remove stacking from one stacking port to convert it to a data port.

   ```
   ICX7150-24 Router(config-unit-1)# no stack-port 1/3/3
   Remove stack-port 1/3/3. The remaining stack-port is 1/3/1.
   ```

The following example converts stacking port 1/3/3 to a data port.

```
ICX7150-24 Router# configure terminal
ICX7150-24 Router(config)# stack unit 1
ICX7150-24 Router(config-unit-1)# no stack-port 1/3/3
Remove stack-port 1/3/3. The remaining stack-port is 1/3/1.

ICX7150-24 Router(config-unit-1)# show stack
T=41m15.7: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7150-24    active  00e0.5200.0100 128 local   Ready
2  S ICX7150-48P   standby 748e.f882.e418   0 remote  Ready

    standby      active
     +---+        +---+
  3/3| 2 |3/1==3/1| 1 |
     +---+        +---+
Will assign standby in 58 sec due to all ready

Standby u2 - protocols ready, can failover
Current stack management MAC is 00e0.5200.0100
```

Displaying information about an ICX 7150 stack

1. Enter the **show stack** unit to display stack topology and the roles of individual stack members.

```
ICX7150-24 Router# show stack
T=34m53.4: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7150-24    active  00e0.5200.0100 128 local   Ready
2  D ICX7150-48P   standby 748e.f882.e418   0 remote  Ready
3  D ICX7150-24P   member  cc4e.24b4.729c   0 remote  Ready

    active                   standby
     +---+        +---+        +---+
 -3/1| 1 |3/3==3/3| 3 |3/1--3/3| 2 |3/1-
  |   +---+        +---+        +---+   |
  |                                      |
  |--------------------------------------|
Standby u2 - protocols ready, can failover
Current stack management MAC is 00e0.5200.0100
```

The example displays information for a three-unit stack configured in a ring. Three different ICX 7150 models are stacked together. Stack unit 1 is the active controller, and unit 2 is the standby controller. Units 1 and 3 are connected by a trunk through ports 1/3/3 and 3/3/3. Units 1 and 2 are connected by a link through ports 1/3/1 and 2/3/1. The MAC address, stack priority, and state of each unit are also listed.

2. Enter the **show stack detail** command for more detailed information on the stack.

```
ICX7150-24 Router# show stack detail
T=20h8m23.6: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7150-24    active  00e0.5200.0100 128 local   Ready
2  D ICX7150-48P   standby 748e.f882.e418   0 remote  Ready
3  D ICX7150-24P   member  cc4e.24b4.729c   0 remote  Ready

    active                   standby
     +---+        +---+        +---+
 -3/1| 1 |3/3==3/3| 3 |3/1--3/3| 2 |3/1-
  |   +---+        +---+        +---+   |
  |                                     |
  |-------------------------------------|
Standby u2 - protocols ready, can failover
Current stack management MAC is 00e0.5200.0100

Image-Auto-Copy is Enabled.

      Stack Port Status                       Neighbors
Unit# Stack-port1         Stack-port2         Stack-port1         Stack-port2
1     up (1/3/1)          up (1/3/3-1/3/4)    U2 (2/3/1)          U3 (3/3/3-3/3/4)
2     up (2/3/1)          up (2/3/3)          U1 (1/3/1)          U3 (3/3/1)
3     up (3/3/1)          up (3/3/3-3/3/4)    U2 (2/3/3)          U1 (1/3/3-1/3/4)

Unit# System uptime
1     20 hour(s) 8 minute(s) 23 second(s)
2     7 minute(s) 47 second(s)
3     7 minute(s) 47 second(s)
The system started at 00:01:49 GMT+00 Thu Jan 01 1970
```

The example adds information on stack port status for each unit, identifies the connecting ports and neighbors, and indicates up time for each unit. It also indicates that Image Auto-Copy, used to update stack system software, is enabled.

3. Enter the **show stack connection** command for a summary of stack topology and links.

```
ICX7150-24 Router# show stack connection
Probing the topology. Please wait ...
ICX7150-24 Router#
    active                   standby
     +---+        +---+        +---+
 =3/1| 1 |3/3==3/3| 3 |3/1--3/3| 2 |3/1=
  |   +---+        +---+        +---+   |
  |                                     |
  |-------------------------------------|

trunk probe results: 3 links
Link 1: u1 -- u2, num=1
  1: 1/3/1 (T0) <---> 2/3/1 (T0)
  2: 1/3/2 (T0) <---> 2/3/2 (T0)
Link 2: u1 -- u3, num=2
  1: 1/3/3 (T1) <---> 3/3/3 (T1)
  2: 1/3/4 (T1) <---> 3/3/4 (T1)
Link 3: u2 -- u3, num=1
  1: 2/3/3 (P1) <---> 3/3/1 (P0)
CPU to CPU packets are fine between 3 units.
```

The example shows stack connections for a similar stack, including port details for the trunk connections. This stack includes a second trunk between units 1 and 2 (as opposed to a single link in the previous **show stack detail** output) that forms the ring topology.

4. Enter the **show running-config** command to display the active configuration of the stack.

```
ICX7150-24 Router# show running-config
Current configuration:
!
ver 08.0.61b1T213
!
stack unit 1
  module 1 icx7150-24-port-management-module
  module 2 icx7150-2-copper-port-2g-module
  module 3 icx7150-4-sfp-plus-port-40g-module
  priority 128
  stack-trunk 1/3/3 to 1/3/4
  stack-port 1/3/1 1/3/3
stack unit 2
  module 1 icx7150-48p-poe-port-management-module
  module 2 icx7150-2-copper-port-2g-module
  module 3 icx7150-4-sfp-plus-port-40g-module
  stack-port 2/3/1 2/3/3
stack unit 3
  module 1 icx7150-24p-poe-port-management-module
  module 2 icx7150-2-copper-port-2g-module
  module 3 icx7150-4-sfp-plus-port-40g-module
  stack-trunk 3/3/3 to 3/3/4
  stack-port 3/3/1 3/3/3
stack enable
stack mac 00e0.5200.0100
!
!

disable-hw-ip-checksum-check  lag lg1 to lg64 lag lg65 to lg128 lag lg129 to lg192 lag lg193 to
lg256
  lag lg257 to lg320 lag lg321 to lg384 lag lg385 to lg448 lag lg449 to lg512
hitless-failover enable
!
!
end
```

The example shows the running configuration for a similar three-unit stack; however, this stack has no trunk configured on unit 2. Stacking and hitless-failover are enabled. Stacking trunks and ports for each unit are displayed. The modules installed in each unit are also displayed.

ICX 7250 stack configuration overview

The following table provides an overview of ICX 7250 stacking capabilities.

TABLE 12 ICX 7250 traditional stacking capability

Stacking capability	ICX 7250	Additional information
Topologies supported	Ring and linear	Refer to ICX 7250 stacking topologies on page 62.
Maximum stack size	12	Traditional stacking and SPX configurations. Any combination of ICX 7250 devices may be stacked. When a stand-alone ICX 7250 is configured as a PE unit attached to a control bridge in an 802.1br SPX configuration, scaling is increased. Refer to the *Ruckus FastIron Campus Fabric Configuration Guide* for more information.
Maximum stacking distance	10 Kilometers	Refer to FastIron stacking distances and optics by device on page 20 for more information.

TABLE 12 ICX 7250 traditional stacking capability (continued)

Stacking capability	ICX 7250	Additional information
Stacking ports	Four 10-Gbps stacking ports (from eight available ports) on fixed module on front panel	Module 2 on front panel contains four stacking ports and four uplink ports, which can be used as alternative ports for stacking. Refer to ICX 7250 stacking topologies on page 62 for module and port locations.
Default-ports sets	Factory set (x/2/1, x/2/3, 2) or (x/2/5, x/2/7, 2) **NOTE** The third number in each set is the maximum number of ports in a stacking trunk.	Refer to ICX 7250 stacking topologies on page 62 for port locations.
Reconfigurable ports	Supported	Use the **stack-port** command to reconfigure one stack port as a data uplink port. Once licensed, stacking ports come up as 10-Gbps ports automatically. You can manually reconfigure 1-Gbps ports to 10-Gbps ports when licensed using the **speed-duplex** command. Refer to Traditional stack CLI commands on page 162.
Stack trunks	stack-trunk 1/2/1 to 1/2/2 stack-trunk 1/2/3 to 1/2/4 stack-trunk 1/2/5 to 1/26 stack-trunk 1/2/7 to 1/2/8	Refer to ICX 7250 trunk configuration on page 65.
Linear-topology trunk	stack-trunk x/2/1 to x/2/4 or stack-trunk x/2/5 to x/2/8	Refer to ICX 7250 trunk configuration on page 65.
Hitless switchover and hitless failover	Supported	Refer to Hitless stacking on page 139.
License requirements	A license is required for 10-Gbps ports. (Trunks cannot be formed with the pre-installed two-port license.)	The pre-installed license is for two 10-Gbps ports (supports stacking ports 1/2/1 and 1/2/3). Licenses are available for eight 10-Gbps ports. Refer to the *Ruckus FastIron Software Licensing Guide* for information.
Configuration options	Manual and automatic, including interactive-setup and zero-touch provisioning	Refer to Traditional stack construction methods on page 25.
Access methods	TFTP, SCP	Software images, boot images, and signatures can be downloaded to a stack using TFTP and SCP. Refer to the *Ruckus FastIron Software Upgrade Guide* for more information.
Traditional stacking CLI	All stacking CLI is available on the ICX 7250 unless otherwise noted on the command reference page.	Refer to Traditional stack CLI commands on page 162.

ICX 7250 stacking topologies

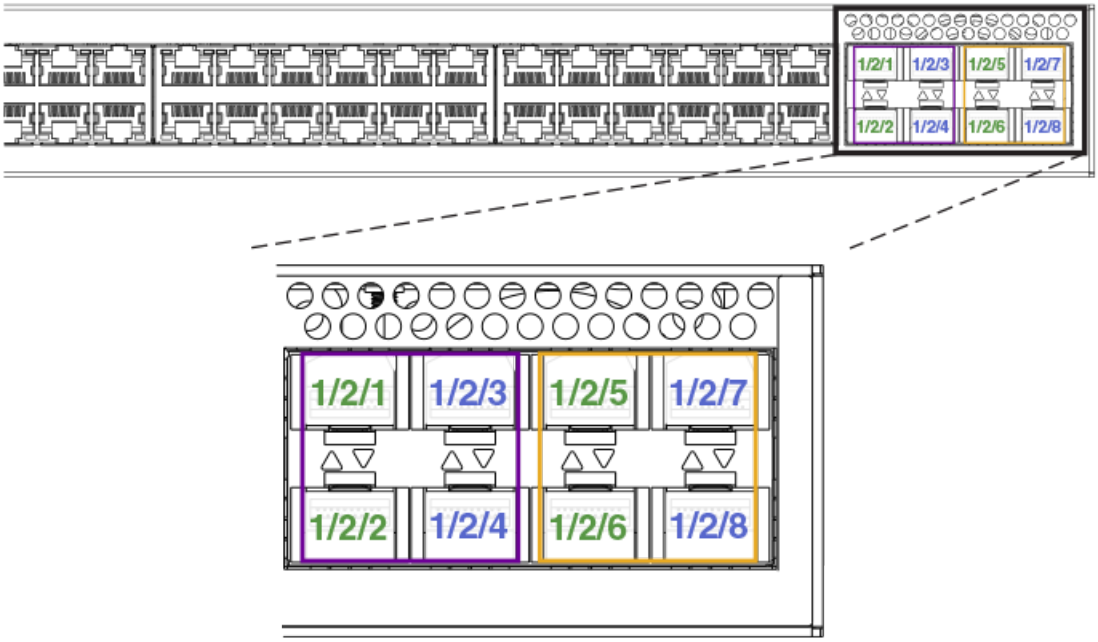
Up to 12 ICX 7250-24, ICX 7250-24P, ICX 7250-48, or ICX 7250-48P units can be connected in a linear or ring topology. Any of these models can be mixed in the same stack. Stacking ports are located on the front panel as shown in the following figures.

NOTE
The ICX 7250-24G is not stackable.

From one to four 10-Gbps ports (from eight available 10-Gbps ports) can be used for stacking on the ICX 7250. All stacking ports must have an active license installed to be properly configured. Active stacking ports can be configured in one of two sets of ports on the front panel; however, stacking ports cannot be mixed between the two sets of ports because of operational constraints. Available ports are numbered 1/2/1 through 1/2/8 as shown in the following figure.

Default stacking ports on the ICX 7250 are 1/2/1 and 1/2/3. The default stacking ports may be reassigned to ports 1/2/5 and 1/2/7 as described in Changing default ports on the ICX 7250 on page 65.

FIGURE 14 ICX 7250 stacking ports



The following figures show ICX 7250 units connected in a linear stack and a ring stack.

FIGURE 15 ICX 7250-24P linear stack

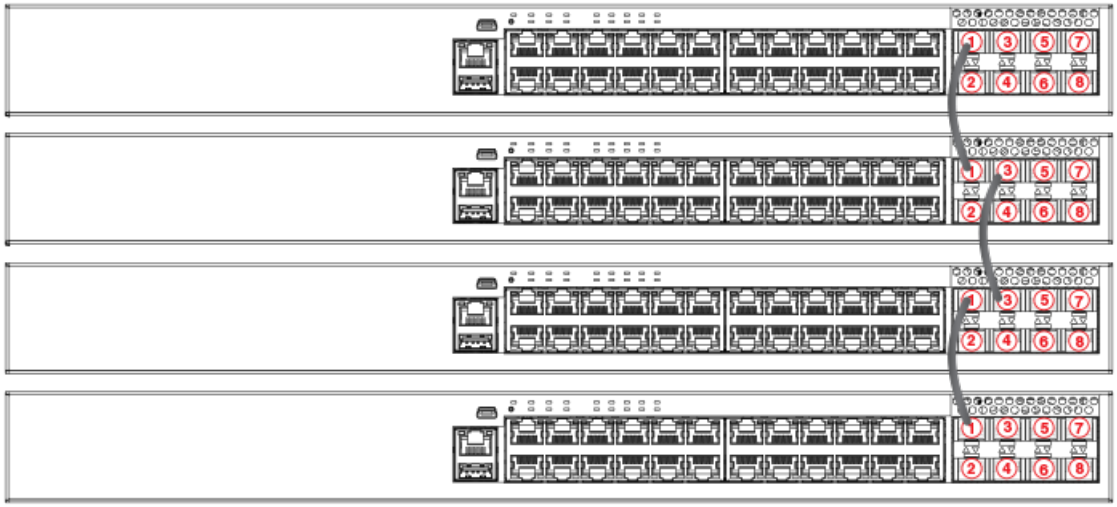
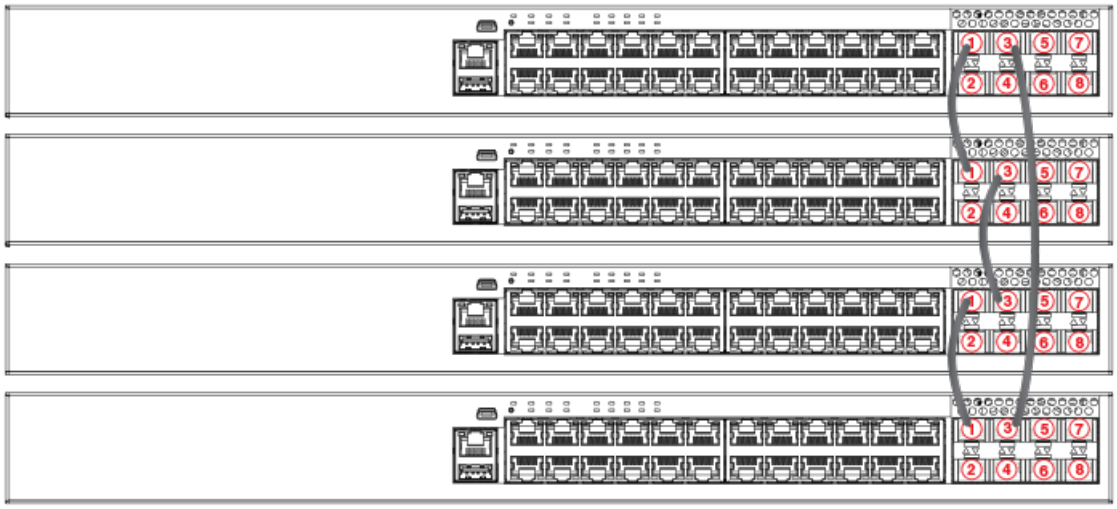


FIGURE 16 ICX 7250-24P ring stack



ICX 7250 stacking configuration notes

All ICX 7250 platforms except the ICX 7250-24G support stacking on 10-Gbps links. The ICX 7250 requires a POD license for ports to operate at 10 Gbps. Otherwise, the ports support only 1 Gbps. These 1-Gbps ports do not support stacking.

If a port is configured to operate at 1 Gbps in the startup configuration, it would continue to operate at 1 Gbps after a license is installed, unless it is re-configured to operate at 10 Gbps. Refer to Reconfiguring ICX 7250 1-Gbps ports as 10-Gbps ports on page 64. However, if no user configuration is present for the ports, they will automatically be configured as 10-Gbps ports when a license is installed.

If an ICX 7250 stack is formed on licensed ports and the license is later removed, the stack breaks afer reload because the stack ports return to 1-Gbps mode. To form the stack again, the license must be downloaded to each device.

Of the eight 10-Gbps SFP+ ports potentially available on the ICX 7250 as stacking or uplink ports, a maximum of four ports can be used simultaneously for stacking. These ports can operate as separate ports, or they can be configured as two-port trunks. Refer to ICX 7250 trunk configuration on page 65 for more information. All eight ports are available as uplink data ports when not used for stacking.

When stacking is configured, all stack ports and trunks must be either in the port range of 1/2/1 through 1/2/4 or in the port range 1/2/5 through 1/2/8. Ports 1/2/1 through 1/2/8 support both active cables and 10-Gbps SFP+ optics. Ports 1/2/5 through 1/2/8 have re-timers that support active cables. Any of these ports can be used for long-distance stacking if appropriate SFP's and cables are used. When any units in the stack are cross-cabled to a unit with stacking on ports 1/2/1 through 1/2/4, active cables should be used throughout the stack.

Reconfiguring ICX 7250 1-Gbps ports as 10-Gbps ports

A port previously configured as a 1-Gbps port must be reconfigured to operate at 10 Gbps. Stacking on the ICX 7250 is only available on 10-Gbps ports in module 2.

NOTE
A license is required for 10-Gbps ports on the ICX 7250. Refer to the *Ruckus FastIron Software Licensing Guide* for additional information.

NOTE
Once a 10-Gbps port license is installed, previously unconfigured ports that are covered by the license come up automatically as 10-Gbps ports. Ports must then be configured for stacking. Refer to ICX 7250 stacking configuration notes on page 64.

Use the **speed-duplex** command to reconfigure port speed on a 1-Gbps port.

In the following example, port 1/2/1, a 1-Gbps port, is reconfigured as a 10-Gbps port.

```
ICX7250-48P Router# configure terminal
ICX7250-48P Router(config)# interface ethernet 1/2/1
ICX7250-48P Router(config-if-e10000-1/2/1)# speed-duplex 10g-full
```

Changing default ports on the ICX 7250

Use the **default-ports** command to change default stacking ports on the ICX 7250.

When a port is not configured as a stacking port or a stacking trunk, it is an available uplink or data port.

When stacking is enabled, the default stacking ports on the ICX 7250 are ports 1/2/1 and 1/2/3. All other ports in module 2 can be used as uplinks. You can change the default stacking ports to 1/2/5 and 1/2/7 as shown in the following example.

```
device# configure terminal
device(config)# stack unit 1
device(config-unit-1)# default-ports 1/2/5 1/2/7
```

Return the stacking ports to the original defaults using the **no default-ports** command as shown in the second example.

```
device# configure terminal
device(config)# stack unit 1
device(config-unit-1)# no default-ports
```

ICX 7250 trunk configuration

When a 10-port license is installed, two stacking trunks containing two ports each can be configured on each ICX 7250 unit.

Stacked trunks can be formed using the following port combinations only:

- Stack ports 1/2/1 and 1/2/2
- Stack ports 1/2/3 and 1/2/4
- Stack ports 1/2/5 and 1/2/6
- Stack ports 1/2/7 and 1/2/8

The following example designates ports 1/2/1 and 1/2/3 as stacking default ports and then creates two trunks.

```
ICX7250-24P Router(config)# stack unit 1
ICX7250-24P Router(config-unit-1)# default-ports 1/2/1 1/2/3
ICX7250-24P Router(config-unit-1)# stack-trunk 1/2/1 to 1/2/2
ICX7250-24P Router(config-unit-1)# stack-trunk 1/2/3 to 1/2/4
```

The following example reassigns ports 1/2/5 and 1/2/7 as stacking default ports and creates two trunks.

```
ICX7250-24P Router(config)# stack unit 1
ICX7250-24P Router(config-unit-1)# default-ports 1/2/5 1/2/7
ICX7250-24P Router(config-unit-1)# stack-trunk 1/2/5 to 1/2/6
ICX7250-24P Router(config-unit-1)# stack-trunk 1/2/7 to 1/2/8
```

Creating ICX 7250 trunks in a production environment

The **stack-trunk** command cannot be used in a live environment. Instead, use the **multi-stack-trunk** command to configure both ends of a trunk simultaneously.

The following example creates a multi-stack-trunk cross-cabled connection between unit 1 and unit 2 on ports 1/2/7 through 1/2/8 and ports 2/2/5 through 2/2/6.

```
ICX7250-48 Router(config-unit-1)# multi-stack-trunk 1/2/7 to 1/2/8 and 2/2/5 to 2/2/6

ICX7250-48 Router(config-unit-1)# show stack
T=15d23h18m0.7: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7250-48    active  cc4e.24b4.23e8   0 local   Ready
2  S ICX7250-24P   member  cc4e.24b4.8aa8   0 remote  Ready
3  S ICX7250-24    standby cc4e.24b4.8cc4   0 remote  Ready
4  S ICX7250-48P   member  cc4e.24b4.2d84   0 remote  Ready

    active                                  standby
     +---+        +---+        +---+        +---+
 =2/5| 1 |2/7==2/5| 2 |2/7--2/5| 4 |2/7--2/5| 3 |2/7=
  |   +---+        +---+        +---+        +---+   |
  |                                                   |
  |---------------------------------------------------|
Standby u3 - protocols ready, can failover or manually switch over
Current stack management MAC is cc4e.24b4.23e8
```

The double lines between unit 1 and unit 2 in the previous output indicate a trunk connection with 2 ports form each unit.

ICX 7250 secure-setup example

Use the **stack secure-setup** command to form a correctly connected stack automatically. For more information on stack construction, refer to Traditional stack construction methods on page 25.

In the following example, the **stack secure-setup** command is used to form a 3-unit ICX 7250 stack in a ring topology with a stacking trunk connection.

```
ICX7250-24 Router# stack secure-setup
ICX7250-24 Router# Discovering the stack topology...

Current Discovered Topology - RING

Available UPSTREAM units
Hop(s)  Id      Type          Mac Address
1        3   ICX7250-24      cc4e.24b4.7740
2        2   ICX7250-24      cc4e.24b4.75d8

Available DOWNSTREAM units
Hop(s)  Id      Type          Mac Address
1        2   ICX7250-24      cc4e.24b4.75d8
2        3   ICX7250-24      cc4e.24b4.7740

Do you accept the topology (RING) (y/n)?: y

ICX7250-24 Router# stack secure-setup
ICX7250-24 Router# Discovering the stack topology...

Current Discovered Topology - RING

Available UPSTREAM units
Hop(s)  Id      Type          Mac Address
1        3   ICX7250-24      cc4e.24b4.7740
2        2   ICX7250-24      cc4e.24b4.75d8

Available DOWNSTREAM units
Hop(s)  Id      Type          Mac Address
1        2   ICX7250-24      cc4e.24b4.75d8
```

```
2        3   ICX7250-24      cc4e.24b4.7740

Do you accept the topology (RING) (y/n)?: y

Confirm Stacking Links...

UPSTREAM Unit: Id 3 at 1 hop(s) ICX7250-24    cc4e.24b4.7740

Enter the desired links(1-2)[1]: 2


Selected Topology:
Active  Id      Type          Mac Address
        1    ICX7250-24      cc4e.24b4.7278

Selected UPSTREAM units
Hop(s)  Id      Type        Mac Address
1       3    ICX7250-24      cc4e.24b4.7740
2       2    ICX7250-24      cc4e.24b4.75d8

Selected DOWNSTREAM units
Hop(s)  Id      Type        Mac Address
1       2    ICX7250-24      cc4e.24b4.75d8
2       3    ICX7250-24      cc4e.24b4.7740

Do you accept the unit id's (y/n)?: y
```

The following example shows secure-setup of 12 units in a ring stack.

```
ICX7250-24P Router# stack secure-setup
ICX7250-24P Router# Discovering the stack topology...

Available UPSTREAM units
Hop(s)  Id      Type          Mac Address
1        2   ICX7250-24P     cc4e.24b4.7bc0
2        3   ICX7250-24P     cc4e.24b4.7efc
3        4   ICX7250-24      cc4e.24b4.8670
4        5   ICX7250-24      cc4e.24b4.84c0
5        6   ICX7250-24      cc4e.24b4.8064
6        7   ICX7250-24      cc4e.24b4.83a0
7        8   ICX7250-48      cc4e.24b4.2514
8        9   ICX7250-48      cc4e.24b4.2820
9       10   ICX7250-24      cc4e.24b4.8988
10       11   ICX7250-48P     cc4e.24b4.2f28
11       12   ICX7250-48P     cc4e.24b4.2eb0

No new core units found...

Selected Topology:
Active  Id      Type          Mac Address
        1    ICX7250-24P     cc4e.24b4.7c50

Selected UPSTREAM units
Hop(s)  Id      Type        Mac Address
1       2    ICX7250-24P     cc4e.24b4.7bc0
2       3    ICX7250-24P     cc4e.24b4.7efc
3       4    ICX7250-24      cc4e.24b4.8670
4       5    ICX7250-24      cc4e.24b4.84c0
5       6    ICX7250-24      cc4e.24b4.8064
6       7    ICX7250-24      cc4e.24b4.83a0
7       8    ICX7250-48      cc4e.24b4.2514
8       9    ICX7250-48      cc4e.24b4.2820
9       10   ICX7250-24      cc4e.24b4.8988
10      11   ICX7250-48P     cc4e.24b4.2f28
11      12   ICX7250-48P     cc4e.24b4.2eb0

Do you accept the unit id's (y/n)?: y
```

Displaying basic information for an ICX 7250 stack

Enter the **show stack** command at the device level to display general information about the stack, including unit IDs, device type, role, MAC address, priority, status, and connections.

The following **show stack** command output display details for the 3-unit stack and the 12-unit stack formed in the previous secure-setup examples.

```
ICX7250-24 Router# show stack
T=15h50m28.8: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7250-24    active  cc4e.24b4.7278 128 local   Ready
2  S ICX7250-24    standby cc4e.24b4.75d8 128 remote  Ready
3  S ICX7250-24    member  cc4e.24b4.7740   0 remote  Ready

    active       standby
     +---+        +---+        +---+
     | 1 |2/3--2/3| 2 |2/1--2/3| 3 |
     +---+        +---+        +---+
Standby u2 - protocols ready, can failover or manually switch over
Current stack management MAC is cc4e.24b4.7278
```

The following **show stack** command output displays information for the 12-unit stack.

```
ICX7250-24P Router# show stack
T=8h40m5.7: alone: standalone, D: dynamic cfg, S: static, A=10, B=11, C=12
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7250-24P   active  cc4e.24b4.7c50 200 local   Ready
2  S ICX7250-24P   member  cc4e.24b4.7bc0 128 remote  Ready
3  S ICX7250-24P   member  cc4e.24b4.7efc   0 remote  Ready
4  S ICX7250-24    member  cc4e.24b4.8670   0 remote  Ready
5  S ICX7250-24    member  cc4e.24b4.84c0   0 remote  Ready
6  S ICX7250-24    member  cc4e.24b4.8064   0 remote  Ready
7  S ICX7250-24    member  cc4e.24b4.83a0   0 remote  Ready
8  S ICX7250-48    member  cc4e.24b4.2514   0 remote  Ready
9  S ICX7250-48    member  cc4e.24b4.2820   0 remote  Ready
10 S ICX7250-24    member  cc4e.24b4.8988   0 remote  Ready
11 S ICX7250-48P   member  cc4e.24b4.2f28   0 remote  Ready
12 S ICX7250-48P   standby cc4e.24b4.2eb0 200 remote  Ready

    standby
     +---+        +---+        +---+        +---+        +---+        +---+
  2/7| C |2/5==2/5| B |2/7==2/5| A |2/7==2/1| 9 |2/3==2/3| 8 |2/1==2/1| 7 |2/3=
     +---+        +---+        +---+        +---+        +---+        +---+   |
                                                                               |
    active                                                                     |
     +---+        +---+        +---+        +---+        +---+        +---+   |
 -2/7| 1 |2/5==2/7| 2 |2/5==2/3| 3 |2/1==2/3| 4 |2/1==2/1| 5 |2/3==2/3| 6 |2/1=
     +---+        +---+        +---+        +---+        +---+        +---+
Standby u12 - protocols ready, can failover or manually switch over
Current stack management MAC is cc4e.24b4.7c50
```

Displaying detailed information for an ICX 7250 stack

Use the **show stack detail** command to display information on all units in the stack, including their role, MAC address, priority, status, and stack connections.

The following **show stack detail** command output provides information on an ICX 7250 stack containing 3 units.

```
ICX7250-24 Router# show stack detail
T=15h50m34.3: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7250-24    active  cc4e.24b4.7278 128 local   Ready
2  S ICX7250-24    standby cc4e.24b4.75d8 128 remote  Ready
3  S ICX7250-24    member  cc4e.24b4.7740   0 remote  Ready

    active       standby
```

```
     +---+        +---+        +---+
     | 1 |2/3--2/3| 2 |2/1--2/3| 3 |
     +---+        +---+        +---+
Standby u2 - protocols ready, can failover or manually switch over
Current stack management MAC is cc4e.24b4.7278

Image-Auto-Copy is Enabled.

      Stack Port Status                       Neighbors
Unit# Stack-port1         Stack-port2         Stack-port1         Stack-port2
1     none                up (1/2/3)          none                U2 (2/2/3)
2     up (2/2/1)          up (2/2/3)          U3 (3/2/3)          U1 (1/2/3)
3     none                up (3/2/3)          none                U2 (2/2/1)

Unit# System uptime
1     15 hour(s) 50 minute(s) 34 second(s)
2     15 hour(s) 50 minute(s) 42 second(s)
3     15 hour(s) 50 minute(s) 27 second(s)
```

The following output is for an ICX 7250 stack containing 12 units.

```
ICX7250-24P Router# show stack detail
T=8h31m0.8: alone: standalone, D: dynamic cfg, S: static, A=10, B=11, C=12
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7250-24P   active  cc4e.24b4.7c50 200 local   Ready
2  S ICX7250-24P   member  cc4e.24b4.7bc0 128 remote  Ready
3  S ICX7250-24P   member  cc4e.24b4.7efc   0 remote  Ready
4  S ICX7250-24    member  cc4e.24b4.8670   0 remote  Ready
5  S ICX7250-24    member  cc4e.24b4.84c0   0 remote  Ready
6  S ICX7250-24    member  cc4e.24b4.8064   0 remote  Ready
7  S ICX7250-24    member  cc4e.24b4.83a0   0 remote  Ready
8  S ICX7250-48    member  cc4e.24b4.2514   0 remote  Ready
9  S ICX7250-48    member  cc4e.24b4.2820   0 remote  Ready
10 S ICX7250-24    member  cc4e.24b4.8988   0 remote  Ready
11 S ICX7250-48P   member  cc4e.24b4.2f28   0 remote  Ready
12 S ICX7250-48P   standby cc4e.24b4.2eb0 200 remote  Ready

    standby
     +---+        +---+        +---+        +---+        +---+        +---+
  2/7| C |2/5==2/5| B |2/7==2/5| A |2/7==2/1| 9 |2/3==2/3| 8 |2/1==2/1| 7 |2/3=
     +---+        +---+        +---+        +---+        +---+        +---+   |
                                                                               |
    active                                                                     |
     +---+        +---+        +---+        +---+        +---+        +---+   |
 -2/7| 1 |2/5==2/7| 2 |2/5==2/3| 3 |2/1==2/3| 4 |2/1==2/1| 5 |2/3==2/3| 6 |2/1=
     +---+        +---+        +---+        +---+        +---+        +---+
Standby u12 - protocols ready, can failover or manually switch over
Current stack management MAC is cc4e.24b4.7c50

Image-Auto-Copy is Enabled.

      Stack Port Status                       Neighbors
Unit# Stack-port1         Stack-port2         Stack-port1         Stack-port2
1     up (1/2/5-1/2/6)    dn (1/2/7)          U2 (2/2/7-2/2/8)    none
2     up (2/2/5-2/2/6)    up (2/2/7-2/2/8)    U3 (3/2/3-3/2/4)    U1 (1/2/5-1/2/6)
3     up (3/2/1-3/2/2)    up (3/2/3-3/2/4)    U4 (4/2/3-4/2/4)    U2 (2/2/5-2/2/6)
4     up (4/2/1-4/2/2)    up (4/2/3-4/2/4)    U5 (5/2/1-5/2/2)    U3 (3/2/1-3/2/2)
5     up (5/2/1-5/2/2)    up (5/2/3-5/2/4)    U4 (4/2/1-4/2/2)    U6 (6/2/3-6/2/4)
6     up (6/2/1-6/2/2)    up (6/2/3-6/2/4)    U7 (7/2/3-7/2/4)    U5 (5/2/3-5/2/4)
7     up (7/2/1-7/2/2)    up (7/2/3-7/2/4)    U8 (8/2/1-8/2/2)    U6 (6/2/1-6/2/2)
8     up (8/2/1-8/2/2)    up (8/2/3-8/2/4)    U7 (7/2/1-7/2/2)    U9 (9/2/3-9/2/4)
9     up (9/2/1-9/2/2)    up (9/2/3-9/2/4)    U10 (10/2/7-10/2/8) U8 (8/2/3-8/2/4)
10    up (10/2/5-10/2/6)  up (10/2/7-10/2/8)  U11 (11/2/7-11/2/8) U9 (9/2/1-9/2/2)
11    up (11/2/5-11/2/6)  up (11/2/7-11/2/8)  U12 (12/2/5-12/2/6) U10 (10/2/5-10/2/6)
12    up (12/2/5-12/2/6)  dn (12/2/7)         U11 (11/2/5-11/2/6) none

Unit# System uptime
1     8 hour(s) 31 minute(s) 0 second(s)
2     8 hour(s) 30 minute(s) 59 second(s)
3     8 hour(s) 30 minute(s) 59 second(s)
4     8 hour(s) 30 minute(s) 59 second(s)
```

```
5      8 hour(s) 31 minute(s) 0 second(s)
6      8 hour(s) 30 minute(s) 58 second(s)
7      8 hour(s) 30 minute(s) 58 second(s)
8      8 hour(s) 30 minute(s) 57 second(s)
9      8 hour(s) 30 minute(s) 59 second(s)
10     8 hour(s) 30 minute(s) 58 second(s)
11     29 minute(s) 59 second(s)
12     30 minute(s) 3 second(s)
```

ICX 7450 stack configuration overview

The following table provides an overview of ICX 7450 stacking capabilities. From FastIron release 08.0.30, 4 x 10-Gbps stacking is available from module 2 as an option.

TABLE 13 ICX 7450 traditional stacking capability

Stacking capability	ICX 7450	Additional information
Topologies supported	Ring and linear	Refer to ICX 7450 stacking topologies on page 71.
Maximum stack size	12 (configured in a traditional stack)	Traditional stacking and SPX configurations. Any combination of ICX 7450 devices may be stacked. When a stand-alone ICX 7450 is configured as a PE unit attached to an ICX 7750 control bridge in an 802.1br SPX configuration, scaling is increased. Refer to the *Ruckus FastIron Campus Fabric Configuration Guide* for more information.
Maximum stacking distance	100 meters, 300 meters, or 10 kilometers, depending on optic	Refer to FastIron stacking distances and optics by device on page 20 for more information.
Stacking ports	Two 40-Gbps ports in rear or 4 X 10-Gbps ports as an option on front **NOTE** 40-Gbps stacking and 4 X 10-Gbps stacking cannot be used simultaneously in the same stack.	Modules 3 and 4, one port each. Four 10-Gbps ports are available as an option when a 4X10GF module is installed in slot 2. Refer to ICX 7450 stacking topologies on page 71 for module locations.
Default ports	Two ports: 1/3/1 and 1/4/1 **NOTE** Default ports can be changed to 1/2/1 and 1/2/3 if a 4X10GF module is installed in slot 2. Use the **default-ports** command to change the default ports. **NOTE** Default ports are handled differently on PE units in an SPX configuration.	Refer to ICX 7450 stacking topologies on page 71 for port locations. Refer to Configuring 10 Gbps stacking ports on the ICX 7450 on page 75 for more information. Refer to Planning to build a stack with 802.1br switch port extender capability on page 25 for more information about configuring ICX 7450 devices in an SPX configuration.
Reconfigurable ports	Use the **default-ports** and **stack-port** commands to reconfigure ports.	Stacking ports can be reconfigured as data ports. The **default-ports** command allows you to choose between two sets of stacking ports. The **stack-port** command allows you to use one or two ports of the chosen set.

TABLE 13 ICX 7450 traditional stacking capability (continued)

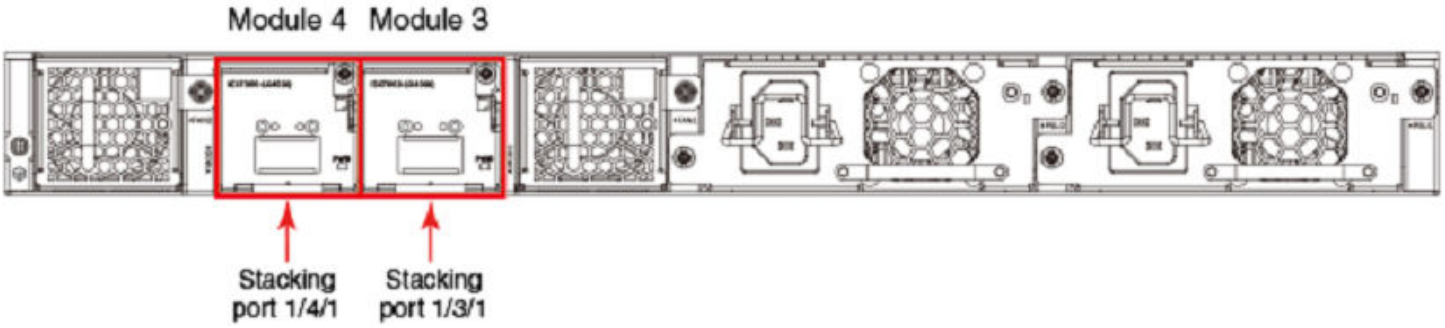
Stacking capability	ICX 7450	Additional information
		Refer to configuration examples and Traditional stack CLI commands on page 162.
Stack trunks	Two trunks are possible: 1/2/1 to 1/2/2 and 1/2/3 to 1/2/4	Supported on 10-Gbps ports only when a 4X10GF module is present in slot 2. Refer to Creating stacking trunks on the ICX 7450 on page 77 for more information.
Hitless switchover and hitless failover	Supported	Refer to Hitless stacking on page 139.
License requirements	No license required for **stack-port** configuration	Premium feature requires trust-based license. Refer to the *Ruckus FastIron Software Licensing Guide* for information.
Configuration options	Manual and automatic, including Secure-setup	Refer to Traditional stack construction methods on page 25.
Access methods	TFTP, SCP	Software images, boot images, and signatures can be downloaded to a stack using TFTP and SCP. Refer to the *Ruckus FastIron Software Upgrade Guide* for more information.
Traditional stacking CLI	These commands are not available on the ICX 7450, except as noted: **connect** **default-ports**, except when a 4X10GF module is present in slot 2 **multi-stack-port**, except when a 4X10GF module is present in slot 2 **multi-stack-trunk**, except when a 4X10GF module is present in slot 2 **stack-trunk**, except when a 4X10GF module is present in slot 2	Refer to Traditional stack CLI commands on page 162.

ICX 7450 stacking topologies

Up to 12 ICX 7450 units of any kind can be connected in a linear or ring topology. Default stacking ports are located on the rear panel as shown in the following figures. The default port numbers are 1/3/1 and 1/4/1 (unit/slot/port); that is, they are the single port located in modules 3 and 4 of the ICX 7450 as shown.

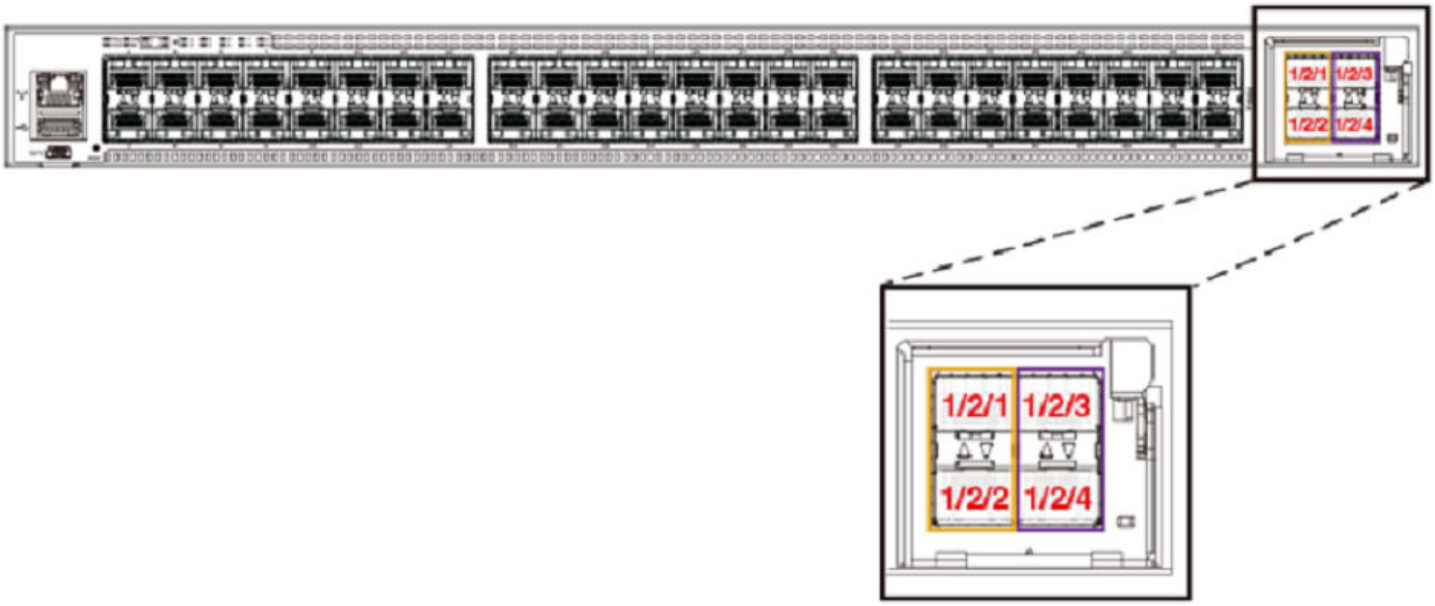
The following figure shows the default stacking ports for the ICX 7450. These ports may also be used as data ports.

FIGURE 17 ICX 7450 1 X 40-Gbps default stacking ports



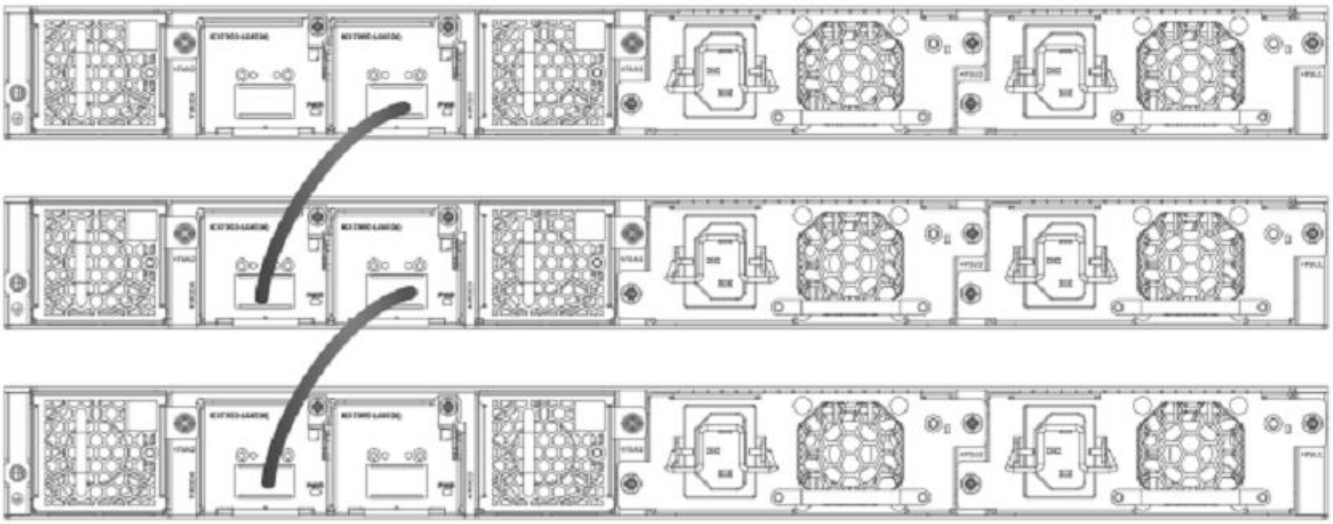
The following figure shows the 4X10GF module and port numbers.

FIGURE 18 ICX 7450 module 2 ports available for stacking



The following figure shows ICX 7450 units connected from 1 X 40-Gbps ports on the rear in a linear stack.

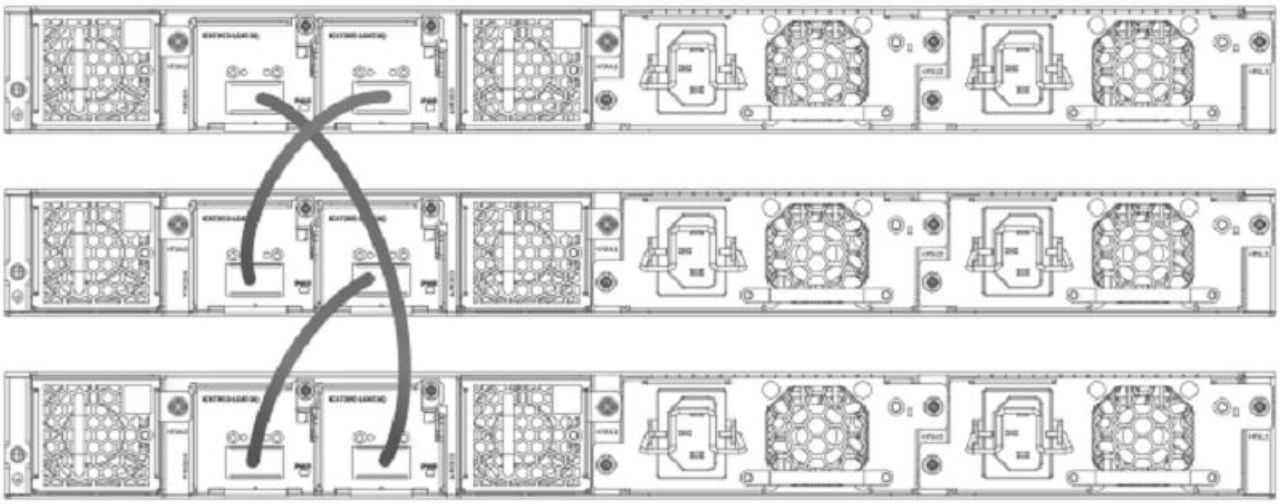
FIGURE 19 ICX 7450 1 X 40-Gbps linear stack



The following figure shows ICX 7450 units connected from 1 X 40-Gbps ports on the rear in a ring stack.

NOTE
The secure-setup utility starts discovery with the lowest numbered port. Assuming the top unit is the Active Controller, the cabling depicted is recommended so that units are discovered and numbered sequentially, starting from the Active Controller at the top. Refer to ICX 7450 stacking configuration notes on page 74 for more information on secure-setup discovery.

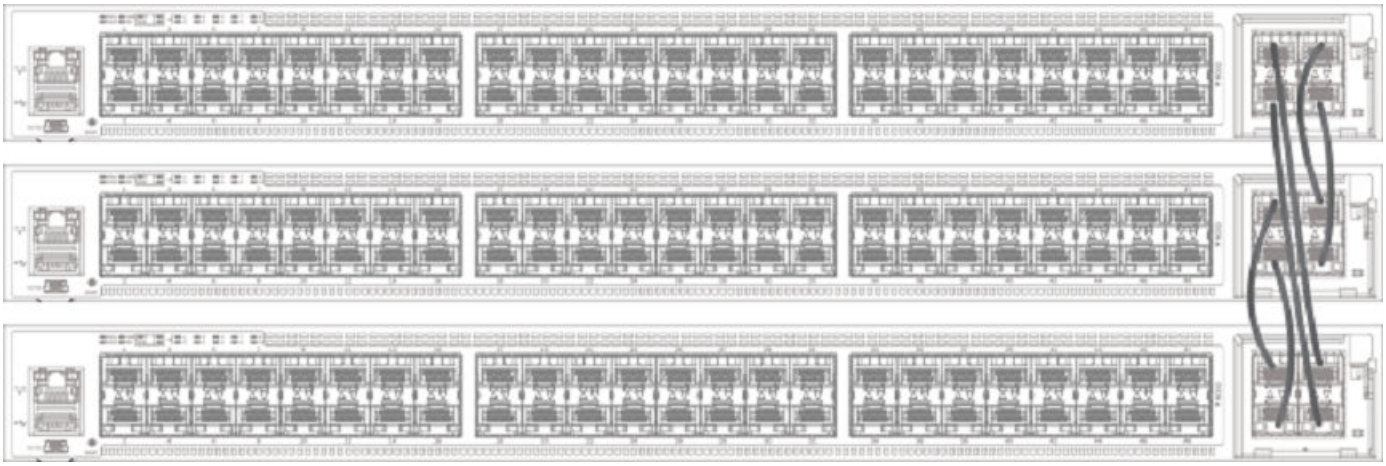
FIGURE 20 ICX 7450 1 X 40-Gbps ring stack



The following figure shows the ICX 7450 connected from the front in a ring stack.

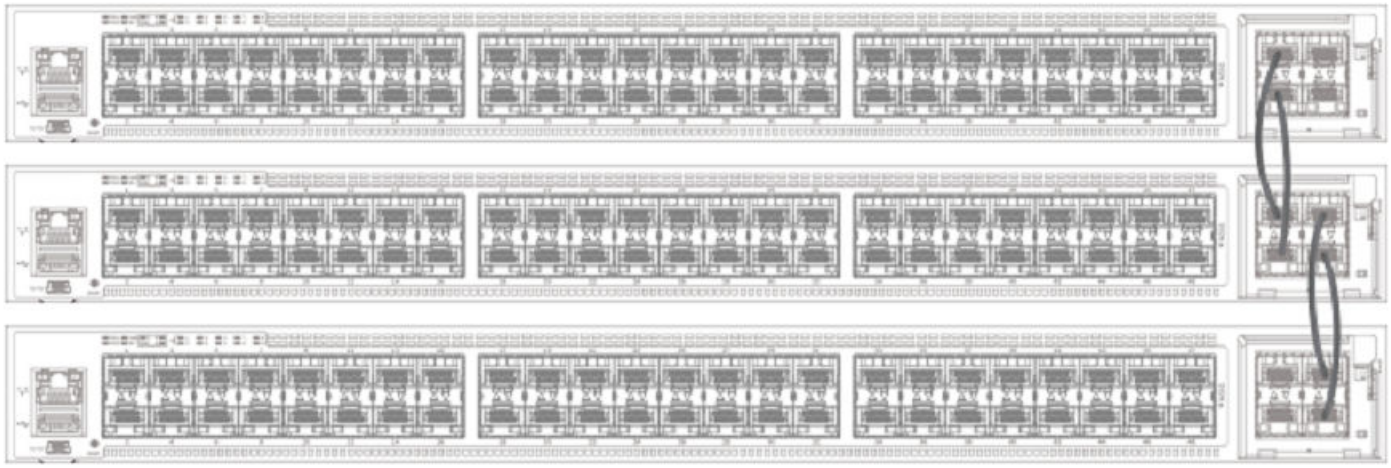
NOTE
The secure-setup utility starts discovery with the lowest numbered port. Assuming the top unit is the Active Controller, the cabling depicted is recommended so that units are discovered and numbered sequentially, starting from the Active Controller at the top. Refer to ICX 7450 stacking configuration notes on page 74 for more information on secure-setup discovery.

FIGURE 21 ICX 7450 4 X 10-Gbps ring stack



The following figure shows the ICX 7450 connected from the front in a linear stack.

FIGURE 22 ICX 7450 4 X 10-Gbps linear stack



ICX 7450 stacking configuration notes

- The 1 X 40-Gbps module supports stacking only when installed in rear panel slot 3 or 4.
- The ICX 7450 supports 10-Gbps stacking when a 4X10GF module is present in slot 2. Each unit must be individually configured with default stacking ports as 1/2/1 and 1/2/3 and reloaded to join a stack, or to use secure setup. Refer to Configuring 10-Gbps stacking ports on the ICX 7450 on page 75 for more information on 4 X 10-Gbps ports.
- Stack ports can be configured using the **stack-ports** command.
- ICX 7450 units support stack trunks only on a 4 X 10-Gbps (4X10GF) module installed in slot 2.
- The 4X10GF ports can also support MACsec but not simultaneously. Refer to Converting ICX 7450 slot 2 ports for MACsec or stacking on page 75 for more information on converting 4 X 10-Gbps ports to or from MACsec.
- An IPsec module can be installed as an add-on in slot 2, 3, or 4 of an ICX 7450 device. Only one IPsec module should be installed in a stacking unit, and only one IPsec module is active in the stack at any time. A second IPsec module may be present in another stack unit; however, the second card does not provide active redundancy if the active IPsec module fails.
- The secure-setup utility starts stack discovery on the stack port with the lowest port number, and that number is always on module 3 on an ICX 7450 40-Gbps stack. As a result, the switch unit IDs are allocated sequentially (1 , 2, 3, and so on) from the Active controller down to the stack port with the lowest port number (port 1/3/1 in an ICX 7450 40-Gbps stack).
- When the secure-setup utility is used to configure an ICX 7450 stack, endpoints or ports of ending units that are not used for stacking are left as data ports, except on active units, where both ports 1/3/1 and 1/4/1 (or both ports 1/2/1 and 1/2/3 with 4 X 10-Gbps stacking) become stack ports as a result of the **stack enable** command being executed.

Configuring 10-Gbps stacking ports on the ICX 7450

By default, the ICX 7450 uses 40-Gbps ports in slots 3 and 4 as stacking ports. When a 4X10GF module is installed in slot 2 on the front panel of an ICX 7450, 10-Gbps stacking can be configured.

> **NOTE**
> Stacking and MACsec cannot be configured on these 10 Gbps ports at the same time. Refer to Converting ICX 7450 slot 2 ports for MACsec or stacking on page 75 for more information.

To configure stacking on 10-Gbps ports in a 4X10GF module installed in slot 2, change the default stacking ports as shown in the following example.

```
ICX7450-48F Router# configure terminal
ICX7450-48F Router(config)# stack unit 1
ICX7450-48F Router(config-unit-1)# default-ports 1/2/1 1/2/3
Reload required.  Please write memory and then reload or power cycle.
ICX7450-48F Router(config-unit-1)# write memory
Write startup-config done.
ICX7450-48F Router(config-unit-1)# end
ICX7450-48F Router# reload
```

When the **default-ports** command is issued, the following error messages may be returned if Slot 2 does not contain a 4 X 10-Gbps module.

```
Error - Module <module_number> is not a 4x10GF module.

Error- Module <module_number> is not present.

Error- Invalid default ports "<port_1> and <port_2>" on ICX7450.
```

Once the default stacking ports are configured, the configuration is written to memory, and the unit is reloaded, it is ready to join an existing stack or to be configured for stacking using secure-setup or manual stack construction.

> **NOTE**
> Automatic stack configuration (described in "Traditional stack construction methods") and unit replacement features do not work with ICX 7450 4X10GF stacking. For unit replacement to work, you must use the same model as the one you are replacing, and the new unit must be a clean unit. Refer to Traditional stacking terminology on page 17 for a definition of clean unit. Suppose the stack is using a 4X10GF module installed in slot 2, and you want to replace a unit. To configure the new unit with the same configuration, you must configure the default ports, write memory, and reload. As a result, the new unit is no longer a clean unit because it has startup configuration flash, and the unit replacement feature will not automatically integrate this unit into a stack. You must use secure-setup or the manual stack construction method described in Traditional stack construction methods on page 25 to add the new unit to the stack. If you use the manual stack construction method, you must configure the **stack suggested-id** with the same ID in the replacement unit before you enable the stack.

Converting ICX 7450 slot 2 ports for MACsec or stacking

When a 4x10GF module is installed in slot 2 of the ICX 7450, it is enabled for MACsec even if the ports have not been configured. To use these ports for stacking, you must reconfigure them.

> **NOTE**
> The ICX 7450 can support 4 X 10-Gbps stacking from slot 2 or 40-Gbps stacking from rear ports; however, it cannot support both at the same time.

By default, if a 4X10GF module is present in slot 2, it is enabled for MACsec. No reload or power-cycle is required to enable or disable MACsec on slot 2 interfaces. However, to use the slot 2 ports for stacking, the default ports must be changed, and the unit must be reloaded as described in Configuring 10-Gbps stacking ports on the ICX 7450 on page 75.

If the 4X10GF module in slot 2 is programmed for stacking during bootup, MACsec cannot be configured on the ports until the stacking default ports have been changed to rear panel ports and the unit has been reloaded or turned off and on.

MACsec and stacking cannot be configured at the same time on slot 2 interfaces. However, 4X10GF modules installed in slots 3 and 4 on the rear panel of the ICX 7450 can support MACsec at the same time that slot 2 is configured for 4X10GF stacking.

The following error message is displayed when MACsec is configured on slot 2 and you try to set the stacking default ports to slot 2.

```
Error - Please remove MACsec configuration from port <port_id> before using 4x10GF for stacking
```

If you try to use the stack enable command, the command is blocked, and the following message is displayed.

```
Error - Please remove MACsec configuration from port <port_id> before using 4x10GF for stacking
```

The following error message is displayed if stacking is configured on these ports and you enter the **enable-mka ethernet** command for any of the ports.

```
Error: MACsec is not allowed when 4x10GF module is used for stacking.
Please use "default-ports" command to change the default stacking ports
```

The following example reconfigures stacking ports on slot 2 for use as MACsec ports.

```
ICX7450-48 Router#
ICX7450-48 Router# show running-config
Current configuration:
!
ver 08.0.30q070T213
!
stack unit 1
  module 1 icx7450-48-port-management-module
  module 2 icx7400-xgf-4port-40g-module
  module 3 icx7400-qsfp-1port-40g-module
  module 4 icx7400-qsfp-1port-40g-module
  default-ports 1/2/1 1/2/3
!
!
!
!
!
!
!
!
ip dns domain-list englab.ruckuswireless.com
ip dns server-address 10.31.2.10
!
!
!
--More--, next page: Space, next line: Return key, quit: Control-c^C
ICX7450-48 Router#
ICX7450-48 Router#
ICX7450-48 Router#
ICX7450-48 Router# configure terminal
ICX7450-48 Router(config)#
ICX7450-48 Router(config)# dot1x-mka
ICX7450-48 Router(config-dot1x-mka)# enable-mka ethernet 1/2/1
  <cr>
ICX7450-48 Router(config-dot1x-mka)# enable-mka ethernet 1/2/1
Error: MACsec is not allowed when 4x10GF module is used for stacking.
Please use "default-ports" command to change the default stacking ports
ICX7450-48 Router(config-dot1x-mka)# exit
ICX7450-48 Router(config)# stack unit 1
```

```
ICX7450-48 Router(config-unit-1)#
ICX7450-48 Router(config-unit-1)# default-ports 1/3/1 1/4/1
1/3/1 and 1/4/1 are default, so they won't show up in "show run"
ICX7450-48 Router(config-unit-1)# show running-config
Current configuration:
!
ver 08.0.30q070T213
!
stack unit 1
  module 1 icx7450-48-port-management-module
  module 2 icx7400-xgf-4port-40g-module
  module 3 icx7400-qsfp-1port-40g-module
  module 4 icx7400-qsfp-1port-40g-module
!
!
!
!
!
!
!
!
ip dns domain-list englab.ruckuswireless.com
ip dns server-address 10.31.2.10
!
!
!
dot1x-mka-enable
--More--, next page: Space, next line: Return key, quit: Control-c^C
ICX7450-48 Router(config-unit-1)#
ICX7450-48 Router(config-unit-1)# dot1x-mka
ICX7450-48 Router(config-dot1x-mka)# enable-mka ethernet 1/2/1
Reload required.  Please write memory and then reload or power cycle.
Error: This 4x10GF module has been used for stacking. To enable MACsec on it, a reload is required
ICX7450-48 Router(config-dot1x-mka)# write memory
Write startup-config done.

ICX7450-48 Router(config-dot1x-mka)# Flash Memory Write (8192 bytes per dot) .
Copy Done.
ICX7450-48 Router(config-dot1x-mka)# reload
ICX7450-48 Router(config-dot1x-mka)# exit
ICX7450-48 Router(config)# exit
ICX7450-48 Router# reload
```

Creating stacking trunks on the ICX 7450

The ICX 7450 supports two stacking trunks per stack unit when the 4X10GF module in slot 2 is used for stacking.

You can configure one or two stacking trunks on an ICX 7450 stand-alone after changing default stacking ports to 1/2/1 and 1/2/3 as shown in the following example. Each stacking trunk can have two ports. Potential stacking trunks contain the stacking port and the next sequential port (1/2/1 through 1/2/2 and 1/2/3 through 1/2/4).

The following example configures two stacking trunks.

```
ICX7450-24P Router#
ICX7450-24P Router#
ICX7450-24P Router# configure terminal
ICX7450-24P Router(config)# stack unit 1
ICX7450-24P Router(config-unit-1)#
ICX7450-24P Router(config-unit-1)# default-ports 1/2/1 1/2/3
Reload required.  Please write memory and then reload or power cycle.
ICX7450-24P Router(config-unit-1)#
ICX7450-24P Router(config-unit-1)# stack-trunk 1/2/1 to 1/2/2
ICX7450-24P Router(config-unit-1)# stack-trunk 1/2/3 to 1/2/4
ICX7450-24P Router(config-unit-1)#
ICX7450-24P Router(config-unit-1)# show running-config
Current configuration:
!
ver 08.0.30q071T213
!
stack unit 1
  module 1 icx7450-24p-poe-port-management-module
  module 2 icx7400-xgf-4port-40g-module
  module 4 icx7400-xgf-4port-40g-module
  default-ports 1/2/1 1/2/3
  stack-trunk 1/2/1 to 1/2/2
  stack-trunk 1/2/3 to 1/2/4
!

ip dns domain-list englab.ruckuswireless.com
ip dns server-address 10.31.2.10
!
ICX7450-24P Router(config-unit-1)# exit
ICX7450-24P Router(config)# write memory
  memory     To startup config file
ICX7450-24P Router(config)# write memory

There is no startup config file, unable to save legacy config

ICX7450-24P Router(config)# Flash Memory Write (8192 bytes per dot) .
Write startup-config done.
Copy Done.
ICX7450-24P Router(config)# exit
ICX7450-24P Router# reload
Are you sure? (enter 'y' or 'n'):
```

NOTE
Default ports 1/3/1 and 1/4/1, which are 40-Gbps ports on the rear panel of the ICX 7450, do not support stacking trunks.

Creating stacking trunks on live stacks

Use the **multi-stack trunk** command to add or remove a stacking trunk on a live ICX 7450 stack. The following example creates two stacking trunks.

```
device# configure terminal
device(config)# stack unit 1
device(config-unit-1)# multi-stack-trunk 1/2/1 to 1/2/2 and 2/2/1 to 2/2/2
device(config-unit-1)# end
device(config)# end
device#
```

NOTE
You can use the **multi-stack-port** command to create individual ports on a live stack. Available ports on slot 2 are 1/2/1 and 1/2/3.

ICX 7450 secure-setup examples

Use the **stack secure-setup** command to automatically form a correctly connected stack. For more information on stack construction, refer to Traditional stack construction methods on page 25.

In the following example, the **stack secure-setup** command is used to form a 12-unit ICX 7450 stack in a ring topology.

```
ICX7450-48P Router# configure terminal
ICX7450-48P Router(config)# stack enable
Enable stacking. This unit actively participates in stacking
stacking is enable. optical monitoring for stacking ports 1/3/1, 1/4/1 is not available.
ICX7450-48P Router(config)# exit
ICX7450-48P Router# stack secure-setup
ICX7450-48P Router# Discovering the stack topology...

Current Discovered Topology - RING

Available UPSTREAM units
Hop(s)  Id      Type          Mac Address
 1       new  ICX7450-48F     cc4e.2489.a220
 2       new  ICX7450-48F     cc4e.246d.1838
 3       new  ICX7450-48P     cc4e.246d.2938
 4       new  ICX7450-24P     cc4e.246d.0520
 5       new  ICX7450-24P     cc4e.2489.8a38
 6       new  ICX7450-48P     cc4e.2489.b388
 7       new  ICX7450-48F     cc4e.246d.1478
 8       new  ICX7450-48P     cc4e.2489.8640
 9       new  ICX7450-48F     cc4e.246d.1df8
10       new  ICX7450-48F     cc4e.246d.1b78
11       new  ICX7450-48F     cc4e.246d.1c78

Available DOWNSTREAM units
Hop(s)  Id      Type          Mac Address
 1       new  ICX7450-48F     cc4e.246d.1c78
 2       new  ICX7450-48F     cc4e.246d.1b78
 3       new  ICX7450-48F     cc4e.246d.1df8
 4       new  ICX7450-48P     cc4e.2489.8640
 5       new  ICX7450-48F     cc4e.246d.1478
 6       new  ICX7450-48P     cc4e.2489.b388
 7       new  ICX7450-24P     cc4e.2489.8a38
 8       new  ICX7450-24P     cc4e.246d.0520
 9       new  ICX7450-48P     cc4e.246d.2938
10       new  ICX7450-48F     cc4e.246d.1838
11       new  ICX7450-48F     cc4e.2489.a220

Do you accept the topology (RING) (y/n)?: y


Selected Topology:
Active  Id      Type          Mac Address
        1    ICX7450-48P     cc4e.2489.b188

Selected UPSTREAM units
Hop(s)  Id      Type        Mac Address
 1       2    ICX7450-48F     cc4e.2489.a220
 2       3    ICX7450-48F     cc4e.246d.1838
 3       4    ICX7450-48P     cc4e.246d.2938
 4       5    ICX7450-24P     cc4e.246d.0520
 5       6    ICX7450-24P     cc4e.2489.8a38
 6       7    ICX7450-48P     cc4e.2489.b388
 7       8    ICX7450-48F     cc4e.246d.1478
 8       9    ICX7450-48P     cc4e.2489.8640
 9       10   ICX7450-48F     cc4e.246d.1df8
10       11   ICX7450-48F     cc4e.246d.1b78
11       12   ICX7450-48F     cc4e.246d.1c78

Selected DOWNSTREAM units
Hop(s)  Id      Type        Mac Address
 1       12   ICX7450-48F     cc4e.246d.1c78
 2       11   ICX7450-48F     cc4e.246d.1b78
```

```
 3       10   ICX7450-48F     cc4e.246d.1df8
 4       9    ICX7450-48P     cc4e.2489.8640
 5       8    ICX7450-48F     cc4e.246d.1478
 6       7    ICX7450-48P     cc4e.2489.b388
 7       6    ICX7450-24P     cc4e.2489.8a38
 8       5    ICX7450-24P     cc4e.246d.0520
 9       4    ICX7450-48P     cc4e.246d.2938
10       3    ICX7450-48F     cc4e.246d.1838
11       2    ICX7450-48F     cc4e.2489.a220

Do you accept the unit id's (y/n)?: y
ICX7450-48P Router#T=13m8.4: Election, was alone --> active, ID=1, pri=128, 12U(1-12), A=u1, nbr#=11 11,
reason: u7: SecureS, ,

Config changed due to add/del units. Do write mem if you want to keep it
T=13m13.9: reset unit 2: u2 bo-id=1
T=13m13.9: reset unit 3: u3 bo-id=1
T=13m13.9: reset unit 4: u4 bo-id=1 SS or UR
T=13m13.9: reset unit 5: u5 bo-id=1 SS or UR
T=13m13.9: reset unit 6: u6 bo-id=1 SS or UR
T=13m13.9: reset unit 7: u7 bo-id=1 SS or UR
T=13m13.9: reset unit 8: u8 bo-id=1 SS or UR
T=13m13.9: reset unit 9: u9 bo-id=1 SS or UR
T=13m13.9: reset unit 10: u10 bo-id=1 SS or UR
T=13m13.9: reset unit 11: u11 bo-id=1 SS or UR
T=13m13.9: reset unit 12: u12 bo-id=1 SS or UR
T=13m23.8: Election, was active, no change, ID=1, pri=128, 12U(1-12), A=u1,
nbr#=11 11, reason: u7: port-up, ,
T=13m26.8: reset unit 2: u2 bo-id=1
T=13m26.8: reset unit 3: u3 bo-id=1
T=13m26.8: reset unit 4: u4 bo-id=1
T=13m26.8: reset unit 5: u5 bo-id=1
T=13m26.8: reset unit 6: u6 bo-id=1
T=13m26.8: reset unit 7: u7 bo-id=1
T=13m26.8: reset unit 8: u8 bo-id=1
T=13m26.8: reset unit 9: u9 bo-id=1
T=13m26.8: reset unit 10: u10 bo-id=1
T=13m26.8: reset unit 11: u11 bo-id=1
T=13m26.8: reset unit 12: u12 bo-id=1
T=13m28.5: Unit 1 loses all neighbors.
T=13m28.9: Active U1 deletes U2 and its config because it is learned.
T=13m29.5: Active U1 deletes U3 and its config because it is learned.
T=13m29.9: Active U1 deletes U4 and its config because it is learned.
T=13m30.1: Active U1 deletes U5 and its config because it is learned.
T=13m30.1: Active U1 deletes U6 and its config because it is learned.
T=13m30.1: Active U1 deletes U7 and its config because it is learned.
T=13m30.2: Active U1 deletes U8 and its config because it is learned.
T=13m30.7: Active U1 deletes U9 and its config because it is learned.
T=13m31.2: Active U1 deletes U10 and its config because it is learned.
T=13m31.6: Active U1 deletes U11 and its config because it is learned.
T=13m32.1: Active U1 deletes U12 and its config because it is learned.

Config changed due to add/del units. Do write mem if you want to keep it


ICX7450-48P Router#T=15m36.4: Election, was active, no change, ID=1, pri=128,
10U(1,4-12), A=u1, nbr#=0 9, reason: u4: port-up, ,
T=15m38.1: Synchronize webauth files to u7
Detect stack member 7 POE capable
T=15m38.2: Synchronize webauth files to u8
T=15m38.3: Synchronize webauth files to u9
T=15m38.3: Synchronize webauth files to u10
Detect stack member 9 POE capable
T=15m38.3: Synchronize webauth files to u11
T=15m38.3: Synchronize webauth files to u12
T=15m39.2: Synchronize webauth files to u4
T=15m39.2: Synchronize webauth files to u5
Detect stack member 4 POE capable
Detect stack member 5 POE capable
T=15m39.2: Synchronize webauth files to u6
Detect stack member 6 POE capable
T:15m39.5: Done hot swap: active controller u1 sets u7 to Ready.
```

```
T:15m39.7: Done hot swap: active controller u1 sets u8 to Ready.
T:15m39.9: Done hot swap: active controller u1 sets u9 to Ready.
T:15m40.4: Done hot swap: active controller u1 sets u10 to Ready.
T:15m40.9: Done hot swap: active controller u1 sets u11 to Ready.
T:15m41.4: Done hot swap: active controller u1 sets u12 to Ready.

Config changed due to add/del units. Do write mem if you want to keep it
Stack unit 10 Power supply 1 is up
Stack unit 10 Power supply 2 is down
Stack unit 8 Power supply 1 is up
Stack unit 8 Power supply 2 is down
T:15m43.2: Done hot swap: active controller u1 sets u4 to Ready.
T:15m43.6: Done hot swap: active controller u1 sets u5 to Ready.
T:15m44.1: Done hot swap: active controller u1 sets u6 to Ready.
Stack unit 7 Power supply 1 is down
PoE: Stack unit 7 Power supply 2 with 748000 mwatts capacity is up
PoE: Stack unit 9 Power supply 1 with 748000 mwatts capacity is up
Stack unit 9 Power supply 2 is down
Stack unit 11 Power supply 1 is up
Stack unit 11 Power supply 2 is down
PoE: Stack unit 5 Power supply 1 with 258000 mwatts capacity is up
PoE: Stack unit 5 Power supply 2 with 258000 mwatts capacity is up
Stack unit 12 Power supply 1 is up
Stack unit 12 Power supply 2 is down
PoE: Stack unit 4 Power supply 1 with 748000 mwatts capacity is up
Stack unit 4 Power supply 2 is down
PoE: Stack unit 6 Power supply 1 with 748000 mwatts capacity is up
Stack unit 6 Power supply 2 is down
T=16m44.4: Assigned unit 4 to be standby
T=16m46.4: start running config sync to standby u4
T=16m47.0: Running config sync to standby u4 is complete
T=17m30.5: Election, was active, no change, ID=1, pri=128, 12U(1-12), A=u1,
nbr#=11 11, reason: u2: port-up, ,
T=17m34.6: Synchronize webauth files to u2
T=17m35.1: Synchronize webauth files to u3

Config changed due to add/del units. Do write mem if you want to keep it
T:17m37.2: Done hot swap: active controller u1 sets u2 to Ready.
T:17m39.1: Done hot swap: active controller u1 sets u3 to Ready.
T=17m39.2: Election, was active, no change, ID=1, pri=128, 12U(1-12), A=u1,
nbr#=11 11, reason: u3: port-up, ,
Stack unit 2 Power supply 1 is up
Stack unit 2 Power supply 2 is down
Stack unit 3 Power supply 1 is up
Stack unit 3 Power supply 2 is down

Config changed due to add/del units. Do write mem if you want to keep it
```

In the next example, **show stack** command output displays details for the 12-unit stack just formed.

```
ICX7450-48P Router# show stack
T=18m12.1: alone: standalone, D: dynamic cfg, S: static, A=10, B=11, C=12
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7450-48P   active  cc4e.2489.b188 128 local   Ready
2  D ICX7450-48F   member  cc4e.2489.a220   0 remote  Ready
3  D ICX7450-48F   member  cc4e.246d.1838   0 remote  Ready
4  D ICX7450-48P   standby cc4e.246d.2938   0 remote  Ready
5  D ICX7450-24P   member  cc4e.246d.0520   0 remote  Ready
6  D ICX7450-24P   member  cc4e.2489.8a38   0 remote  Ready
7  D ICX7450-48P   member  cc4e.2489.b388   0 remote  Ready
8  D ICX7450-48F   member  cc4e.246d.1478   0 remote  Ready
9  D ICX7450-48P   member  cc4e.2489.8640   0 remote  Ready
10 D ICX7450-48F   member  cc4e.246d.1df8   0 remote  Ready
11 D ICX7450-48F   member  cc4e.246d.1b78   0 remote  Ready
12 D ICX7450-48F   member  cc4e.246d.1c78   0 remote  Ready

    active
     +---+        +---+        +---+        +---+        +---+        +---+
 -3/1| 1 |4/1--3/1| C |4/1--3/1| B |4/1--3/1| A |4/1--3/1| 9 |4/1--3/1| 8 |4/1-
  |   +---+        +---+        +---+        +---+        +---+        +---+   |
```

```
 |                                                                          |
 |                            standby                                       |
 |   +---+        +---+        +---+        +---+        +---+        +---+   |
 -4/1| 2 |3/1--4/1| 3 |3/1--4/1| 4 |3/1--4/1| 5 |3/1--4/1| 6 |3/1--4/1| 7 |3/1-
     +---+        +---+        +---+        +---+        +---+        +---+
Will assign standby in 28 sec due to all ready

Standby u4 - wait for standby assignment due to election
Current stack management MAC is cc4e.2489.b188
```

The following example configures an ICX 7450 to use 4 X 10-Gbps ports for stacking. First, default ports are reassigned, a **write memory** command is executed, and the unit is reloaded. When the unit reboots, the 4 X 10-Gbps default ports are configured, and the stack secure setup utility can be executed to form the stack.

```
ICX7450-24 Router> enable
No password has been assigned yet...
ICX7450-24 Router# configure terminal
ICX7450-24 Router(config)# stack enable
Enable stacking. This unit actively participates in stacking
stacking is enable. optical monitoring for stacking ports 1/2/1, 1/2/3 is not available.

ICX7450-24 Router(config)# stack unit 1
ICX7450-24 Router(config-unit-1)# default-ports 1/2/1 1/2/3
Reload required.  Please write memory and then reload or power cycle.
ICX7450-24 Router(config-unit-1)#
ICX7450-24 Router(config-unit-1)# end
ICX7450-24 Router# write memory

 There is no startup config file, unable to save legacy config

ICX7450-24 Router#
ICX7450-24 Router# write memory
Flash access in progress. Please try later
ICX7450-24 Router# Flash Memory Write (8192 bytes per dot) .
Write startup-config done.
Copy Done.
ICX7450-24 Router#
ICX7450-24 Router#
ICX7450-24 Router# reload
Sent SIGTERM to all processesn'):
Sent SIGKILL to all processes
Requesting system reboot
Restarting system.
```

After the unit reloads, run the secure setup utility with the **stack secure-setup** command to form the stack.

```
ICX7450-24 Router#
ICX7450-24 Router# configure terminal
ICX7450-24 Router(config)# show run
Current configuration:
!
ver 08.0.30q101T213
!
stack unit 1
  module 1 icx7450-24-port-management-module
  module 2 icx7400-xf-4port-40g-module
  module 3 icx7400-xf-4port-40g-module
  module 4 icx7400-qsfp-1port-40g-module
  default-ports 1/2/1 1/2/3
!
!
!
!
!
!
!
!
ip dns domain-list englab.ruckuswireless.com
ip dns server-address 10.31.2.10
!
```

```
!
!
--More--, next page: Space, next line: Return key, quit: Control-c^C
ICX7450-24 Router(config)# exit
ICX7450-24 Router# stack secure-setup
ICX7450-24 Router# Discovering the stack topology...

Available UPSTREAM units
Hop(s)  Id      Type          Mac Address
 1       new  ICX7450-48F     cc4e.246d.1c78
 2       new  ICX7450-48F     cc4e.246d.1b78
 3       new  ICX7450-48F     cc4e.246d.1ff8
 4       new  ICX7450-48P     cc4e.2489.8640
 5       new  ICX7450-48F     cc4e.246d.1478
 6       new  ICX7450-48P     cc4e.2489.b388
 7       new  ICX7450-48P     cc4e.2489.b188
 8       new  ICX7450-48P     cc4e.246d.2938
 9       new  ICX7450-48F     cc4e.246d.1838
10       new  ICX7450-48P     cc4e.246d.23b8
11       new  ICX7450-24P     cc4e.246d.0520

Enter the number of the desired UPSTREAM units (0-11)[0]: 11

Confirm Stacking Links...

UPSTREAM Unit: Id new at 1 hop(s) ICX7450-48F   cc4e.246d.1c78

Enter the desired links(1-2)[1]: 2

UPSTREAM Unit: Id new at 2 hop(s) ICX7450-48F   cc4e.246d.1b78

Enter the desired links(1-2)[1]: 2

UPSTREAM Unit: Id new at 3 hop(s) ICX7450-48F   cc4e.246d.1ff8

Enter the desired links(1-2)[1]: 2

UPSTREAM Unit: Id new at 4 hop(s) ICX7450-48P   cc4e.2489.8640

Enter the desired links(1-2)[1]: 2

UPSTREAM Unit: Id new at 5 hop(s) ICX7450-48F  cc4e.246d.1478

Enter the desired links(1-2)[1]: 2

UPSTREAM Unit: Id new at 6 hop(s) ICX7450-48P   cc4e.2489.b388

Enter the desired links(1-2)[1]: 2

UPSTREAM Unit: Id new at 7 hop(s) ICX7450-48P   cc4e.2489.b188

Enter the desired links(1-2)[1]: 2

UPSTREAM Unit: Id new at 8 hop(s) ICX7450-48P   cc4e.246d.2938

Enter the desired links(1-2)[1]: 2

UPSTREAM Unit: Id new at 9 hop(s) ICX7450-48F   cc4e.246d.1838

Enter the desired links(1-2)[1]: 2

UPSTREAM Unit: Id new at 10 hop(s) ICX7450-48P   cc4e.246d.23b8

Enter the desired links(1-2)[1]: 2

UPSTREAM Unit: Id new at 11 hop(s) ICX7450-24P   cc4e.246d.0520

Enter the desired links(1-2)[1]: 2

Selected Topology:
Active  Id      Type          Mac Address
        1    ICX7450-24F     cc4e.246c.ffd0
```

```
Selected UPSTREAM units
Hop(s)  Id      Type        Mac Address
 1       2    ICX7450-48F     cc4e.246d.1c78
 2       3    ICX7450-48F     cc4e.246d.1b78
 3       4    ICX7450-48F     cc4e.246d.1ff8
 4       5    ICX7450-48P     cc4e.2489.8640
 5       6    ICX7450-48F     vcc4e.246d.1478
 6       7    ICX7450-48P     cc4e.2489.b388
 7       8    ICX7450-48P     cc4e.2489.b188
 8       9    ICX7450-48P     cc4e.246d.2938
 9       10   ICX7450-48F     cc4e.246d.1838
10       11   ICX7450-48P     cc4e.246d.23b8
11       12   ICX7450-24P     cc4e.246d.0520

Do you accept the unit id's (y/n)?: y
ICX7450-24 Router#T=5m2.9: Election, was alone --> active, ID=1, pri=128, 12U(1-12), A=u1, nbr#=11 0,
reason: u12: port-up, ,
The period is 25
T=5m6.9: Election, was active, no change, ID=1, pri=128, 12U(1-12), A=u1, nbr#=11 0, reason: u1: stk-po-
chg, ,
T=5m10.0: reset unit 2: u2 bo-id=1
T=5m10.0: reset unit 3: u3 bo-id=1
T=5m10.0: reset unit 4: u4 bo-id=1
T=5m10.0: reset unit 5: u5 bo-id=1
T=5m10.0: reset unit 6: u6 bo-id=1
T=5m10.0: reset unit 7: u7 bo-id=1
T=5m10.0: reset unit 8: u8 bo-id=1
T=5m10.0: reset unit 9: u9 bo-id=1
T=5m10.0: reset unit 10: u10 bo-id=1
T=5m10.0: reset unit 11: u11 bo-id=1
T=5m10.0: reset unit 12: u12 bo-id=1

Config changed due to add/del units. Do write mem if you want to keep it
T=5m15.0: Unit 1 loses all neighbors.
T=5m18.0: Active U1 deletes U2 and its config because it is learned.
T=5m21.0: Active U1 deletes U3 and its config because it is learned.
T=5m23.8: Active U1 deletes U4 and its config because it is learned.
T=5m26.6: Active U1 deletes U5 and its config because it is learned.
T=5m29.5: Active U1 deletes U6 and its config because it is learned.
T=5m30.5: Active U1 deletes U7 and its config because it is learned.
T=5m31.5: Active U1 deletes U8 and its config because it is learned.
T=5m32.5: Active U1 deletes U9 and its config because it is learned.
T=5m33.5: Active U1 deletes U10 and its config because it is learned.
T=5m34.5: Active U1 deletes U11 and its config because it is learned.
T=5m35.0: Active U1 deletes U12 and its config because it is learned.
T=7m5.1: Election, was active, no change, ID=1, pri=128, 3U(1-3), A=u1, nbr#=2 0, reason: u3: port-up, ,
The period is 25
Detect stack unit 2 has different startup config flash, will synchronize it
T=7m5.5: Synchronize webauth files to u2
Detect stack unit 3 has different startup config flash, will synchronize it
T=7m5.5: Synchronize webauth files to u3
T:7m6.7: Done hot swap: active controller u1 sets u2 to Ready.
T:7m6.8: Done hot swap: active controller u1 sets u3 to Ready.
T=7m7.5: Synchronize startup config to u2
Flash Memory Write (8192 bytes per dot) .
Write startup-config done.
T=7m8.5: Synchronize startup config to u3
Flash Memory Write (8192 bytes per dot) .
Write startup-config done.
Stack unit 3 Power supply 1 is up
Stack unit 3 Power supply 2 is down
Stack unit 2 Power supply 1 is up
Stack unit 2 Power supply 2 is down

Config changed due to add/del units. Do write mem if you want to keep it
T=7m10.7: Election, was active, no change, ID=1, pri=128, 12U(1-12), A=u1, nbr#=11 0, reason: u12: port-
up, ,
Detect stack unit 9 has different startup config flash, will synchronize it
T=7m11.6: Synchronize webauth files to u9
Detect stack unit 12 has different startup config flash, will synchronize it
T=7m11.6: Synchronize webauth files to u12
```

```
Detect stack member 9 POE capable
Detect stack member 12 POE capable
Detect stack unit 10 has different startup config flash, will synchronize it
T=7m11.6: Synchronize webauth files to u10
Detect stack unit 11 has different startup config flash, will synchronize it
T=7m11.6: Synchronize webauth files to u11
Detect stack unit 4 has different startup config flash, will synchronize it
T=7m11.7: Synchronize webauth files to u4
Detect stack member 11 POE capable
Detect stack unit 6 has different startup config flash, will synchronize it
T=7m11.7: Synchronize webauth files to u6
Detect stack unit 5 has different startup config flash, will synchronize it
T=7m11.7: Synchronize webauth files to u5
Detect stack unit 7 has different startup config flash, will synchronize it
T=7m11.7: Synchronize webauth files to u7
Detect stack unit 8 has different startup config flash, will synchronize it
T=7m11.7: Synchronize webauth files to u8
Detect stack member 5 POE capable
Detect stack member 7 POE capable
Detect stack member 8 POE capable
T:7m12.9: Done hot swap: active controller u1 sets u9 to Ready.
T:7m13.1: Done hot swap: active controller u1 sets u10 to Ready.
T:7m13.3: Done hot swap: active controller u1 sets u11 to Ready.
T:7m13.5: Done hot swap: active controller u1 sets u12 to Ready.
T=7m13.7: Synchronize startup config to u9
T:7m13.9: Done hot swap: active controller u1 sets u4 to Ready.
Flash Memory Write (8192 bytes per dot) .
Write startup-config done.
T:7m14.0: Done hot swap: active controller u1 sets u5 to Ready.
T:7m14.2: Done hot swap: active controller u1 sets u6 to Ready.
T:7m14.7: Done hot swap: active controller u1 sets u7 to Ready.
T:7m15.2: Done hot swap: active controller u1 sets u8 to Ready.
PoE: Stack unit 9 Power supply 1 with 748000 mwatts capacity is up
Stack unit 9 Power supply 2 is down
T=7m15.7: Synchronize startup config to u4
PoE: Stack unit 5 Power supply 1 with 748000 mwatts capacity is up
Stack unit 5 Power supply 2 is down
Flash Memory Write (8192 bytes per dot) .
Write startup-config done.

Config changed due to add/del units. Do write mem if you want to keep it
PoE: Stack unit 12 Power supply 1 with 258000 mwatts capacity is up
PoE: Stack unit 12 Power supply 2 with 258000 mwatts capacity is up
Stack unit 8 Power supply 1 is down
PoE: Stack unit 8 Power supply 2 with 748000 mwatts capacity is up
T=7m16.7: Synchronize startup config to u5
Flash Memory Write (8192 bytes per dot) .
Write startup-config done.
T=7m16.8: Election, was active, no change, ID=1, pri=128, 12U(1-12), A=u1, nbr#=11 0, reason: u1: stk-po-
chg, ,
T=7m17.7: Synchronize startup config to u6
Flash Memory Write (8192 bytes per dot) .
Write startup-config done.
Stack unit 10 Power supply 1 is up
Stack unit 10 Power supply 2 is down
Stack unit 7 Power supply 1 is down
PoE: Stack unit 7 Power supply 2 with 748000 mwatts capacity is up
Stack unit 11 Power supply 1 is down
PoE: Stack unit 11 Power supply 2 with 748000 mwatts capacity is up
T=7m18.7: Synchronize startup config to u7
Flash Memory Write (8192 bytes per dot) .
Write startup-config done.
T=7m19.7: Synchronize startup config to u8
Flash Memory Write (8192 bytes per dot) .
Write startup-config done.
Stack unit 6 Power supply 1 is up
Stack unit 6 Power supply 2 is down
Stack unit 4 Power supply 1 is up
Stack unit 4 Power supply 2 is down
T=7m20.7: Synchronize startup config to u10
Flash Memory Write (8192 bytes per dot) .
Write startup-config done.
```

```
T=7m21.7: Synchronize startup config to u11
Flash Memory Write (8192 bytes per dot) .
Write startup-config done.

Config changed due to add/del units. Do write mem if you want to keep it
T=7m22.7: Synchronize startup config to u12
Flash Memory Write (8192 bytes per dot) .
Write startup-config done.
T=8m18.1: Assigned unit 2 to be standby
T=8m20.1: start running config sync to standby u2
T=8m21.0: Running config sync to standby u2 is complete

ICX7450-24 Router#
```

The following example provides **show stack** command output for the ICX 7450 10-Gbps stack formed in the previous example.

```
ICX7450-24 Router# show stack
T=10m34.8: alone: standalone, D: dynamic cfg, S: static, A=10, B=11, C=12
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7450-24F   active  cc4e.246c.ffd0 128 local   Ready
2  D ICX7450-48F   standby cc4e.246d.1c78   0 remote  Ready
3  D ICX7450-48F   member  cc4e.246d.1b78   0 remote  Ready
4  D ICX7450-48F   member  cc4e.246d.1ff8   0 remote  Ready
5  D ICX7450-48P   member  cc4e.2489.8640   0 remote  Ready
6  D ICX7450-48F   member  cc4e.246d.1478   0 remote  Ready
7  D ICX7450-48P   member  cc4e.2489.b388   0 remote  Ready
8  D ICX7450-48P   member  cc4e.2489.b188   0 remote  Ready
9  D ICX7450-48P   member  cc4e.246d.2938   0 remote  Ready
10 D ICX7450-48F   member  cc4e.246d.1838   0 remote  Ready
11 D ICX7450-48P   member  cc4e.246d.23b8   0 remote  Ready
12 D ICX7450-24P   member  cc4e.246d.0520   0 remote  Ready


     +---+        +---+        +---+        +---+        +---+        +---+
     | C |2/1==2/1| B |2/3==2/3| A |2/1==2/1| 9 |2/3==2/3| 8 |2/1==2/1| 7 |2/3=
     +---+        +---+        +---+        +---+        +---+        +---+   |
                                                                              |
    active       standby                                                      |
     +---+        +---+        +---+        +---+        +---+        +---+   |
 -2/3| 1 |2/1==2/1| 2 |2/3==2/3| 3 |2/1==2/1| 4 |2/3==2/3| 5 |2/1==2/1| 6 |2/3=
     +---+        +---+        +---+        +---+        +---+        +---+
Standby u2 - protocols ready, can failover
Current stack management MAC is cc4e.246c.ffd0
ICX7450-24 Router#
```

The following **show stack connection** output provides details on the ICX 7450 10-Gbps stack formed in the previous example.

```
ICX7450-24 Router# show stack connection
Probing the topology. Please wait ...
ICX7450-24 Router#

     +---+        +---+        +---+        +---+        +---+        +---+
     | C |2/1==2/1| B |2/3==2/3| A |2/1==2/1| 9 |2/3==2/3| 8 |2/1==2/1| 7 |2/3=
     +---+        +---+        +---+        +---+        +---+        +---+   |
                                                                              |
    active       standby                                                      |
     +---+        +---+        +---+        +---+        +---+        +---+   |
 -2/3| 1 |2/1==2/1| 2 |2/3==2/3| 3 |2/1==2/1| 4 |2/3==2/3| 5 |2/1==2/1| 6 |2/3=
     +---+        +---+        +---+        +---+        +---+        +---+

trunk probe results: 11 links
Link 1: u1 -- u2, num=2
  1: 1/2/1 (T0) <---> 2/2/1 (T0)
  2: 1/2/2 (T0) <---> 2/2/2 (T0)
Link 2: u2 -- u3, num=2
  1: 2/2/3 (T1) <---> 3/2/3 (T1)
  2: 2/2/4 (T1) <---> 3/2/4 (T1)
Link 3: u3 -- u4, num=2
  1: 3/2/1 (T0) <---> 4/2/1 (T0)
  2: 3/2/2 (T0) <---> 4/2/2 (T0)
```

```
Link 4: u4 -- u5, num=2
  1: 4/2/3 (T1) <---> 5/2/3 (T1)
  2: 4/2/4 (T1) <---> 5/2/4 (T1)
Link 5: u5 -- u6, num=2
  1: 5/2/1 (T0) <---> 6/2/1 (T0)
  2: 5/2/2 (T0) <---> 6/2/2 (T0)
Link 6: u6 -- u7, num=2
  1: 6/2/3 (T1) <---> 7/2/3 (T1)
  2: 6/2/4 (T1) <---> 7/2/4 (T1)
Link 7: u7 -- u8, num=2
  1: 7/2/1 (T0) <---> 8/2/1 (T0)
  2: 7/2/2 (T0) <---> 8/2/2 (T0)
Link 8: u8 -- u9, num=2
  1: 8/2/3 (T1) <---> 9/2/3 (T1)
  2: 8/2/4 (T1) <---> 9/2/4 (T1)
Link 9: u9 -- u10, num=2
  1: 9/2/1 (T0) <---> 10/2/1 (T0)
  2: 9/2/2 (T0) <---> 10/2/2 (T0)
Link 10: u10 -- u11, num=2
  1: 10/2/3 (T1) <---> 11/2/3 (T1)
  2: 10/2/4 (T1) <---> 11/2/4 (T1)
Link 11: u11 -- u12, num=2
  1: 11/2/1 (T0) <---> 12/2/1 (T0)
  2: 11/2/2 (T0) <---> 12/2/2 (T0)
CPU to CPU packets are fine between 12 units.
```

The following example provides output for the **show stack detail** command for the ICX 7450 10-Gbps stack formed in the previous example.

```
ICX7450-24 Router# show stack detail
  detail        show detailed information about the stack system
ICX7450-24 Router# show stack detail
T=10m55.8: alone: standalone, D: dynamic cfg, S: static, A=10, B=11, C=12
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7450-24F   active  cc4e.246c.ffd0 128 local   Ready
2  D ICX7450-48F   standby cc4e.246d.1c78   0 remote  Ready
3  D ICX7450-48F   member  cc4e.246d.1b78   0 remote  Ready
4  D ICX7450-48F   member  cc4e.246d.1ff8   0 remote  Ready
5  D ICX7450-48P   member  cc4e.2489.8640   0 remote  Ready
6  D ICX7450-48F   member  cc4e.246d.1478   0 remote  Ready
7  D ICX7450-48P   member  cc4e.2489.b388   0 remote  Ready
8  D ICX7450-48P   member  cc4e.2489.b188   0 remote  Ready
9  D ICX7450-48P   member  cc4e.246d.2938   0 remote  Ready
10 D ICX7450-48F   member  cc4e.246d.1838   0 remote  Ready
11 D ICX7450-48P   member  cc4e.246d.23b8   0 remote  Ready
12 D ICX7450-24P   member  cc4e.246d.0520   0 remote  Ready


     +---+        +---+        +---+        +---+        +---+        +---+
     | C |2/1==2/1| B |2/3==2/3| A |2/1==2/1| 9 |2/3==2/3| 8 |2/1==2/1| 7 |2/3=
     +---+        +---+        +---+        +---+        +---+        +---+   |
                                                                              |
    active       standby                                                      |
     +---+        +---+        +---+        +---+        +---+        +---+   |
 -2/3| 1 |2/1==2/1| 2 |2/3==2/3| 3 |2/1==2/1| 4 |2/3==2/3| 5 |2/1==2/1| 6 |2/3=
     +---+        +---+        +---+        +---+        +---+        +---+
Standby u2 - protocols ready, can failover
Current stack management MAC is cc4e.246c.ffd0

Image-Auto-Copy is Enabled.

      Stack Port Status                       Neighbors
Unit# Stack-port1         Stack-port2         Stack-port1         Stack-port2
1     up (1/2/1-1/2/2)    dn (1/2/3)          U2 (2/2/1-2/2/2)    none
2     up (2/2/1-2/2/2)    up (2/2/3-2/2/4)    U1 (1/2/1-1/2/2)    U3 (3/2/3-3/2/4)
3     up (3/2/1-3/2/2)    up (3/2/3-3/2/4)    U4 (4/2/1-4/2/2)    U2 (2/2/3-2/2/4)
4     up (4/2/1-4/2/2)    up (4/2/3-4/2/4)    U3 (3/2/1-3/2/2)    U5 (5/2/3-5/2/4)
5     up (5/2/1-5/2/2)    up (5/2/3-5/2/4)    U6 (6/2/1-6/2/2)    U4 (4/2/3-4/2/4)
6     up (6/2/1-6/2/2)    up (6/2/3-6/2/4)    U5 (5/2/1-5/2/2)    U7 (7/2/3-7/2/4)
7     up (7/2/1-7/2/2)    up (7/2/3-7/2/4)    U8 (8/2/1-8/2/2)    U6 (6/2/3-6/2/4)
```

```
8     up (8/2/1-8/2/2)    up (8/2/3-8/2/4)     U7 (7/2/1-7/2/2)    U9 (9/2/3-9/2/4)
9     up (9/2/1-9/2/2)    up (9/2/3-9/2/4)     U10 (10/2/1-10/2/2) U8 (8/2/3-8/2/4)
10    up (10/2/1-10/2/2)  up (10/2/3-10/2/4)   U9 (9/2/1-9/2/2)    U11 (11/2/3-11/2/4)
11    up (11/2/1-11/2/2)  up (11/2/3-11/2/4)   U12 (12/2/1-12/2/2) U10 (10/2/3-10/2/4)
12    up (12/2/1-12/2/2)  none                 U11 (11/2/1-11/2/2) none

Unit# System uptime
1     10 minute(s) 55 second(s)
2     4 minute(s) 38 second(s)
3     4 minute(s) 39 second(s)
4     4 minute(s) 37 second(s)
5     4 minute(s) 39 second(s)
6     4 minute(s) 37 second(s)
7     4 minute(s) 37 second(s)
8     4 minute(s) 38 second(s)
9     4 minute(s) 39 second(s)
10    4 minute(s) 37 second(s)
11    4 minute(s) 37 second(s)
12    4 minute(s) 38 second(s)
ICX7450-24 Router#
```

The following **show stack neighbors** command output provides information on neighbors for the ICX 7450 10-Gbps stack formed in the previous example.

```
ICX7450-24 Router# show stack neighbors
U#     Stack-port1                          Stack-port2
1    (1/2/1-1/2/2) to U2 (2/2/1-2/2/2)          (1/2/3) to none
2    (2/2/1-2/2/2) to U1 (1/2/1-1/2/2)    (2/2/3-2/2/4) to U3 (3/2/3-3/2/4)
3    (3/2/1-3/2/2) to U4 (4/2/1-4/2/2)    (3/2/3-3/2/4) to U2 (2/2/3-2/2/4)
4    (4/2/1-4/2/2) to U3 (3/2/1-3/2/2)    (4/2/3-4/2/4) to U5 (5/2/3-5/2/4)
5    (5/2/1-5/2/2) to U6 (6/2/1-6/2/2)    (5/2/3-5/2/4) to U4 (4/2/3-4/2/4)
6    (6/2/1-6/2/2) to U5 (5/2/1-5/2/2)    (6/2/3-6/2/4) to U7 (7/2/3-7/2/4)
7    (7/2/1-7/2/2) to U8 (8/2/1-8/2/2)    (7/2/3-7/2/4) to U6 (6/2/3-6/2/4)
8    (8/2/1-8/2/2) to U7 (7/2/1-7/2/2)    (8/2/3-8/2/4) to U9 (9/2/3-9/2/4)
9    (9/2/1-9/2/2) to U10 (10/2/1-10/2/2  (9/2/3-9/2/4) to U8 (8/2/3-8/2/4)
10  (10/2/1-10/2/2 to U9 (9/2/1-9/2/2)   (10/2/3-10/2/4 to U11 (11/2/3-11/2/4
11  (11/2/1-11/2/2 to U12 (12/2/1-12/2/2 (11/2/3-11/2/4 to U10 (10/2/3-10/2/4
12  (12/2/1-12/2/2 to U11 (11/2/1-11/2/2           none to none
ICX7450-24 Router#
```

Displaying basic information for an ICX 7450 stack

Enter the **show stack** command at the device level to display general information about the stack, including unit IDs, device type, role, MAC address, priority, status, and connections.

The following **show stack** command output is for a 12-unit ICX 7450 linear topology.

```
ICX7450-24 Router# show stack
T=17h38m45.2: alone: standalone, D: dynamic cfg, S: static, A=10, B=11, C=12
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7450-24F   active  cc4e.246c.ff80 128 local   Ready
2  S ICX7450-24F   standby cc4e.246d.02c8   0 remote  Ready
3  S ICX7450-24F   member  cc4e.246c.ffd0   0 remote  Ready
4  S ICX7450-24P   member  cc4e.246d.0520   0 remote  Ready
5  S ICX7450-48F   member  cc4e.246d.1c78   0 remote  Ready
6  S ICX7450-48F   member  cc4e.246d.1b78   0 remote  Ready
7  S ICX7450-48F   member  cc4e.246d.1df8   0 remote  Ready
8  S ICX7450-48P   member  cc4e.2489.8640   0 remote  Ready
9  S ICX7450-48F   member  cc4e.246d.1478   0 remote  Ready
10 D ICX7450-24P   member  cc4e.246d.0638   0 remote  Ready
11 D ICX7450-24P   member  cc4e.246d.0778   0 remote  Ready
12 D ICX7450-48P   member  cc4e.246d.2938   0 remote  Ready

    active       standby
     +---+        +---+        +---+        +---+        +---+        +---+
  3/1| 1 |4/1--3/1| 2 |4/1--3/1| 3 |4/1--3/1| 4 |4/1--3/1| 5 |4/1--3/1| 6 |4/1-
     +---+        +---+        +---+        +---+        +---+        +---+   |
                                                                              |
```

```
                                                                                |
     +---+        +---+        +---+        +---+        +---+        +---+    |
     | C |3/1--4/1| B |3/1--4/1| A |3/1--4/1| 9 |3/1--4/1| 8 |3/1--4/1| 7 |3/1-
     +---+        +---+        +---+        +---+        +---+        +---+
Will assign standby in 53 sec due to all ready

Standby u2 - wait for standby assignment due to election
Current stack management MAC is cc4e.246c.ff80
```

Displaying details for an ICX 7450 stack

Use the **show stack detail** command to display information on all units in the stack, including their role, MAC address, priority, status, and stack connections.

The following **show stack detail** command output provides information on a full ICX 7450 stack containing 12 units, with six different models among them.

```
ICX7450-24 Router# show stack detail
T=17h38m45.2: alone: standalone, D: dynamic cfg, S: static, A=10, B=11, C=12
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7450-24F   active  cc4e.246c.ff80 128 local   Ready
2  S ICX7450-24F   standby cc4e.246d.02c8   0 remote  Ready
3  S ICX7450-24F   member  cc4e.246c.ffd0   0 remote  Ready
4  S ICX7450-24P   member  cc4e.246d.0520   0 remote  Ready
5  S ICX7450-48F   member  cc4e.246d.1c78   0 remote  Ready
6  S ICX7450-48F   member  cc4e.246d.1b78   0 remote  Ready
7  S ICX7450-48F   member  cc4e.246d.1df8   0 remote  Ready
8  S ICX7450-48P   member  cc4e.2489.8640   0 remote  Ready
9  S ICX7450-48F   member  cc4e.246d.1478   0 remote  Ready
10 D ICX7450-24P   member  cc4e.246d.0638   0 remote  Ready
11 D ICX7450-24P   member  cc4e.246d.0778   0 remote  Ready
12 D ICX7450-48P   member  cc4e.246d.2938   0 remote  Ready

    active       standby
     +---+        +---+        +---+        +---+        +---+        +---+
  3/1| 1 |4/1--3/1| 2 |4/1--3/1| 3 |4/1--3/1| 4 |4/1--3/1| 5 |4/1--3/1| 6 |4/1-
     +---+        +---+        +---+        +---+        +---+        +---+   |
                                                                              |
                                                                              |
     +---+        +---+        +---+        +---+        +---+        +---+   |
     | C |3/1--4/1| B |3/1--4/1| A |3/1--4/1| 9 |3/1--4/1| 8 |3/1--4/1| 7 |3/1-
     +---+        +---+        +---+        +---+        +---+        +---+
Will assign standby in 53 sec due to all ready

Standby u2 - wait for standby assignment due to election
Current stack management MAC is cc4e.246c.ff80


Image-Auto-Copy is Enabled.

      Stack Port Status                  Neighbors
Unit# Stack-port1       Stack-port2      Stack-port1       Stack-port2
1     dn (1/3/1)        up (1/4/1)       none              U2 (2/3/1)
2     up (2/3/1)        up (2/4/1)       U1 (1/4/1)        U3 (3/3/1)
3     up (3/3/1)        up (3/4/1)       U2 (2/4/1)        U4 (4/3/1)
4     up (4/3/1)        up (4/4/1)       U3 (3/4/1)        U5 (5/3/1)
5     up (5/3/1)        up (5/4/1)       U4 (4/4/1)        U6 (6/3/1)
6     up (6/3/1)        up (6/4/1)       U5 (5/4/1)        U7 (7/3/1)
7     up (7/3/1)        up (7/4/1)       U6 (6/4/1)        U8 (8/3/1)
8     up (8/3/1)        up (8/4/1)       U7 (7/4/1)        U9 (9/3/1)
9     up (9/3/1)        up (9/4/1)       U8 (8/4/1)        U10 (10/3/1)
10    up (10/3/1)       up (10/4/1)      U9 (9/4/1)        U11 (11/3/1)
11    up (11/3/1)       up (11/4/1)      U10 (10/4/1)      U12 (12/3/1)
12    up (12/3/1)       none             U11 (11/4/1)      none

Unit# System uptime
1     17 hours 38 minutes 45 seconds
```

```
2     17 hours 38 minutes 43 seconds
3     17 hours 38 minutes 45 seconds
4     17 hours 38 minutes 44 seconds
5     17 hours 38 minutes 44 seconds
6     17 hours 38 minutes 44 seconds
7     17 hours 38 minutes 44 seconds
8     17 hours 38 minutes 45 seconds
9     17 hours 38 minutes 43 seconds
10    17 hours 32 minutes 24 seconds
11    1 minutes 9 seconds
12    1 minutes 9 seconds
```

ICX 7650 stack configuration overview

The following table provides an overview of ICX 7650 stacking capabilities.

TABLE 14 ICX 7650 traditional stacking capabilities

Stacking capability	ICX 7650	Additional information
Topologies supported	Ring and linear	**NOTE** ICX 7650 devices can operate in a stack only when the rear module (Module 3) is in Stacking Mode. Stacking is not available when the rear module is configured in Uplink Mode. Refer to ICX 7650 rear-module options on page 95 for more information. Refer to ICX 7650 stacking topologies on page 92 for sample linear and ring topologies.
Maximum stack size	12	Traditional stacking only. Any combination of ICX 7650 devices may be stacked.
Maximum stacking distance	10 Kilometers	Refer to FastIron stacking distances and optics by device on page 20 for more information.
Stacking ports	ICX 7650 devices support 40-Gbps and 100-Gbps stacking.	Module 3 supports 4 X 40-Gbps stacking or 2 X 100-Gbps stacking (the default). Stacking port speeds can be changed to 40-Gbps with the **rear-module stack-40G** command. Refer to Changing ICX 7650 stacking speed on page 95 for instructions. Refer to ICX 7650 stacking ports on page 91 for module and port locations.
Default-ports sets	For 100-Gbps stacking: (x/3/1, x/3/2, 1) For 40-Gbps stacking: (x/3/1, x/3/3, 2) **NOTE** The third number in the set is the maximum number of ports in a stacking trunk. One indicates stack-port only.	Refer to ICX 7650 stacking ports on page 91 for module and port locations.
Reconfigurable ports	Supported	The **rear-module** command can be used to change stacking port speeds or to reconfigure stacking ports as uplink ports and vice versa.

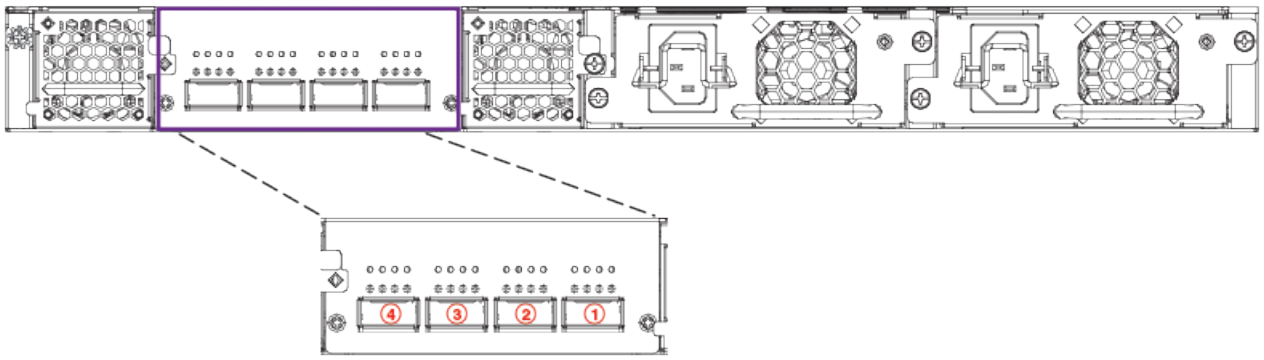
TABLE 14 ICX 7650 traditional stacking capabilities (continued)

Stacking capability	ICX 7650	Additional information
		NOTE Default stacking ports are specific to stacking port speed settings and cannot be reconfigured.
Stack trunks	Supported	2 X 40-Gbps bidirectional trunks are supported on ports 1/3/1 to 1/3/2 and ports 1/3/3 to 1/3/4. **NOTE** When stacking port speed changes, existing stacking trunk configuration may be removed. Refer to Configuring an ICX 7650 trunk manually on a non-production system on page 102 and Configuring an ICX 7650 stacking trunk on a live system on page 107.
Linear-topology trunk	For 100-Gbps: stack-trunk x/3/1 to x/3/2 For 40-Gbps: stack-trunk x/3/1 to x/3/4	Linear-topology trunks are used only in a two-unit stack. Linear-topology trunks can be configured for 40-Gbps or 100-Gbps connections.
Hitless switchover and hitless failover	Supported	Refer to Hitless stacking on page 139.
License requirements	Premium Layer 3, MACsec	Static routing and RIP are the only Layer 3 protocols available without a license. All other Layer 3 protocols require a Premium Layer 3 license. A separate license is required for MACsec. Refer to the *Ruckus FastIron Software Licensing Guide* for more information.
Configuration options	Manual and automatic, including stack interactive-setup and zero-touch provisioning	Refer to Traditional stack construction methods on page 25.
Access methods	TFTP, SCP	Software images, boot images, and signatures can be downloaded to a stack using TFTP and SCP. Refer to the *Ruckus FastIron Software Upgrade Guide* for more information.
Traditional stacking CLI	All stacking CLI is available on the ICX 7650 unless otherwise noted on the command reference page.	Refer to Traditional stack CLI commands on page 162.

ICX 7650 stacking ports

ICX 7650 devices support stacking through Module 3 on the rear panel, shown in the following figure.

FIGURE 23 ICX 7650 rear-module 40-Gbps stacking ports



The rear module is fixed, and its ports can be configured for stacking or uplink. By default, the rear module supports 100-Gbps stacking on ports 1 and 2 (1/3/1 and 1/3/2). When 100-Gbps stacking is enabled, ports 3 and 4 are not used. Stacking trunks are not supported on 100-Gbps connections.

The rear-module stacking configuration can be changed to support four 40-Gbps stacking ports, with the default stacking ports configured on ports 1 and 3 (1/3/1 and 1/3/3). Stacking trunks can be configured on 40-Gbps connections.

NOTE
Rear-module ports can also be configured as data uplink ports. Refer to ICX 7650 rear-module options on page 95 for more information.

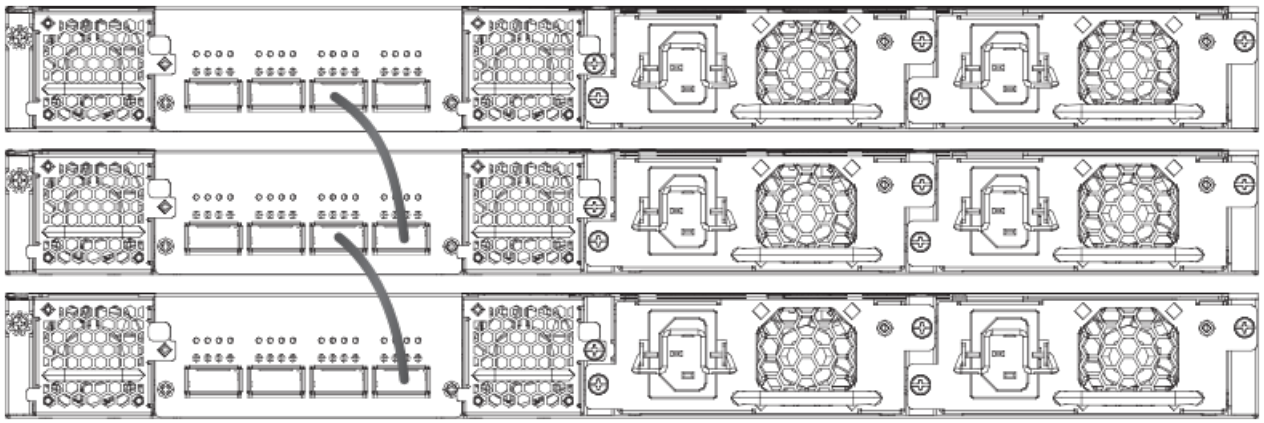
ICX 7650 stacking topologies

All ICX 7650 models support stacking from Module 3 on the rear panel. ICX 7650 stacks containing any combination of ICX 7650 models can be connected in linear or ring configurations.

ICX 7650 100-Gbps linear stack

The following figure depicts a three-unit stack of ICX 7650 devices configured in a 100-Gbps linear stack.

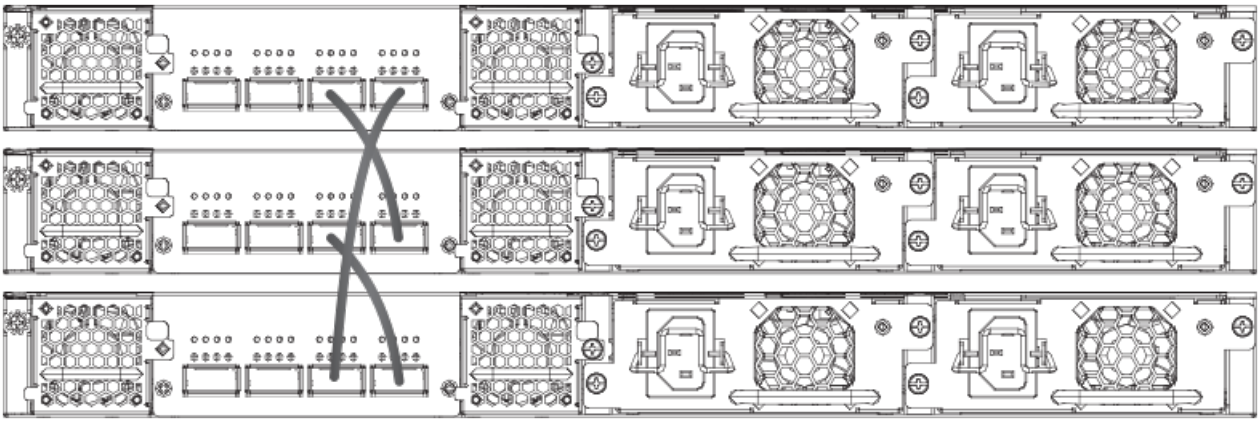
FIGURE 24 ICX 7650 100-Gbps linear stack



ICX 7650 100-Gbps ring stack

The following figure depicts a three-unit stack of ICX 7650 devices configured in a 100-Gbps ring stack.

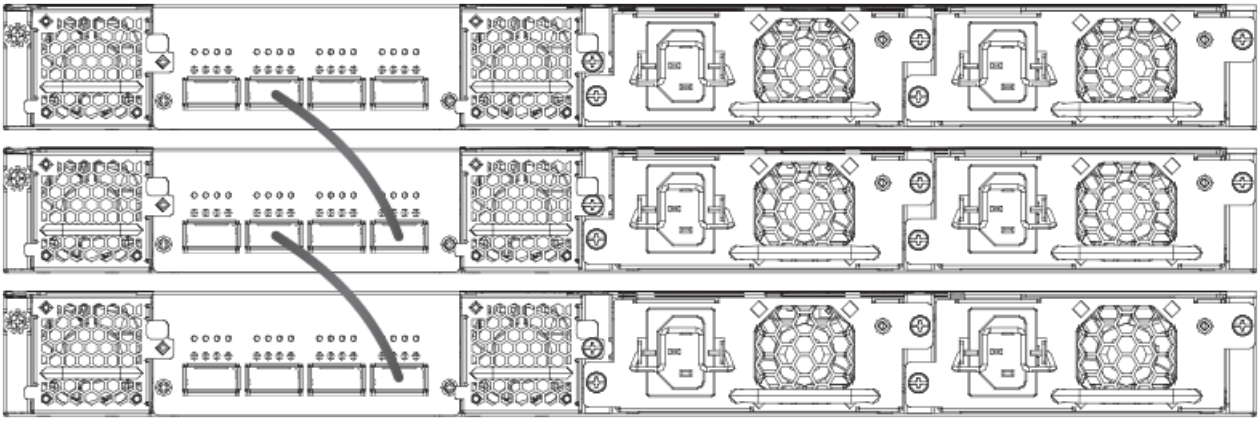
FIGURE 25 ICX 7650 100-Gbps ring stack



ICX 7650 40-Gbps linear stack

The following figure depicts a three-unit stack of ICX 7650 devices configured in a 40-Gbps linear stack.

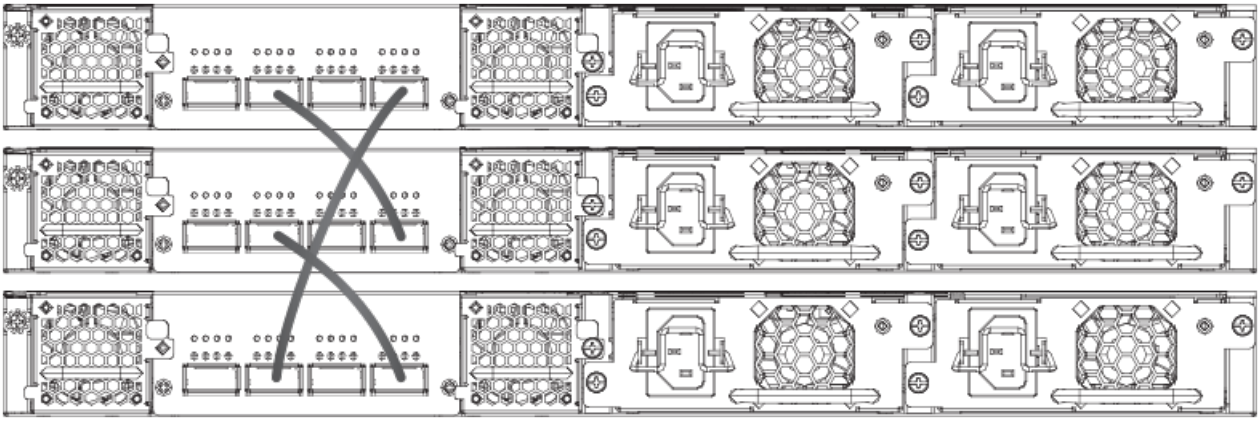
FIGURE 26 ICX 7650 40-Gbps linear stack



ICX 7650 40-Gbps ring stack

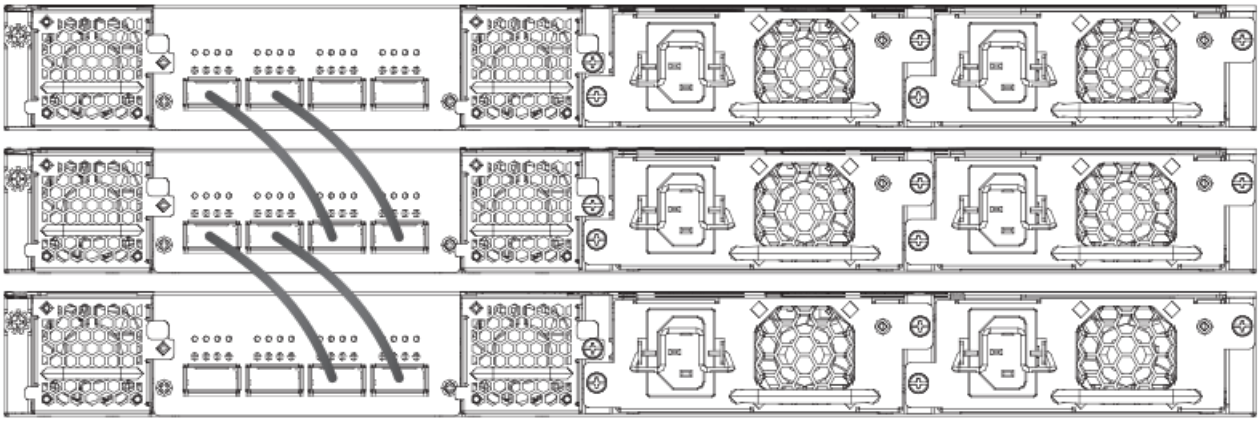
The following figure depicts a three-unit stack of ICX 7650 devices configured in a 40-Gbps ring stack.

FIGURE 27 ICX 7650 40-Gbps ring stack



ICX 7650 40-Gbps trunk

The following figure depicts a three-unit stack of ICX 7650 devices configured in a 40-Gbps stack with a trunk.



ICX 7650 configuration notes

Consider these items when configuring an ICX 7650 stack:

- Stacking ports operate in 100-Gbps stacking mode by default when an ICX 7650 device has no rear-module configuration.
- Optics and stacking ports differ for 100-Gbps and 40-Gbps stacking. Connections remain down if you attempt to configure stacking with a port speed mismatch. It is the user's responsibility to change the optics.
- To join a stack, a new ICX 7650 unit must be preconfigured to match the **rear-module** configuration of the existing stack.
- You cannot issue a **rear-module stack-40g** or **no rear-module** command unless the data uplink configuration has been removed from the ports.
- When a stack has been formed, you cannot configure the rear module for uplink mode without removing the stacking configuration from all stack members and rebooting the units.
- Stack units must be configured with matching High-Gig Ethernet settings.

- When the rear module is operating in uplink mode, you can configure stacking offline; however, stacking elections are blocked. When you execute the **write memory** command, you will be prompted to save or erase the stacking configuration. If you elect to erase the stacking configuration, all the stacking configuration, including the stacking.boot file configuration, is removed.
- Stacking or uplink mode settings must be saved with the **write memory** command and do not become active until the **reload** command is issued for the stack or standalone unit.
- If uplink mode is active on the ICX 7650 rear module, Module 2 cannot be used for uplink.
- If the ICX 7650 rear module has been operating in stacking mode, is reconfigured for uplink mode, and later is returned to stacking mode, Module 2 uplink port configuration may be lost. When Module 3 has been configured with the command **rear-module uplink-100g** or **rear-module uplink-40g** and before the user executes the **write memory** command to save the configuration, the following warning message appears: "After reload, rear module ports will be configured as uplink ports, and module 2 will be unused. Existing configurations for ports in module 2 may be removed."
- A configuration mismatch with the physical module installed as Module 2 can cause a stacking unit to become non-operational. The mismatch can be resolved by removing the unit from the stack so that the active controller relearns its configuration or by correcting module information. Refer to Resolving Module 2 mismatches in an ICX 7650 stack on page 117 for more information. For additional information on Module 2, refer to the *ICX 7650 Switch Hardware Installation Guide*.

ICX 7650 rear-module options

NOTE
ICX 7650 devices cannot operate in a stack when the rear module is configured for data uplink. Stacking election mechanisms and all stacking operations, including IPC communications, are blocked in uplink mode.

The following operating modes can be configured on the ICX 7650 fixed rear module (Module 3):

- 2 X 100-Gbps stacking (the default)
- 4 X 40-Gbps stacking
- 2 X 100-Gbps data uplink
- 2 X 40-Gbps data uplink

Changing ICX 7650 stacking speed

Be sure to connect stacking ports using optics that are compatible with the planned port speed. Be sure that the correct ports are connected. Be sure that speeds match on both ends of the stacking connection.

1. To change the rear-module stacking speed from 100 Gbps to 40 Gbps, enter the following commands on each affected unit.

```
device# configure terminal
device(config)# rear-module stack-40g
device(config)# write memory
device(config)# exit
device# reload
```

The example sets ICX 7650 speeds on ports x/3/1 through x/3/4 to 40 Gbps and configures default stacking ports x/3/1 and x/3/3. The change takes effect when the **reload** command is executed.

2. To remove the 40-Gbps stacking configuration and return the rear-module stacking speed to the default of 100 Gbps, enter the following commands on each affected unit.

```
device# configure terminal
device(config)# no rear-module stack-40g
device(config)# write memory
device(config)# exit
device# reload
```

The example configures ICX 7650 stacking ports x/3/1 and x/3/2 for 100 Gbps. (Ports 3 and 4 are not used.) The change takes effect when the **reload** command is executed.

NOTE
If 40-Gbps stacking trunks are configured, the configuration is removed.

NOTE
Different stacking ports are used for the two speeds. Be sure cables are connected correctly and correct optics are used before changing the stacking speed.

Converting stacking ports to data uplink ports

Be sure port connections are correct before changing modes or speeds. Be sure local and remote ports operate in the same mode and at the same speed.

NOTE
ICX 7650 devices cannot operate in a stack when the rear module is configured for data uplink. Stacking election mechanisms and all stacking operations, including IPC communications, are blocked in uplink mode.

When the rear module operates in stacking mode and has active member units attached to it, you cannot convert the rear module to uplink mode. To change the rear module to uplink mode, you must first unconfigure the stack.

Follow these steps to convert the rear module (Module 3) of an ICX 7650 device from stacking to uplink mode.

1. (Optional) Enter the **show stack** command to check for active stack configuration.

```
ICX7650-48F Router# show stack
T=7m25.5: alone: standalone, D: dynamic cfg, S: static
ID Type Role Mac Address Pri State Comment
1 S ICX7650-48F active 94fd.2e05.1a10 0 local Ready
2 D ICX7650-48P member 00e0.5200.0100 0 remote Ready
active
   +---+        +---+
3/3| 2 |3/1--3/1| 1 |3/3
   +---+        +---+
There is no standby. Will assign a standby in 39 sec
Current stack management MAC is 94fd.2e05.1a10
```

2. On the active controller for the stack, enter the **stack unconfigure all** command, and enter **y** when prompted to remove the stacking configuration from all stack members.

```
ICX7650-48F Router# stack unconfigure all
Will dismantle the entire stack and recover pre-stacking startup config. Are you sure? (enter 'y' or
'n'):
y Removed "stack enable" from startup-config
All units recover startup-config. Reset others
"stack enable" is removed from runtime config of this unit.
ICX7650-48F Router# Remove stack enable. This unit will not actively participate in stacking.
```

The example removes the stacking configuration from all stack members.

3. In global configuration mode on each unit, enter the **rear-module uplink** command with the desired uplink speed.

   NOTE
   You must enter the write memory command and then reload for the configuration takes effect. This removes module two from operation as well as ports 1/3/1 and 1/3/4. The following system warning is issued.

   ```
   ICX7650-48F Router(config)# rear-module uplink-100g
   ICX-7650 rear module setting changes requires a reload to take effect!!!
   The rear module would operate in uplink mode with 100Gbps speed after reload.
   After reload, rear module ports will be configured as uplink ports, and module 2 will be
   unused.
   Existing configurations for ports in module 2 may be removed.
   ```

4. Enter the **write memory** command to save the configuration.
5. Enter the **reload** command in privileged EXEC mode to apply the new configuration.

   Any configuration is removed from module 2, and it is not in use after the reload. Ports 1/3/1 and 1/3/4 are also unused after the reload.

The following example unconfigures the stack and configures one ICX 7650 rear module for data uplink at 100 Gbps on ports 1/3/1 and 1/3/2. (Ports 1/3/3 and 1/3/4 are not used.)

```
ICX7650-48F Router# stack unconfigure all
Will dismantle the entire stack and recover pre-stacking startup config. Are you sure? (enter 'y' or 'n'):
y Removed "stack enable" from startup-config
All units recover startup-config. Reset others
"stack enable" is removed from runtime config of this unit.
ICX7650-48F Router# Remove stack enable. This unit will not actively participate in stacking.
ICX7650-48F Router(config)# rear-module uplink-100g
ICX-7650 rear module setting changes requires a reload to take effect!!!
The rear module would operate in uplink mode with 100Gbps speed after reload.
ICX7650-48F Router(config)# write memory
Flash Memory Write (8192 bytes per dot)
.
Write startup-config done.
Copy Done.
ICX7650-48F Router(config)# exit
ICX7650-48F Router# reload
```

The following example unconfigures the stack and configures one ICX 7650 rear module for data uplink at 40 Gbps on ports 1/3/1 through 1/3/4.

```
ICX7650-48F Router# stack unconfigure all
Will dismantle the entire stack and recover pre-stacking startup config. Are you sure? (enter 'y' or 'n'):
y Removed "stack enable" from startup-config
All units recover startup-config. Reset others
"stack enable" is removed from runtime config of this unit.
ICX7650-48F Router# Remove stack enable. This unit will not actively participate in stacking.
ICX7650-48F Router(config)# rear-module uplink-40g
ICX-7650 rear module setting changes requires a reload to take effect!!!
The rear module would operate in uplink mode with 40Gbps speed after reload.
ICX7650-48F Router(config)# write memory
Flash Memory Write (8192 bytes per dot)
.
Write startup-config done.
Copy Done.
ICX7650-48F Router(config)# exit
ICX7650-48F Router# reload
```

Converting data uplink ports to stacking ports

Be sure port connections are correct before changing modes or speeds. Be sure local and remote ports operate in the same mode and at the same speed.

NOTE
ICX 7650 devices cannot operate in a stack when the rear module is configured for data uplink. Stacking election mechanisms and all stacking operations, including IPC communications, are blocked in uplink mode.

Follow these steps to convert the rear module (Module 3) of an ICX 7650 device from uplink to stacking mode.

1. Enter global configuration mode.

```
ICX7650-48P Router# configure terminal
```

2. Enter the **no rear-module** command to restore the rear-module default (100-Gbps stacking mode).

```
ICX7650-48P Router(config)# no rear-module
```

3. Enter the **write memory** command to save the change.

```
ICX7650-48P Router(config)# write memory
```

4. Reload the unit to put the mode change into effect.

```
ICX7650-48P Router(config)# exit
ICX7650-48P Router# reload
```

The following example removes the data uplink configuration from an ICX 7650 device, restores the default (100-Gbps stacking), saves the configuration, and reloads the unit so that it operates in 100-Gbps stacking mode.

NOTE
For information on changing the stacking speed, refer to Changing ICX 7650 stacking speed on page 95.

```
ICX7650-48P Router(config)# no rear-module
ICX7650-48F Router(config)# write memory
Flash Memory Write (8192 bytes per dot)
.
Write startup-config done.
Copy Done.
ICX7650-48F Router(config)# exit
ICX7650-48F Router# reload

ICX7650-48F Router# show rear-module
The rear module operates in stacking mode with 100G speed.
The rear module is configured in stacking mode with 100G speed.
ICX7650-48F Router#
```

Forming an ICX 7650 stack

Be sure the rear module on all ICX 7650 units is cabled correctly before configuring stacking.

You can use the **stack secure-setup** command as outlined in this procedure to configure a stack with an automatic utility. Other options for configuring a stack are also available. For more information on stack construction and secure-setup, refer to Traditional stack construction methods on page 25.

1. (Optional) Use the **show rear-module** command to verify that the rear module is operating in a stacking mode. The default mode is 100-Gbps stacking.

```
ICX7650-48P Router# show rear-module
The rear module operates in stacking mode with 100G speed.
The rear module is configured in stacking mode with 100G speed.
```

   The example shows the unit is operating in default mode (100-Gbps stacking).

2. If necessary, reconfigure the rear module for each unit in the stack to operate in the desired stacking mode. This may require removing the data uplink configuration. Refer to ICX 7650 rear-module options on page 95 for more information.
3. Enable stacking on each unit you plan to include in the stack.

```
ICX7650-48P Router# configure terminal
ICX7650-48P Router(config)# stack enable
Enable stacking. This unit actively participates in stacking
```

4. Enter the **stack secure-setup** command to configure the stack automatically. Respond to system prompts to confirm the stack configuration and to specify options such as the number of units in the stack, preferred unit IDs, the formation of multiple links as stacking trunks, and the creation of a ring topology.

ICX 7650 secure-setup examples

The following example enables stacking on units with the rear module in default 100-Gbps stacking mode and uses the secure-setup utility to configure 100-Gbps stacking on four units connected in a ring.

```
ICX7650-48P Router# show rear-module
The rear module operates in stacking mode with 100G speed.
The rear module is configured in stacking mode with 100G speed.
ICX7650-48P Router#
ICX7650-48P Router# configure terminal
ICX7650-48P Router(config)# stack enable
Enable stacking. This unit actively participates in stacking
ICX7650-48P Router(config)# end
ICX7650-48P Router#
ICX7650-48P Router# stack secure-setup
ICX7650-48P Router#Discovering the stack topology...

Current Discovered Topology - RING

Available UPSTREAM units
Hop(s)  Id      Type          Mac Address
 1       new  ICX7650-48ZP    609c.9f52.32e3
 2       new  ICX7650-48ZP    609c.9f52.2743
 3       new  ICX7650-48P     609c.9f52.6353

Available DOWNSTREAM units
Hop(s)  Id      Type          Mac Address
 1       new  ICX7650-48P     609c.9f52.6353
 2       new  ICX7650-48ZP    609c.9f52.2743
 3       new  ICX7650-48ZP    609c.9f52.32e3

Do you accept the topology (RING) (y/n)?: y

Selected Topology:
Active  Id      Type          Mac Address
        1    ICX7650-48P     609c.9f52.5a9b

Selected UPSTREAM units
Hop(s)  Id      Type        Mac Address
 1       2    ICX7650-48ZP    609c.9f52.32e3
 2       3    ICX7650-48ZP    609c.9f52.2743
 3       4    ICX7650-48P     609c.9f52.6353

Selected DOWNSTREAM units
Hop(s)  Id      Type        Mac Address
 1       4    ICX7650-48P     609c.9f52.6353
 2       3    ICX7650-48ZP    609c.9f52.2743
 3       2    ICX7650-48ZP    609c.9f52.32e3

Do you accept the unit id's (y/n)?: y
ICX7650-48P Router#T=6m12.0: Election, was alone --> active, ID=1, pri=128, 4U(1-4), A=u1, nbr#=3 3,
reason:
u4: SecureS, ,
```

```
T=6m13.0: Election, was active, no change, ID=1, pri=128, 4U(1-4), A=u1, nbr#=3 3, reason: u1: stk-po-
chg, ,
T=6m16.0: reset unit 2: u2 bo-id=1
T=6m16.0: reset unit 3: u3 bo-id=1
T=6m16.0: reset unit 4: u4 bo-id=1
Debug: Sep  7 01:53:03
Config changed due to add/del units. Do write mem if you want to keep it
Debug: Sep  7 01:53:06 T=6m21.0: Unit 1 loses all neighbors.
T=6m21.0: Active U1 deletes U2 and its config because it is learned.
T=6m21.1: Active U1 deletes U3 and its config because it is learned.
T=6m21.1: Active U1 deletes U4 and its config because it is learned.


ICX7650-48P Router#T=6m21.1: Active U1 deletes U4 and its config because it is learned.T=8m47.4: Election,
was active, no change, ID=1, pri=128, 2U(1,4), A=u1, nbr#=0 1, reason: u4: port-up, ,
T=8m49.0: Election, was active, no change, ID=1, pri=128, 2U(1,4), A=u1, nbr#=0 1, reason: u4: port-up, ,
Detect stack member 4 POE capable
Debug: Sep  7 01:55:34 Detect stack unit 4 has different startup config flash, will synchronize it
Debug: Sep  7 01:55:34 T=8m49.1: Synchronize webauth files to u4
2000 log entries of PoE Event Trace Log Buffer is allocated on unit 1 for unit 4
T:8m50.8: Done hot swap: active controller u1 sets u4 to Ready.
Stack unit 4 Power supply 1 is down
PoE: Stack unit 4 Power supply 2 with 748000 mwatts capacity is up
Debug: Sep  7 01:55:39
Config changed due to add/del units. Do write mem if you want to keep it
T=9m0.7: Election, was active, no change, ID=1, pri=128, 3U(1,3-4), A=u1, nbr#=0 2, reason: u3: port-up, ,
Detect stack member 3 POE capable
Debug: Sep  7 01:55:47 T=9m2.2: Synchronize webauth files to u3
2000 log entries of PoE Event Trace Log Buffer is allocated on unit 1 for unit 3
T:9m3.9: Done hot swap: active controller u1 sets u3 to Ready.
T=9m4.7: Election, was active, no change, ID=1, pri=128, 4U(1-4), A=u1, nbr#=3 3, reason: u2: port-up, ,
Detect stack member 2 POE capable
Debug: Sep  7 01:55:50 T=9m5.0: Synchronize webauth files to u2
2000 log entries of PoE Event Trace Log Buffer is allocated on unit 1 for unit 2
T:9m6.9: Done hot swap: active controller u1 sets u2 to Ready.
Stack unit 3 Power supply 1 is down
PoE: Stack unit 3 Power supply 2 with 748000 mwatts capacity is up
U4-MSG: PoE Info: Resetting module in slot 1....completed.
Debug: Sep  7 01:55:55
Config changed due to add/del units. Do write mem if you want to keep it
Stack unit 2 Power supply 1 is down
PoE: Stack unit 2 Power supply 2 with 748000 mwatts capacity is up
T=9m10.8: Election, was active, no change, ID=1, pri=128, 4U(1-4), A=u1, nbr#=3 3, reason: u1: stk-po-
chg, ,
Debug: Sep  7 01:56:01
Config changed due to add/del units. Do write mem if you want to keep it
PoE Info: PoE module 1 of Unit 4 on ports 4/1/1 to 4/1/48 detected. Initializing....
PoE Info: PoE module 1 of Unit 4 initialization is done.
U3-MSG: PoE Info: Resetting module in slot 1....completed.
U2-MSG: PoE Info: Resetting module in slot 1....completed.
T=10m25.9: Assigned unit 4 to be standby
PoE Info: PoE module 1 of Unit 3 on ports 3/1/1 to 3/1/48 detected. Initializing....
PoE Info: PoE module 1 of Unit 3 initialization is done.
PoE Info: PoE module 1 of Unit 2 on ports 2/1/1 to 2/1/48 detected. Initializing....
PoE Info: PoE module 1 of Unit 2 initialization is done.
PoE: Power enabled on port 2/1/1.
PoE: Power enabled on port 2/1/9.
Debug: Sep  7 01:57:13 T=10m28.0: start running config sync to standby u4
Debug: Sep  7 01:57:33 T=10m47.5: Running config sync to standby u4 is complete

Invalid input -> T=6m21.1: Active U1 deletes U4 and its config because it is learned.

ICX7650-48P Router#
ICX7650-48P Router# show stack
T=11m7.2: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7650-48P   active  609c.9f52.5a9b 128 local   Ready
2  D ICX7650-48ZP  member  609c.9f52.32e3   0 remote  Ready
3  D ICX7650-48ZP  member  609c.9f52.2743   0 remote  Ready
4  D ICX7650-48P   standby 609c.9f52.6353 128 remote  Ready

    active       standby
```

```
     +---+        +---+        +---+        +---+
 -3/1| 1 |3/2--3/1| 4 |3/2--3/2| 3 |3/1--3/1| 2 |3/2-
  |   +---+        +---+        +---+        +---+   |
  |                                                   |
  |---------------------------------------------------|
Standby u4 - sent role but not acked
Role history: N: standalone, A: active, S: standby, M: member
U1: N->A

Current stack management MAC is 609c.9f52.5a9b
Stack ports are operating at 100G.
```

Creating a 40-Gbps stack with secure-setup

The following example creates a 40-Gbps linear stack with two members. A trunk is created based on user entry between ports 1/3/1 and 2/3/1.

```
ICX7650-48P Router# configure terminal
ICX7650-48P Router(config)# rear-module
  stack-40g     set ICX-7650 rear module as 40G stack ports
  uplink-100g   set ICX-7650  rear module as 100G uplink ports
  uplink-40g    set ICX-7650  rear module as 40G uplink ports
ICX7650-48P Router(config)# rear-module stack-40g
ICX-7650 rear module setting changes requires a reload to take effect!!!
The rear module operates in stacking mode with 40Gbps speed after reload.
ICX7650-48P Router(config)# end
ICX7650-48P Router# write memory
ICX7650-48P Router# reload

.
ICX7650-48P Router# stack secure-setup
ICX7650-48P Router#Discovering the stack topology...

Available UPSTREAM units
Hop(s)  Id      Type          Mac Address
 1       new  ICX7650-48P     609c.9f52.74c3

Enter the number of the desired UPSTREAM units (0-1)[0]: 1

Confirm Stacking Links...

UPSTREAM Unit: Id new at 1 hop(s) ICX7650-48P   609c.9f52.74c3

Enter the desired links(1-2)[1]: 2

Selected Topology:
Active  Id      Type          Mac Address
        1    ICX7650-48P     609c.9f52.5eb9

Selected UPSTREAM units
Hop(s)  Id      Type        Mac Address
 1       2    ICX7650-48P     609c.9f52.74c3

Do you accept the unit id's (y/n)?: y
ICX7650-48P Router#T=14m3.7: Election, was alone --> active, ID=1, pri=128, 2U(1-2), A=u1, nbr#=1 0,

reason: u2: port-up, ,
T=14m5.9: reset unit 2: u2 bo-id=1
T=14m10.9: Unit 1 loses all neighbors.
T=14m10.9: Active unit 1 deletes u2 but keeps its static config.
T=16m42.4: Election, was active, no change, ID=1, pri=128, 2U(1-2), A=u1, nbr#=1 0, reason: u2:

enable, ,
Detect stack member 2 POE capable
Detect stack unit 2 has different startup config flash, will synchronize it
T=16m41.7: Synchronize webauth files to u2
2000 log entries of PoE Event Trace Log Buffer is allocated on unit 1 for unit 2
T:16m43.1: Done hot swap: active controller u1 sets u2 to Ready.
T=16m44.7: Synchronize startup config to u2
```

```
Flash Memory Write (8192 bytes per dot)
.
Write startup-config done.
Stack unit 2 Power supply 1 is down
PoE: Stack unit 2 Power supply 2 with 748000 mwatts capacity is up
U2-MSG: PoE Info: Resetting module in slot 1....completed.
PoE Info: PoE module 1 of Unit 2 on ports 2/1/1 to 2/1/48 detected. Initializing....
PoE Info: PoE module 1 of Unit 2 initialization is done.
T=17m43.3: Assigned unit 2 to be standby
T=17m45.3: start running config sync to standby u2
T=17m46.2: Running config sync to standby u2 is complete

ICX7650-48P Router# show stack
T=21m12.2: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7650-48P   active  609c.9f52.5eb9 128 local   Ready
2  S ICX7650-48P   standby 609c.9f52.74c3  10 remote  Ready

    standby      active
     +---+        +---+
  3/3| 2 |3/1==3/1| 1 |3/3
     +---+        +---+
Standby u2 - protocols ready, can failover
Role history: N: standalone, A: active, S: standby, M: member
U1: N->A

Current stack management MAC is 609c.9f52.5eb9
Stack ports are operating at 40G.
```

Configuring an ICX 7650 trunk manually on a non-production system

Stacking trunks can be configured on ICX 7650 devices operating in 40-Gbps stacking mode.

The secure-setup process includes the option to form trunks when multiple links are possible. Refer to ICX 7650 secure-setup examples on page 99. You may also opt to configure a trunk manually.

Follow these steps to create a trunk manually on an ICX 7650 stack that is not live.

NOTE
Stacking trunks can be configured only when the rear module is operating in 40-Gbps stacking mode. Refer to ICX 7650 rear-module options on page 95 for more information.

NOTE
Trunk configuration may be removed when you change stacking speeds.

1. (Optional) Verify that stacking is enabled and that the rear module is configured in 40-Gbps stacking mode.

```
ICX7650-48P Router# show running-config
Current configuration:
!
ver 08.0.70q20T228
!
stack unit 1
  module 1 icx7650-48p-port-management-module
  module 2 icx7600-qsfp-2port-80g-module
  module 3 icx7650-qsfp-4port-160g-module
  priority 128
stack mac 609c.9f52.5eb9
!
!

rear-module stack-40g
!
!

hitless-failover enable
!
!

end

ICX7650-48P Router# show stack

***** Warning! stack is not enabled. *****

T=21h4m4.2: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7650-48P   alone   609c.9f52.5eb9 128 local   None:0


     +---+
  3/1| 1 |3/3
     +---+
Role history: N: standalone, A: active, S: standby, M: member
U1: N->A->N
```

   The example shows that the unit is operating in 40-Gbps stacking mode, but stacking is not enabled. No stacking links are configured to other units.

2. If necessary, enable stacking on the device.

```
ICX7650-48P Router# configure terminal
ICX7650-48P Router(config)# stack enable
Enable stacking. This unit actively participates in stacking
```

3. Enter stack unit configuration mode to configure trunks.

```
ICX7650-48P Router(config)# stack unit 1
ICX7650-48P Router(config-unit-1)#
ICX7650-48P Router(config-unit-1)#  stack-trunk 1/3/1 to 1/3/2
ICX7650-48P Router(config-unit-1)#  stack-trunk 1/3/3 to 1/3/4
```

   The example configures two stacking trunks on stack unit 1.

4. Enter the **write memory** command to save the trunk configuration.

```
ICX7650-48P Router(config-unit-1)# end
ICX7650-48P Router# write memory
```

5. Repeat the previous steps to enable stacking and configure trunks as needed on all units in the stack.

```
ICX7650-48P Router# configure terminal   <---------- Enable stacking and repeat trunk configuration
                                                     on all units where needed.
ICX7650-48P Router(config)# stack enable
Enable stacking. This unit actively participates in stacking

ICX7650-48P Router(config)# stack unit 2
ICX7650-48P Router(config-unit-1)#
ICX7650-48P Router(config-unit-1)#  stack-trunk 2/3/1 to 2/3/2
ICX7650-48P Router(config-unit-1)# end

ICX7650-48P Router# write memory
```

   The example shows stack unit 2 being enabled for stacking and configured with a single stacking trunk.

6. (Optional) Confirm that the stack has formed based on the stacking links configured.

```
ICX7650-48P Router# show stack
T=21h9m2.2: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7650-48P   active  609c.9f52.5eb9 128 local   Ready
2  D ICX7650-48P   member  609c.9f52.74c3 128 remote  Ready

                 active
     +---+        +---+
  3/3| 2 |3/1==3/1| 1 |3/3
     +---+        +---+
There is no standby. Will assign a standby in 4 sec

Role history: N: standalone, A: active, S: standby, M: member
U1: N->A->N->A

Current stack management MAC is 609c.9f52.5eb9
Stack ports are operating at 40G.

ICX7650-48P Router#T=21h9m7.3: Assigned unit 2 to be standby
T=21h9m9.3: start running config sync to standby u2
T=21h9m9.8: Running config sync to standby u2 is complete
```

   The example shows a two-unit stack has formed with a single stacking trunk connection.

The following example manually configures a two-unit ICX 7650 stack with a stacking trunk from ports 1/3/1 and 1/3/2 to ports 2/3/1 and 2/3/2.

```
ICX7650-48P Router# show running-config
Current configuration:
!
ver 08.0.70q20T228
!
stack unit 1
  module 1 icx7650-48p-port-management-module
  module 2 icx7600-qsfp-2port-80g-module
  module 3 icx7650-qsfp-4port-160g-module
  priority 128
stack mac 609c.9f52.5eb9
!
!

rear-module stack-40g
!
!

hitless-failover enable
!
!

end

ICX7650-48P Router# show stack

***** Warning! stack is not enabled. *****

T=21h4m4.2: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7650-48P   alone   609c.9f52.5eb9 128 local   None:0


     +---+
  3/1| 1 |3/3
     +---+
Role history: N: standalone, A: active, S: standby, M: member
U1: N->A->N

Current stack management MAC is 609c.9f52.5eb9
Stack ports are operating at 40G.

ICX7650-48P Router# configure terminal
ICX7650-48P Router(config)# stack enable
Enable stacking. This unit actively participates in stacking

ICX7650-48P Router(config)# stack unit 1
ICX7650-48P Router(config-unit-1)#
ICX7650-48P Router(config-unit-1)#  stack-trunk 1/3/1 to 1/3/2

ICX7650-48P Router(config-unit-1)# end

ICX7650-48P Router# write memory

Flash Memory Write (8192 bytes per dot)
.
Copy Done.
ICX7650-48P Router# show running-config
Current configuration:
!
ver 08.0.70q20T228
!
stack unit 1
  module 1 icx7650-48p-port-management-module
  module 2 icx7600-qsfp-2port-80g-module
  module 3 icx7650-qsfp-4port-160g-module
  priority 128
  stack-trunk 1/3/1 to 1/3/2
```

```
  stack-port 1/3/1 1/3/3
stack enable
stack mac 609c.9f52.5eb9
!
!

rear-module stack-40g
!
!

hitless-failover enable
!
!

end
!
!

ICX7650-48P Router# configure terminal   <---------- Enable stacking and repeat trunk configuration
                                                     on all units where needed.
ICX7650-48P Router(config)# stack enable
Enable stacking. This unit actively participates in stacking

ICX7650-48P Router(config)# stack unit 2
ICX7650-48P Router(config-unit-1)#
ICX7650-48P Router(config-unit-1)#  stack-trunk 2/3/1 to 2/3/2
ICX7650-48P Router(config-unit-1)# end

ICX7650-48P Router# write memory

Flash Memory Write (8192 bytes per dot)
.
Copy Done.

==============
Detect stack unit 2 has different startup config flash, will synchronize it
All entries are cleared on unit 1 for unit 2
T:21h8m5.6: Done hot swap: active controller u1 sets u2 to Ready.
T=21h8m5.6: Synchronize startup config to u2
T=21h8m58.9: Election, was active, no change, ID=1, pri=128, 2U(1-2), A=u1, nbr#=1 0, reason: u1:

stk-po-chg, ,
Flash Memory Write (8192 bytes per dot)
.
Stack unit 2 Power supply 1 is down
PoE: Stack unit 2 Power supply 2 with 748000 mwatts capacity is up

Config changed due to add/del units. Do write mem if you want to keep it
U2-MSG: PoE Info: Resetting module in slot 1....completed.
PoE Info: PoE module 1 of Unit 2 on ports 2/1/1 to 2/1/48 detected. Initializing....
PoE Info: PoE module 1 of Unit 2 initialization is done.


ICX7650-48P Router# show stack
T=21h9m2.2: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7650-48P   active  609c.9f52.5eb9 128 local   Ready
2  D ICX7650-48P   member  609c.9f52.74c3 128 remote  Ready

                 active
     +---+        +---+
  3/3| 2 |3/1==3/1| 1 |3/3
     +---+        +---+
There is no standby. Will assign a standby in 4 sec

Role history: N: standalone, A: active, S: standby, M: member
U1: N->A->N->A

Current stack management MAC is 609c.9f52.5eb9
Stack ports are operating at 40G.

ICX7650-48P Router#T=21h9m7.3: Assigned unit 2 to be standby
```

```
T=21h9m9.3: start running config sync to standby u2
T=21h9m9.8: Running config sync to standby u2 is complete
```

Configuring an ICX 7650 stacking trunk on a live system

Follow these steps to convert stacking ports on both ends of a link to a stacking trunk on an ICX 7650 production stack.

1. (Optional) Enter the **show stack** command to verify stack configuration.

```
ICX7650-48ZP Router# show stack
T=20h23m43.6: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7650-48ZP  active  609c.9f52.2cd5 128 local   Ready
2  S ICX7650-48F   standby 609c.9f52.4643 128 remote  Ready

    active       standby
     +---+        +---+
 -3/3| 1 |3/1--3/1| 2 |3/3-
  |   +---+        +---+   |
  |                        |
  |------------------------|
Standby u2 - protocols ready, can failover or manually switch over
Role history: N: standalone, A: active, S: standby, M: member
U1: M->S->A, U2: A->S

Current stack management MAC is 609c.9f52.2cd5
Stack ports are operating at 40G.
```

   The example shows a two-unit live stack configured in a ring with no trunks.

2. (Optional) Enter the **show running-config** command for additional information on the stack.

```
ICX7650-48ZP Router# show running-config | inc stack
stack unit 1
  stack-port 1/3/1 1/3/3
stack unit 2
  stack-port 2/3/1 2/3/3
stack enable
stack rconsole-off
stack mac 609c.9f52.2cd5
rear-module stack-40g
```

   The example includes only stacking information in the **show running-config** command output. The output confirms that the ICX 7650 stack is operating in 40-Gbps stacking mode.

3. Enter stack unit configuration mode.

```
ICX7650-48ZP Router# configure terminal
ICX7650-48ZP Router(config)#stack unit 1
ICX7650-48ZP Router(config-unit-1)#
```

4. Enter the **multi-stack-trunk** command followed by the set of ports on either end of the live connection to include in the stacking trunk.

```
ICX7650-48ZP Router(config-unit-1)# multi-stack-trunk 1/3/1 to 1/3/2 and 2/3/1 to 2/3/2
SYSLOG: <14> Sep  7 19:13:52 System: Interface ethernet 1/3/2, state down

SYSLOG: <14> Sep  7 19:13:52 System: Interface ethernet 2/3/2, state down
T=20h25m17.5: Election, was active, no change, ID=1, pri=128, 2U(1-2), A=u1, nbr#=1 1, reason: u1:
stk-po-chg, ,

SYSLOG: <14> Sep  7 19:13:52 Stack: Stack unit 1 has been elected as ACTIVE unit of the stack system

SYSLOG: <14> Sep  7 19:13:53 System: Interface ethernet 1/3/2, state up

SYSLOG: <14> Sep  7 19:13:53 System: Interface ethernet 2/3/2, state up

ICX7650-48ZP Router(config-unit-1)# end
```

The example configures a stacking trunk from ports 1/3/1 to 1/3/2 on one end of the connection to ports 2/3/1 and 2/3/2 on the other end.

5. Enter the **write memory** command in privileged Exec mode to save the configuration.

```
ICX7650-48ZP Router(config-unit-1)# end

SYSLOG: <14> Sep  7 19:13:57 Security: running-config was potentially changed by operator from
console

ICX7650-48ZP Router# write memory

Automatic copy to member units:  2
ICX7650-48ZP Router#
SYSLOG: <14> Sep  7 19:13:59 Security: startup-config was changed by operator from console
Flash Memory Write (8192 bytes per dot)
.
Write startup-config done.
Copy Done.
```

The example saves the 40-Gbps trunk configuration.

6. (Optional) Enter the **show stack** command to confirm the formation of the trunk.

```
ICX7650-48ZP Router# show stack
T=20h24m41.8: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7650-48ZP  active  609c.9f52.2cd5 128 local   Ready
2  S ICX7650-48F   standby 609c.9f52.4643 128 remote  Ready

    active       standby
     +---+        +---+
 -3/3| 1 |3/1==3/1| 2 |3/3-
  |   +---+        +---+   |
  |                        |
  |------------------------|
Will assign standby in 47 sec due to all ready

Standby u2 - protocols ready, can failover
Role history: N: standalone, A: active, S: standby, M: member
U1: M->S->A, U2: A->S

Current stack management MAC is 609c.9f52.2cd5
Stack ports are operating at 40G.
```

The example shows a trunk is present.

The following example configures both potential 40-Gbps trunks on a live stack.

```
ICX7650-48ZP Router# show stack
T=20h23m43.6: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7650-48ZP  active  609c.9f52.2cd5 128 local   Ready
2  S ICX7650-48F   standby 609c.9f52.4643 128 remote  Ready

    active       standby
     +---+        +---+
 -3/3| 1 |3/1--3/1| 2 |3/3-
  |   +---+        +---+   |
  |                        |
  |------------------------|
Standby u2 - protocols ready, can failover or manually switch over
Role history: N: standalone, A: active, S: standby, M: member
U1: M->S->A, U2: A->S

Current stack management MAC is 609c.9f52.2cd5
Stack ports are operating at 40G.

ICX7650-48ZP Router# show running-config | inc stack
stack unit 1
  stack-port 1/3/1 1/3/3
stack unit 2
  stack-port 2/3/1 2/3/3
stack enable
stack rconsole-off
stack mac 609c.9f52.2cd5
rear-module stack-40g
ICX7650-48ZP Router# configure terminal
ICX7650-48ZP Router(config)# stack unit 1
ICX7650-48ZP Router(config-unit-1)# multi-stack-trunk 1/3/1 to 1/3/2 and 2/3/1 to 2/3/2
ICX7650-48ZP Router(config-unit-1)#
SYSLOG: <14> Sep  7 19:13:52 System: Interface ethernet 1/3/2, state down

SYSLOG: <14> Sep  7 19:13:52 System: Interface ethernet 2/3/2, state down
T=20h25m17.5: Election, was active, no change, ID=1, pri=128, 2U(1-2), A=u1, nbr#=1 1, reason: u1: stk-po-
chg, ,

SYSLOG: <14> Sep  7 19:13:52 Stack: Stack unit 1 has been elected as ACTIVE unit of the stack system

SYSLOG: <14> Sep  7 19:13:53 System: Interface ethernet 1/3/2, state up

SYSLOG: <14> Sep  7 19:13:53 System: Interface ethernet 2/3/2, state up

ICX7650-48ZP Router(config-unit-1)# end

SYSLOG: <14> Sep  7 19:13:57 Security: running-config was potentially changed by operator from console

ICX7650-48ZP Router# write memory

Automatic copy to member units:  2
ICX7650-48ZP Router#
SYSLOG: <14> Sep  7 19:13:59 Security: startup-config was changed by operator from console
Flash Memory Write (8192 bytes per dot)
.
Write startup-config done.
Copy Done.
ICX7650-48ZP Router# show stack
T=20h24m41.8: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7650-48ZP  active  609c.9f52.2cd5 128 local   Ready
2  S ICX7650-48F   standby 609c.9f52.4643 128 remote  Ready

    active       standby
     +---+        +---+
 -3/3| 1 |3/1==3/1| 2 |3/3-
  |   +---+        +---+   |
  |                        |
  |------------------------|
```

```
Will assign standby in 47 sec due to all ready

Standby u2 - protocols ready, can failover
Role history: N: standalone, A: active, S: standby, M: member
U1: M->S->A, U2: A->S

Current stack management MAC is 609c.9f52.2cd5
Stack ports are operating at 40G.

ICX7650-48ZP Router# configure terminal
ICX7650-48ZP Router(config)# stack unit 1
ICX7650-48ZP Router(config-unit-1)# multi-stack-trunk 1/3/3 to 1/3/4 and 2/3/3 to 2/3/4

SYSLOG: <14> Sep  7 19:14:39 System: Interface ethernet 1/3/4, state down
ICX7650-48ZP Router(config-unit-1)#
SYSLOG: <14> Sep  7 19:14:39 System: Interface ethernet 2/3/4, state down
T=20h26m4.5: Election, was active, no change, ID=1, pri=128, 2U(1-2), A=u1, nbr#=1 1, reason: u1: stk-po-
chg, ,

SYSLOG: <14> Sep  7 19:14:39 Stack: Stack unit 1 has been elected as ACTIVE unit of the stack system

ICX7650-48ZP Router(config-unit-1)#
SYSLOG: <14> Sep  7 19:14:40 System: Interface ethernet 1/3/4, state up

SYSLOG: <14> Sep  7 19:14:40 System: Interface ethernet 2/3/4, state up

ICX7650-48ZP Router(config-unit-1)# end

SYSLOG: <14> Sep  7 19:14:41 Security: running-config was potentially changed by operator from console
ICX7650-48ZP Router#
ICX7650-48ZP Router# write memory

Automatic copy to member units:  2
ICX7650-48ZP Router#
SYSLOG: <14> Sep  7 19:14:42 Security: startup-config was changed by operator from console

Flash Memory Write (8192 bytes per dot)
.
Write startup-config done.
Copy Done.
ICX7650-48ZP Router# show stack
T=20h25m20.2: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7650-48ZP  active  609c.9f52.2cd5 128 local   Ready
2  S ICX7650-48F   standby 609c.9f52.4643 128 remote  Ready

    active       standby
     +---+        +---+
 =3/3| 1 |3/1==3/1| 2 |3/3=
  |   +---+        +---+   |
  |                        |
  |------------------------|
Will assign standby in 56 sec due to all ready

Standby u2 - protocols ready, can failover
Role history: N: standalone, A: active, S: standby, M: member
U1: M->S->A, U2: A->S

Current stack management MAC is 609c.9f52.2cd5
Stack ports are operating at 40G.

ICX7650-48ZP Router# show running-config | inc stack
stack unit 1
  stack-trunk 1/3/1 to 1/3/2
  stack-trunk 1/3/3 to 1/3/4
  stack-port 1/3/1 1/3/3
stack unit 2
  stack-trunk 2/3/1 to 2/3/2
  stack-trunk 2/3/3 to 2/3/4
  stack-port 2/3/1 2/3/3
stack enable
stack rconsole-off
```

```
stack mac 609c.9f52.2cd5
rear-module stack-40g
ICX7650-48ZP Router#
```

Removing an ICX 7650 trunk on a live system

Follow these steps to remove a stacking trunk and convert connections to individual links at both ends of the connection on an ICX 7650 production stack.

1. (Optional) Enter the **show stack** command to verify the stack configuration.

```
ICX7650-48ZP Router# show stack
T=20h18m50.1: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7650-48ZP  active  609c.9f52.2cd5 128 local   Ready
2  S ICX7650-48F   standby 609c.9f52.4643 128 remote  Ready

    active       standby
     +---+        +---+
 =3/3| 1 |3/1==3/1| 2 |3/3=
  |   +---+        +---+   |
  |                        |
  |------------------------|
Will assign standby in 54 sec due to startup synced

Standby u2 - protocols ready, can failover
Role history: N: standalone, A: active, S: standby, M: member
U1: M->S->A, U2: A->S

Current stack management MAC is 609c.9f52.2cd5
Stack ports are operating at 40G.
```

   The example shows a two-unit stack in a ring configuration with two trunks configured between the two units.

2. (Optional) Enter the **show running-config** command for additional information on the stack.

```
ICX7650-48ZP Router# show running-config | inc stack
stack unit 1
  stack-trunk 1/3/1 to 1/3/2
  stack-trunk 1/3/3 to 1/3/4
  stack-port 1/3/1 1/3/3
stack unit 2
  stack-trunk 2/3/1 to 2/3/2
  stack-trunk 2/3/3 to 2/3/4
  stack-port 2/3/1 2/3/3
stack enable
stack rconsole-off
stack mac 609c.9f52.2cd5
rear-module stack-40g
ICX7650-48ZP Router# show stack
T=20h19m18.0: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7650-48ZP  active  609c.9f52.2cd5 128 local   Ready
2  S ICX7650-48F   standby 609c.9f52.4643 128 remote  Ready

    active       standby
     +---+        +---+
 =3/3| 1 |3/1==3/1| 2 |3/3=
  |   +---+        +---+   |
  |                        |
  |------------------------|
Will assign standby in 26 sec due to startup synced

Standby u2 - protocols ready, can failover
Role history: N: standalone, A: active, S: standby, M: member
U1: M->S->A, U2: A->S

Current stack management MAC is 609c.9f52.2cd5
Stack ports are operating at 40G.
```

The example shows specific port-to-port connections for the stacking trunks and confirms that the stack is operating in 40-Gbps stacking mode.

3. Enter stack unit configuration mode.

```
ICX7650-48ZP Router# configure terminal
ICX7650-48ZP Router(config)# stack unit 1
ICX7650-48ZP Router(config-unit-1)#
```

4. Enter the **multi-stack-port** command followed by the set of ports on either end of the live trunk to convert to stacking ports.

```
ICX7650-48ZP Router(config-unit-1)# multi-stack-port 1/3/1 and  2/3/1
ICX7650-48ZP Router(config-unit-1)# end


ICX7650-48ZP Router(config-unit-1)#T=20h20m35.3: Election, was active, no change, ID=1, pri=128,
2U(1-2), A=u1, nbr#=1 1, reason: u1: stk-po-chg, ,

SYSLOG: <14> Sep  7 19:09:10 Stack: Stack unit 1 has been elected as ACTIVE unit of the stack syste

SYSLOG: <14> Sep  7 19:09:12 System: Interface ethernet 1/3/2, state down

SYSLOG: <14> Sep  7 19:09:12 System: Interface ethernet 2/3/2, state down

ICX7650-48ZP Router#
SYSLOG: <14> Sep  7 19:09:12 Security: running-config was potentially changed by operator from
console

ICX7650-48ZP Router#
ICX7650-48ZP Router#
SYSLOG: <14> Sep  7 19:09:12 System: Interface ethernet 2/3/2, state up

SYSLOG: <14> Sep  7 19:09:13 System: Interface ethernet 1/3/2, state up

ICX7650-48ZP Router#
```

   The example removes a stacking trunk and converts these ports to stacking ports on both ends of the link: ports 1/3/1, 1/3/2, 2/3/1, and 2/3/2.

5. Repeat the previous steps if you are removing two live trunks.

```
ICX7650-48ZP Router# configure terminal
ICX7650-48ZP Router(config)# stack unit 1
ICX7650-48ZP Router(config-unit-1)# multi-stack-port 1/3/3 and 2/3/3

ICX7650-48ZP Router(config-unit-1)#enT=20h21m28.8: Election, was active, no change, ID=1, pri=128,
2U(1-2),
A=u1, nbr#=1 1, reason: u1: stk-po-chg, ,

SYSLOG: <14> Sep  7 19:10:04 Stack: Stack unit 1 has been elected as ACTIVE unit of the stack system
d
ICX7650-48ZP Router#
SYSLOG: <14> Sep  7 19:10:04 Security: running-config was potentially changed by operator from
console

ICX7650-48ZP Router#
```

   The example removes the stacking trunk configuration at both ends of the remaining trunk and converts these ports to stacking ports: 1/3/3, 1/3/4, 2/3/3, and 2/3/4.

6. Enter the **write memory** command in privileged EXEC mode to save the configuration.

```
ICX7650-48ZP Router# write memory
Automatic copy to member units:  2

SYSLOG: <14> Sep  7 19:10:05 System: Interface ethernet 1/3/4, state down
SYSLOG: <14> Sep  7 19:10:05 System: Interface ethernet 2/3/4, state down

SYSLOG: <14> Sep  7 19:10:06 Security: startup-config was changed by operator from console
Flash Memory Write (8192 bytes per dot)
.
Write startup-config done.
Copy Done.
ICX7650-48ZP Router#
SYSLOG: <14> Sep  7 19:10:06 System: Interface ethernet 2/3/4, state up

ICX7650-48ZP Router#
SYSLOG: <14> Sep  7 19:10:06 System: Interface ethernet 1/3/4, state up
sh stack
T=20h20m45.4: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7650-48ZP  active  609c.9f52.2cd5 128 local   Ready
2  S ICX7650-48F   standby 609c.9f52.4643 128 remote  Ready

    active       standby
     +---+        +---+
 -3/3| 1 |3/1--3/1| 2 |3/3-
  |   +---+        +---+   |
  |                        |
  |------------------------|
Will assign standby in 55 sec due to all ready

Standby u2 - protocols ready, can failover
Role history: N: standalone, A: active, S: standby, M: member
U1: M->S->A, U2: A->S

Current stack management MAC is 609c.9f52.2cd5
Stack ports are operating at 40G.
```

The example saves the 40-Gbps stacking configuration with no trunks present.

7. (Optional) Enter the **show stack** command to confirm the configuration.

```
ICX7650-48ZP Router# show stack

T=20h20m45.4: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7650-48ZP  active  609c.9f52.2cd5 128 local   Ready
2  S ICX7650-48F   standby 609c.9f52.4643 128 remote  Ready

    active       standby
     +---+        +---+
 -3/3| 1 |3/1--3/1| 2 |3/3-
  |   +---+        +---+   |
  |                        |
  |------------------------|
Will assign standby in 55 sec due to all ready

Standby u2 - protocols ready, can failover
Role history: N: standalone, A: active, S: standby, M: member
U1: M->S->A, U2: A->S

Current stack management MAC is 609c.9f52.2cd5
Stack ports are operating at 40G.
```

The example confirms that the two-unit stack is operating in a ring with individual stacking links and no stacking trunks.

The following example removes two stacking trunks from a live two-unit 40-Gbps stacking ring and converts the related ports to stacking ports.

```
ICX7650-48ZP Router# show stack
T=20h18m50.1: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7650-48ZP  active  609c.9f52.2cd5 128 local   Ready
2  S ICX7650-48F   standby 609c.9f52.4643 128 remote  Ready

    active       standby
     +---+        +---+
 =3/3| 1 |3/1==3/1| 2 |3/3=
  |   +---+        +---+   |
  |                        |
  |------------------------|
Will assign standby in 54 sec due to startup synced

Standby u2 - protocols ready, can failover
Role history: N: standalone, A: active, S: standby, M: member
U1: M->S->A, U2: A->S

Current stack management MAC is 609c.9f52.2cd5
Stack ports are operating at 40G.

ICX7650-48ZP Router# show running-config | inc stack
stack unit 1
  stack-trunk 1/3/1 to 1/3/2
  stack-trunk 1/3/3 to 1/3/4
  stack-port 1/3/1 1/3/3
stack unit 2
  stack-trunk 2/3/1 to 2/3/2
  stack-trunk 2/3/3 to 2/3/4
  stack-port 2/3/1 2/3/3
stack enable
stack rconsole-off
stack mac 609c.9f52.2cd5
rear-module stack-40g
ICX7650-48ZP Router# show stack
T=20h19m18.0: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7650-48ZP  active  609c.9f52.2cd5 128 local   Ready
2  S ICX7650-48F   standby 609c.9f52.4643 128 remote  Ready

    active       standby
     +---+        +---+
 =3/3| 1 |3/1==3/1| 2 |3/3=
  |   +---+        +---+   |
  |                        |
  |------------------------|
Will assign standby in 26 sec due to startup synced

Standby u2 - protocols ready, can failover
Role history: N: standalone, A: active, S: standby, M: member
U1: M->S->A, U2: A->S

Current stack management MAC is 609c.9f52.2cd5
Stack ports are operating at 40G.

X7650-48ZP Router# configure terminal
ICX7650-48ZP Router(config)# stack unit 1
ICX7650-48ZP Router(config-unit-1)# multi-stack-port 1/3/1 and  2/3/1
ICX7650-48ZP Router(config-unit-1)# end


ICX7650-48ZP Router(config-unit-1)#T=20h20m35.3: Election, was active, no change, ID=1, pri=128, 2U(1-2),
A=u1, nbr#=1 1, reason: u1: stk-po-chg, ,

SYSLOG: <14> Sep  7 19:09:10 Stack: Stack unit 1 has been elected as ACTIVE unit of the stack syste

SYSLOG: <14> Sep  7 19:09:12 System: Interface ethernet 1/3/2, state down
```

```
SYSLOG: <14> Sep  7 19:09:12 System: Interface ethernet 2/3/2, state down

ICX7650-48ZP Router#
SYSLOG: <14> Sep  7 19:09:12 Security: running-config was potentially changed by operator from console

ICX7650-48ZP Router#
ICX7650-48ZP Router#
SYSLOG: <14> Sep  7 19:09:12 System: Interface ethernet 2/3/2, state up

SYSLOG: <14> Sep  7 19:09:13 System: Interface ethernet 1/3/2, state up

ICX7650-48ZP Router#
ICX7650-48ZP Router#
ICX7650-48ZP Router# show stack
T=20h19m52.8: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7650-48ZP  active  609c.9f52.2cd5 128 local   Ready
2  S ICX7650-48F   standby 609c.9f52.4643 128 remote  Ready

    active       standby
     +---+        +---+
 =3/3| 1 |3/1--3/1| 2 |3/3=
  |   +---+        +---+   |
  |                        |
  |------------------------|
Will assign standby in 54 sec due to all ready

Standby u2 - protocols ready, can failover
Role history: N: standalone, A: active, S: standby, M: member
U1: M->S->A, U2: A->S

Current stack management MAC is 609c.9f52.2cd5
Stack ports are operating at 40G.

ICX7650-48ZP Router# show running-config | inc stack
stack unit 1
  stack-trunk 1/3/3 to 1/3/4
  stack-port 1/3/1 1/3/3
stack unit 2
  stack-trunk 2/3/3 to 2/3/4
  stack-port 2/3/1 2/3/3
stack enable
stack rconsole-off
stack mac 609c.9f52.2cd5
rear-module stack-40g


ICX7650-48ZP Router# configure terminal
ICX7650-48ZP Router(config)# stack unit 1
ICX7650-48ZP Router(config-unit-1)# multi-stack-port 1/3/3 and 2/3/3

ICX7650-48ZP Router(config-unit-1)#enT=20h21m28.8: Election, was active, no change, ID=1, pri=128, 2U(1-2),
A=u1, nbr#=1 1, reason: u1: stk-po-chg, ,

SYSLOG: <14> Sep  7 19:10:04 Stack: Stack unit 1 has been elected as ACTIVE unit of the stack system
d
ICX7650-48ZP Router#
SYSLOG: <14> Sep  7 19:10:04 Security: running-config was potentially changed by operator from console

ICX7650-48ZP Router#
ICX7650-48ZP Router#
ICX7650-48ZP Router# write memory
Automatic copy to member units:  2

SYSLOG: <14> Sep  7 19:10:05 System: Interface ethernet 1/3/4, state down
SYSLOG: <14> Sep  7 19:10:05 System: Interface ethernet 2/3/4, state down

SYSLOG: <14> Sep  7 19:10:06 Security: startup-config was changed by operator from console
Flash Memory Write (8192 bytes per dot)
.
Write startup-config done.
Copy Done.
```

```
ICX7650-48ZP Router#
SYSLOG: <14> Sep  7 19:10:06 System: Interface ethernet 2/3/4, state up


SYSLOG: <14> Sep  7 19:10:06 System: Interface ethernet 1/3/4, state up

ICX7650-48ZP Router# show stack

T=20h20m45.4: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7650-48ZP  active  609c.9f52.2cd5 128 local   Ready
2  S ICX7650-48F   standby 609c.9f52.4643 128 remote  Ready

    active       standby
     +---+        +---+
 -3/3| 1 |3/1--3/1| 2 |3/3-
  |   +---+        +---+   |
  |                        |
  |------------------------|
Will assign standby in 55 sec due to all ready

Standby u2 - protocols ready, can failover
Role history: N: standalone, A: active, S: standby, M: member
U1: M->S->A, U2: A->S

Current stack management MAC is 609c.9f52.2cd5
Stack ports are operating at 40G.
```

Resolving Module 2 mismatches in an ICX 7650 stack

When an ICX 7650 stack unit rejoins a stack with a different module type installed as Module 2, a configuration mismatch occurs, and the active controller places the stack unit in non-operational mode.

Follow these steps to correct a module configuration mismatch in an ICX 7650 stack.

1. Enter the **show stack** command to confirm that a unit has become non-operational due to a configuration mismatch.

```
ICX7650-48P Router# show stack
T=1d4h22m36.1: alone: standalone, D: dynamic cfg, S: static
ID  Type         Role    Mac Address    Pri State  Comment
1 S ICX7650-48P  active  609c.9f52.6353 128 local  Ready
2 S ICX7650-48P  standby 609c.9f52.5a9b   0 remote Ready
3 S ICX7650-48ZP member  609c.9f52.32e3   0 remote NON-OP: config mismatch  <-- Unit 3 non-
operational due to mismatch
4 S ICX7650-48ZP member  609c.9f52.2743   0 remote Ready
    active                               standby
    +---+        +---+        +---+        +---+
-3/1| 1 |3/2--3/2| 4 |3/1--3/1| 3 |3/2--3/2| 2 |3/1-
|   +---+        +---+        +---+        +---+   |
|                                                   |
|---------------------------------------------------|
Standby u2 - protocols ready, can failover
Current stack management MAC is 609c.9f52.6353
Stack ports are operating at 100G.
```

   The example shows a configuration mismatch on stack unit 3.

   NOTE
   You can use the **show module** command to diagnose the mismatch.

2. Use one of the following options to resolve an identified configuration mismatch:
   - Option 1: In global configuration mode, enter the **no stack unit** command followed by the stack number of the offending device to remove the unit from the stack and allow it to rejoin.

     ```
     ICX7650-48P Router# configure terminal
     ICX7650-48P Router(config)# no stack unit 3
     ICX7650-48P Router(config)#T=1d4h28m30.3: Election, was active, no change, ID=1, pri=128,
     4U(1-4),
     A=u1, nbr#=3 3, reason: u2: unit-removal, ,
     Detect stack member 3 POE capable
     All entries are cleared on unit 1 for unit 3
     T:1d4h27m36.1: Done hot swap: active controller u1 sets u3 to Ready.
     ```

     The example removes stack unit 3 from the stack and shows the unit rejoining the stack with the correct configuration.
   - Option 2: In stack unit configuration mode for the non-operational unit, enter the **no module 2** command to remove the incorrect module configuration, which allows the correct module information to be learned.

     ```
     ICX7650-48P Router# configure terminal
     ICX7650-48P Router(config)# stack unit 3
     ICX7650-48P Router(config-unit-3)# no module 2
     ```

3. (Optional) Enter the **show module** command to verify that the new configuration for Module 2 has been learned.

```
ICX7650-48P Router(config-unit-3)# show module
      Module                                    Status Ports  Starting MAC
U1:M1 ICX7650-48P POE 48-port Management Module   OK     48   609c.9f52.6353
U1:M2 ICX7600-2X40GQ 2-port 80G Module            OK      2   609c.9f52.6384
U1:M3 ICX7650-2X100G 2-port 200G Module           OK      2   609c.9f52.6388
U2:M1 ICX7650-48P POE 48-port Management Module   OK     48   609c.9f52.5a9b
U2:M2 ICX7600-2X40GQ 2-port 80G Module            OK      2   609c.9f52.5acc
U2:M3 ICX7650-2X100G 2-port 200G Module           OK      2   609c.9f52.5ad0
U3:M1 ICX7650-48ZP POE 48-port Management Module  OK     48   609c.9f52.32e3
U3:M2 ICX7600-2X40GQ 2-port 80G Module            OK      2   609c.9f52.3314
U3:M3 ICX7650-2X100G 2-port 200G Module           OK      2   609c.9f52.3318
U4:M1 ICX7650-48ZP POE 48-port Management Module  OK     48   609c.9f52.2743
U4:M2 ICX7600-2X40GQ 2-port 80G Module            OK      2   609c.9f52.2774
U4:M3 ICX7650-2X100G 2-port 200G Module           OK      2   609c.9f52.2778
```

The example displays the updated configuration of Module 2 in stack unit 3 as a 2-port 80-Gbps module.

4. (Optional) Enter the **show stack** command to confirm that the stack unit has returned to operation.

```
ICX7650-48P Router(config-unit-3)# show stack
T=1d4h54m37.4: alone: standalone, D: dynamic cfg, S: static
ID Type          Role    Mac Address    Pri State  Comment
1 S ICX7650-48P  active  609c.9f52.6353 128 local  Ready
2 S ICX7650-48P  standby 609c.9f52.5a9b   0 remote Ready
3 S ICX7650-48ZP member  609c.9f52.32e3   0 remote Ready
4 S ICX7650-48ZP member  609c.9f52.2743   0 remote Ready
    active                                standby
    +---+        +---+        +---+        +---+
-3/1| 1 |3/2--3/2| 4 |3/1--3/1| 3 |3/2--3/2| 2 |3/1-
|   +---+        +---+        +---+        +---+   |
|                                                   |
|---------------------------------------------------|
Will assign standby in 49 sec due to all ready
Standby u2 - protocols ready, can failover
Current stack management MAC is 609c.9f52.6353
Stack ports are operating at 100G.
```

NOTE

Correcting a Module 2 mismatch in a standalone unit involves more steps. You must remove the original module from the configuration, enter the correct configuration for the module, save the configuration with the **write memory** command, install the new module, and reload the device.

Displaying information for an ICX 7650 stack

1. Enter the **show stack** command in privileged EXEC mode to display basic information on a stack.

```
ICX7650-48P Router# show stack
T=2d4h16m5.9: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7650-48P   active  609c.9f52.56f9 128 local   Ready
2  S ICX7650-48F   standby 609c.9f52.4b1b 128 remote  Ready

    active       standby
     +---+        +---+
 -3/2| 1 |3/1--3/1| 2 |3/2-
  |   +---+        +---+   |
  |                        |
  |------------------------|
Standby u2 - protocols ready, can failover or manually switch over
Role history: N: standalone, A: active, S: standby, M: member
U1: M->S->A
Current stack management MAC is 609c.9f52.2cd5
Stack ports are operating at 100G.
```

The previous example displays information for a two-unit stack with no trunk. A single link between ports 1/3/1 and 2/3/1 and between 2/3/2 and 1/3/2 create a ring.

```
ICX7650-48ZP Router# show stack
T=1d1h34m59.5: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7650-48ZP  active  609c.9f52.2cd5 128 local   Ready
2  S ICX7650-48F   standby 609c.9f52.4643 128 remote  Ready

    active       standby
     +---+        +---+
 =3/3| 1 |3/1==3/1| 2 |3/3=
  |   +---+        +---+   |
  |                        |
  |------------------------|
Standby u2 - protocols ready, can failover or manually switch over
Current stack management MAC is 609c.9f52.2cd5
Stack ports are operating at 40G.
```

The previous example shows a two-unit stack with 40-Gbps trunks. The stack connections form a ring.

```
ICX7650-48P Router# show stack
T=4h24m40.8: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7650-48P   standby 609c.9f52.5a9b 128 remote  Ready
2  S ICX7650-48ZP  member  609c.9f52.32e3   0 remote  Ready
3  S ICX7650-48ZP  member  609c.9f52.2743   0 remote  Ready
4  S ICX7650-48P   active  609c.9f52.6353 128 local   Ready

    active                                  standby
     +---+        +---+        +---+        +---+
 -3/1| 4 |3/2--3/2| 3 |3/1--3/1| 2 |3/2--3/1| 1 |3/2-
  |   +---+        +---+        +---+        +---+   |
  |                                                   |
  |---------------------------------------------------|
Standby u1 - protocols ready, can failover or manually switch over
Role history: N: standalone, A: active, S: standby, M: member
U2: M->S->M

Current stack management MAC is 609c.9f52.5a9b
Stack ports are operating at 100G.
```

The previous example shows a four-unit stack with 100-Gbps connections that form a ring. Only ports x/3/1 and x/3/2 are used to form connections.

2. Enter the **show stack detail** command for additional information on the stack.

```
ICX7650-48ZP Router# show stack detail
T=1d1h35m6.2: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7650-48ZP  active  609c.9f52.2cd5 128 local   Ready
2  S ICX7650-48F   standby 609c.9f52.4643 128 remote  Ready

    active       standby
     +---+        +---+
 =3/3| 1 |3/1==3/1| 2 |3/3=
  |   +---+        +---+   |
  |                        |
  |------------------------|
Standby u2 - protocols ready, can failover or manually switch over
Current stack management MAC is 609c.9f52.2cd5
Stack ports are operating at 40G.

Image-Auto-Copy is Enabled.

      Stack Port Status                        Neighbors
Unit# Stack-port1         Stack-port2          Stack-port1         Stack-port2
1     up (1/3/1-1/3/2)    up (1/3/3-1/3/4)     U2 (2/3/1-2/3/2)    U2 (2/3/3-2/3/4)
2     up (2/3/1-2/3/2)    up (2/3/3-2/3/4)     U1 (1/3/1-1/3/2)    U1 (1/3/3-1/3/4)

Unit# System uptime
1     1 day(s) 1 hour(s) 35 minute(s) 6 second(s)
2     1 day(s) 1 hour(s) 35 minute(s) 6 second(s)
The system started at 22:45:37 GMT+00 Thu Sep 07 2017
```

The example provides additional detail on the 40-Gbps stack. Additional information shows that ports 1/3/1 and 1/3/2 to 2/3/1 and 2/3/2 form one trunk. Ports 2/3/3 and 2/3/4 to 1/3/3 and 1/3/4 form the second trunk.

3. Enter the **show stack connection** command for a summary of stack topology and links.

```
ICX7650-48ZP Router# show stack connection
Probing the topology. Please wait ...
ICX7650-48ZP Router#
    active       standby
     +---+        +---+
 =3/3| 1 |3/1==3/1| 2 |3/3=
  |   +---+        +---+   |
  |                        |
  |------------------------|

trunk probe results: 2 links
Link 1: u1 -- u2, num=2
  1: 1/3/1 (T0) <---> 2/3/1 (T0)
  2: 1/3/2 (T0) <---> 2/3/2 (T0)
Link 2: u1 -- u2, num=2
  1: 1/3/3 (T1) <---> 2/3/3 (T1)
  2: 1/3/4 (T1) <---> 2/3/4 (T1)
CPU to CPU packets are fine between 2 units.
```

The example provides a summary of connections for the 40-Gbps stack in the previous example.

4. Enter the **show running-config** command to display information on the active configuration of the stack.

```
ICX7650-48P Router# show running-config
Current configuration:
!
ver 08.0.70q20T228
!
stack unit 1
module 1 icx7650-48p-port-management-module
module 2 icx7600-qsfp-2port-80g-module
module 3 icx7650-qsfp-4port-160g-module
priority 128
stack mac 609c.9f52.5eb9
!!
rear-module stack-40g
!
!
hitless-failover enable
!!
end
```

The example shows a standalone unit configured for operation in 40-Gbps stacking mode.

```
ICX7650-48F Router# show running-config
Current configuration:
!
ver 08.0.70q23T233
!
stack unit 1
  module 1 icx7650-48zp-port-management-module
  module 2 icx7600-qsfp-2port-80g-module
  module 3 icx7650-qsfp-4port-160g-module
  priority 128
  stack-trunk 1/3/1 to 1/3/2
  stack-port 1/3/1
stack unit 2
  module 1 icx7650-48f-sf-port-management-module
  module 2 icx7600-qsfp-2port-80g-module
  module 3 icx7650-qsfp-4port-160g-module
  priority 128
  stack-trunk 2/3/1 to 2/3/2
  stack-port 2/3/1
stack enable
stack rconsole-off
stack mac 609c.9f52.4642
!
!
global-stp
!
!
vlan 1 name DEFAULT-VLAN by port
spanning-tree
!
vlan 400 by port
tagged ethe 1/2/1 to 1/2/2 ethe 2/2/1 to 2/2/2
 router-interface ve 10
multicast active
!
!
system-max igmp-snoop-mcache 8192
system-max igmp-snoop-group-addr 8192
!
!
rear-module stack-40g
!
jumbo
enable acl-per-port-per-vlan
ip route 0.0.0.0/0 10.21.242.1
!
!
hitless-failover enable
```

```
!
!
interface loopback 1
ip address 100.100.100.100 255.255.255.128
!
interface management 1
 ip address 10.21.242.23 255.255.255.128
!
interface ethernet 1/2/1
optical-monitor 11
!
interface ethernet 1/2/2
optical-monitor 11
!
interface ve 10
ip address 192.85.1.1 255.255.255.128
!
!
alias stat40=sh stat br e 1/2/1 e 1/2/2 e 2/2/1 e 2/2/2
alias statst=sh stat stack-port
end
ICX7650-48F Router#
```

The example shows a two-unit ICX 7650 stack operating in 40-Gbps stacking mode with one of two possible stacking trunks configured on each unit.

ICX 7750 stack configuration overview

The following table provides an overview of ICX 7750 stacking capabilities.

TABLE 15 ICX 7750 traditional stacking capability

Stacking capability	ICX 7750	Additional information
Topologies supported	Ring and linear	Refer to ICX 7750 stacking topologies on page 124.
Maximum stack size	12	Traditional stacking only.
Maximum stacking distance	10 kilometers	Refer to FastIron stacking distances and optics by device on page 20 and Installing the ICX 7750 in a remote stack on page 128 for more information.
ICX 7750 model combinations	Allowed	ICX 7750-48C, ICX 7750-48F, and ICX 7750-26Q models can be combined in the same stack.
Stacking ports	12 total ports available simultaneously: Six 40-Gbps ports, Module 2: 1/2/1 to 1/2/6 (Front) and Six 40-Gbps ports, Module 3: 1/3/1 to 1/3/6 (Rear)	Refer to "Default ports" in this table for information on using Module 2 (right front) and Module 3 (rear) simultaneously for stacking.
Default ports	Ports 1/2/1 and 1/2/4	Default ports can be changed to any of the following combinations: • 1/3/1 and 1/3/4 • 1/2/1 and 1/3/1 • 1/2/5 and 1/3/5 • 1/2/5 and 1/2/6 • 1/3/5 and 1/3/6

TABLE 15 ICX 7750 traditional stacking capability (continued)

Stacking capability	ICX 7750	Additional information
Reconfigurable ports	Use the **default-ports** and **stack-port** commands to reconfigure ports.	Refer to "Default ports" in this table.
Trunking	Up to two stack trunks	**NOTE** Refer to ICX 7750 trunk formation during secure-setup on page 131 or Creating an ICX 7750 stacking trunk in a production environment on page 135. **NOTE** To set up long-distance stacking trunks on 48-port units, refer to Installing the ICX 7750 in a remote stack on page 128. Possible 6-port trunks: 1/2/1 through 1/2/6 1/3/1 through 1/3/6 Possible 3-port trunks: 1/2/1 through 1/2/3 1/2/4 through 1/2/6 1/3/1 through 1/3/3 1/3/4 through 1/3/6 Possible 2-port trunks: 1/2/1 through 1/2/2 1/2/4 through 1/2/5 1/3/1 through 1/3/2 1/3/4 through 1/3/5
Hitless switchover and hitless failover	Supported	Refer to Hitless stacking on page 139.
License requirements	No license required for **stack-port** configuration. No license required for Premium features.	For more information on ICX 7750 license options, refer to the *Ruckus FastIron Software Licensing Guide*.
Configuration options	Manual and automatic, including Secure-setup	Refer to Traditional stack construction methods on page 25.
Access methods	TFTP, SCP	Software images, boot images, and signatures can be downloaded to a stack using TFTP and SCP applications. Refer to the *Ruckus FastIron Software Upgrade Guide* for more information.
Traditional stacking CLI	All traditional stacking CLI is supported.	Refer to Traditional stack CLI commands on page 162 for more information.

ICX 7750 stacking topologies

The following figures show available ICX 7750 stacking ports on the front and rear panel. Available front panel stacking ports are 1/2/1 through 1/2/6. Default stacking ports are 1/2/1 and 1/2/4.

FIGURE 28 ICX 7750 default stacking ports on front panel

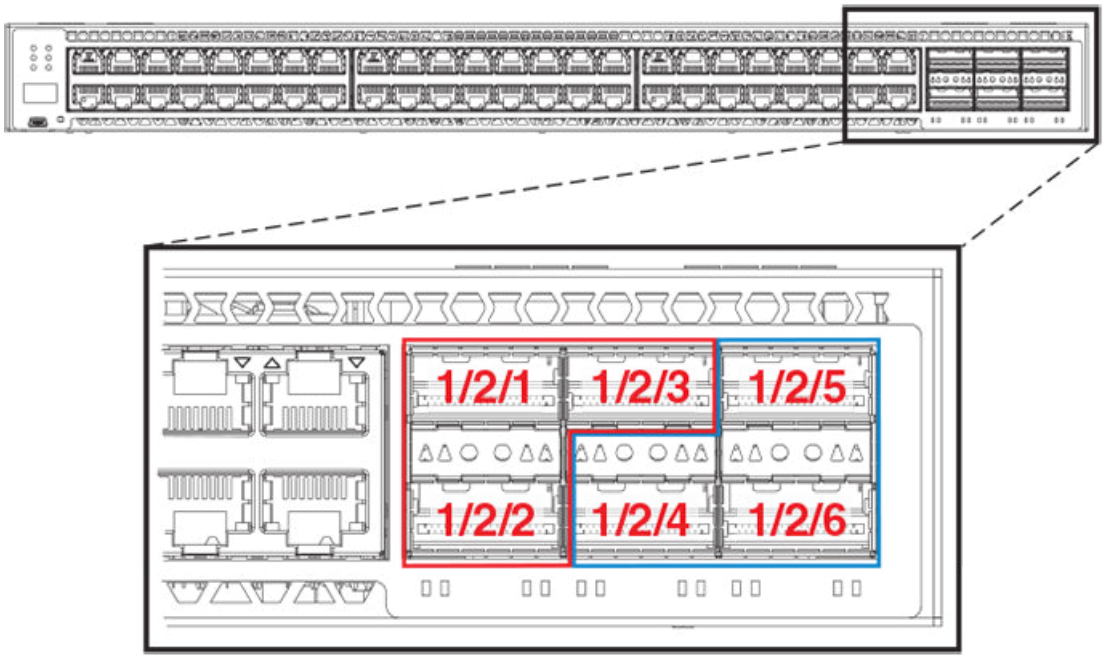
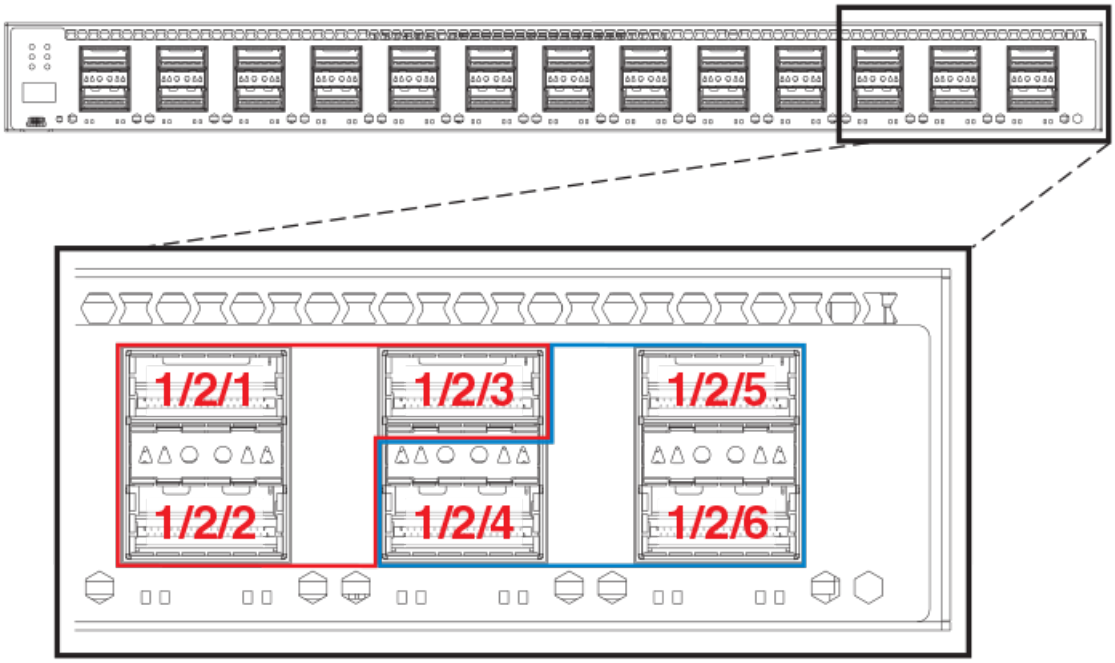
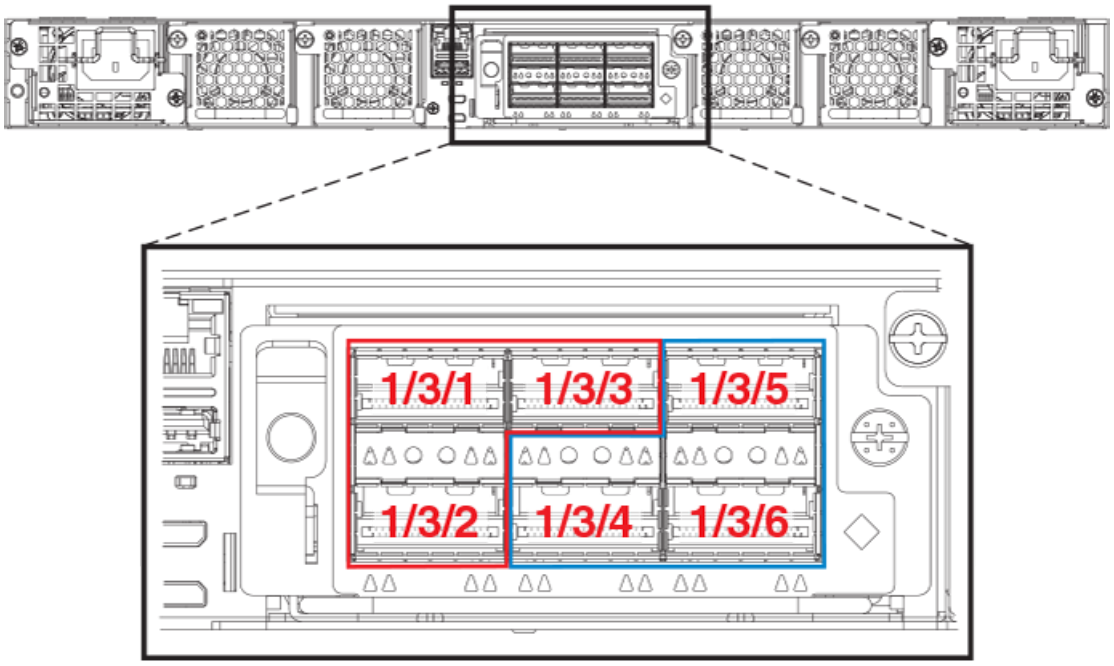


FIGURE 29 ICX 7750-26Q default front panel stacking ports



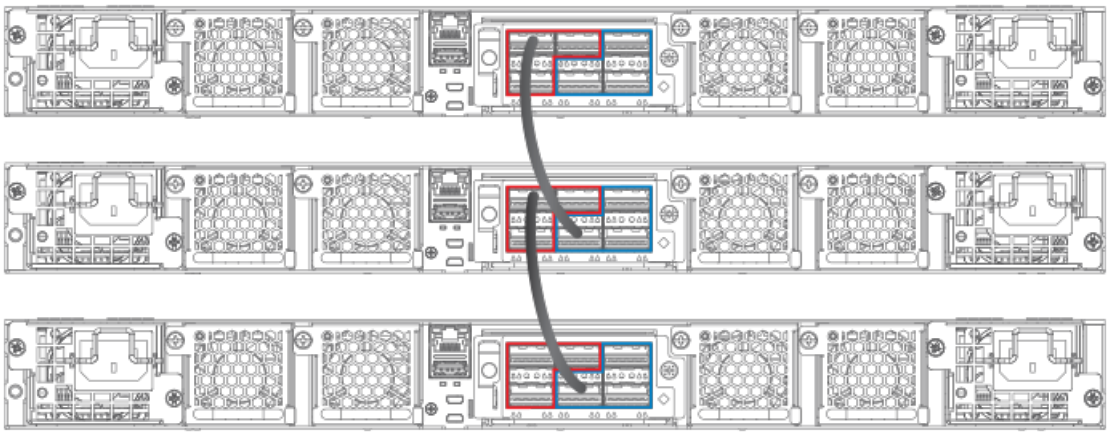
Available stacking ports on the ICX 7750 rear panel are ports 1/3/1 through 1/3/6. Default ports can be changed from front panel ports 1/2/1 and 1/2/4 to rear panel ports 1/3/1 and 1/3/4.

FIGURE 30 ICX 7750 default stacking ports on rear panel



The following figure shows an ICX 7750 linear stack.

FIGURE 31 ICX 7750 linear stack from rear panel



The following figures show ICX 7750 ring stacks from the front and rear panels. Default stacking ports are located on the front panel, but they can be changed to the rear panel using the **default-ports** command.

FIGURE 32 ICX 7750 ring stack from front panel

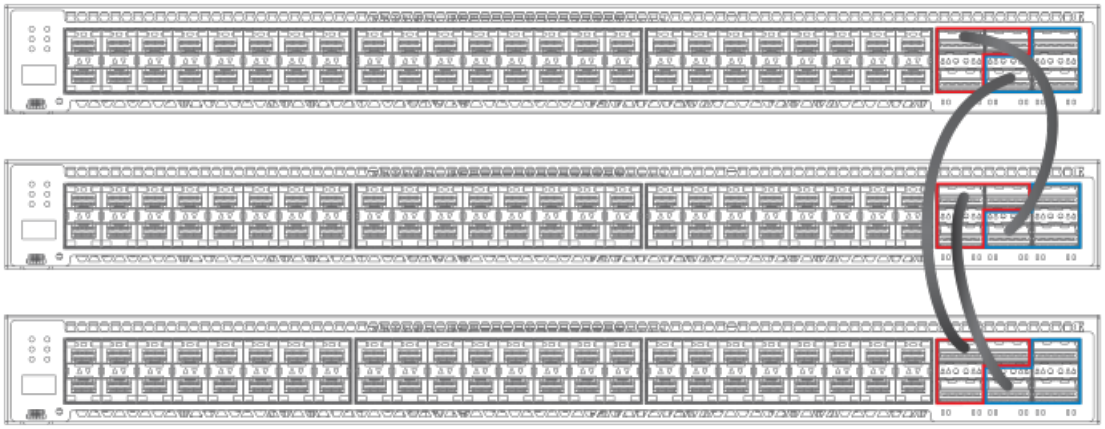


FIGURE 33 ICX 7750 ring stack from rear panel

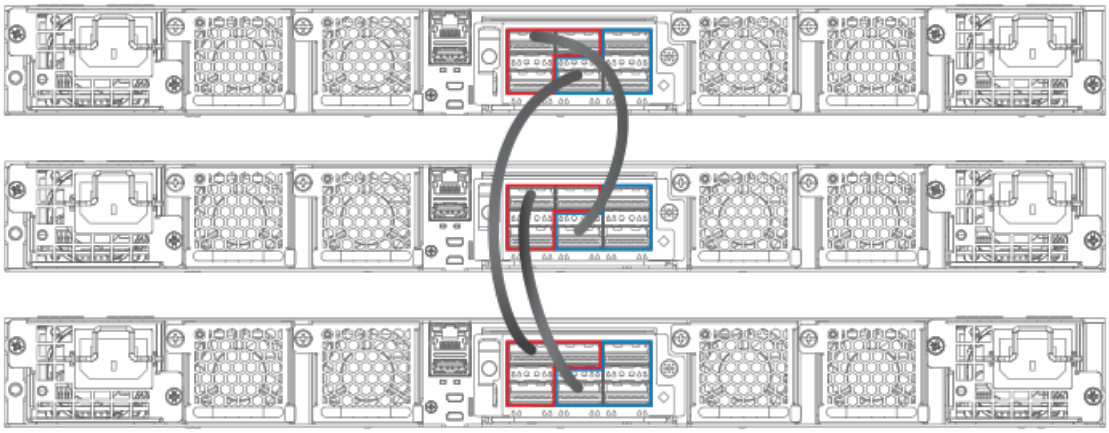
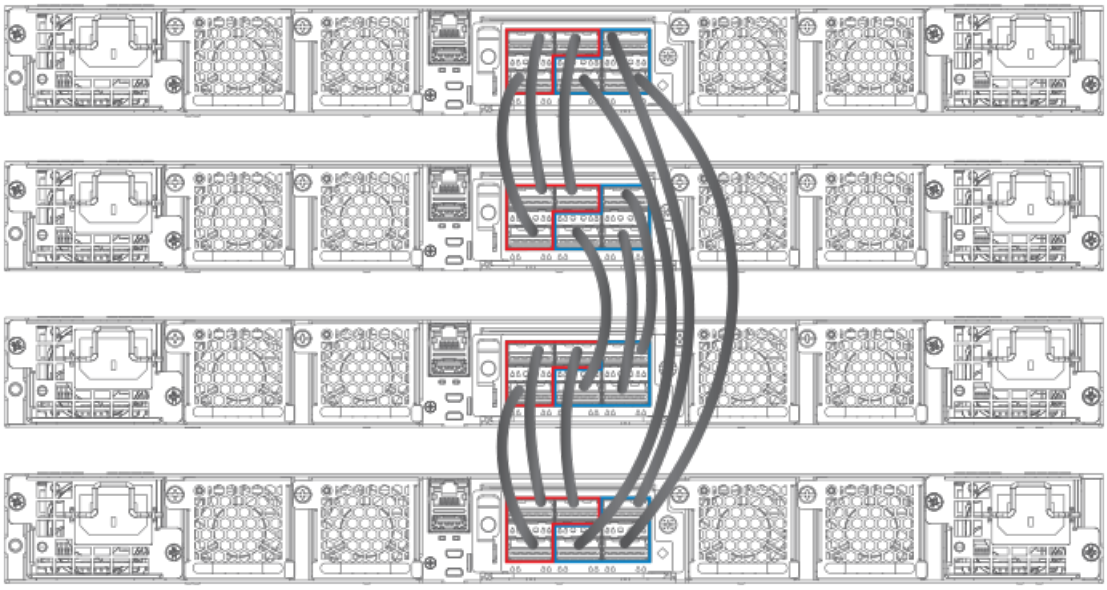


FIGURE 34 ICX 7750 fully populated ring stack from rear panel with three-port stacking trunks



Installing the ICX 7750 in a remote stack

The ICX 7750-26Q, ICX 7750-48C, and ICX 7750-48F can support stacking distances of 10 kilometers.

To achieve maximum stacking distance, these ICX 7750 models must use Ruckus LR4 fiber optics. LR4 optics require high-power operating mode and an advanced thermal profile to control the fan cooling system. Module 2 and module 3 ports support LR4 optics.

NOTE
The ICX 7750-26Q also supports LR4 optics on the front panel (module 1).

Refer to FastIron stacking distances and optics by device on page 20 and to Long-distance stacking ports on page 21 for information.

Port locations for potential stacking ports are shown in the following figures. Although different models are depicted, the port locations are the same on all ICX 7750 units.

FIGURE 35 Module 2 front panel stacking ports (ICX 7750-26Q)

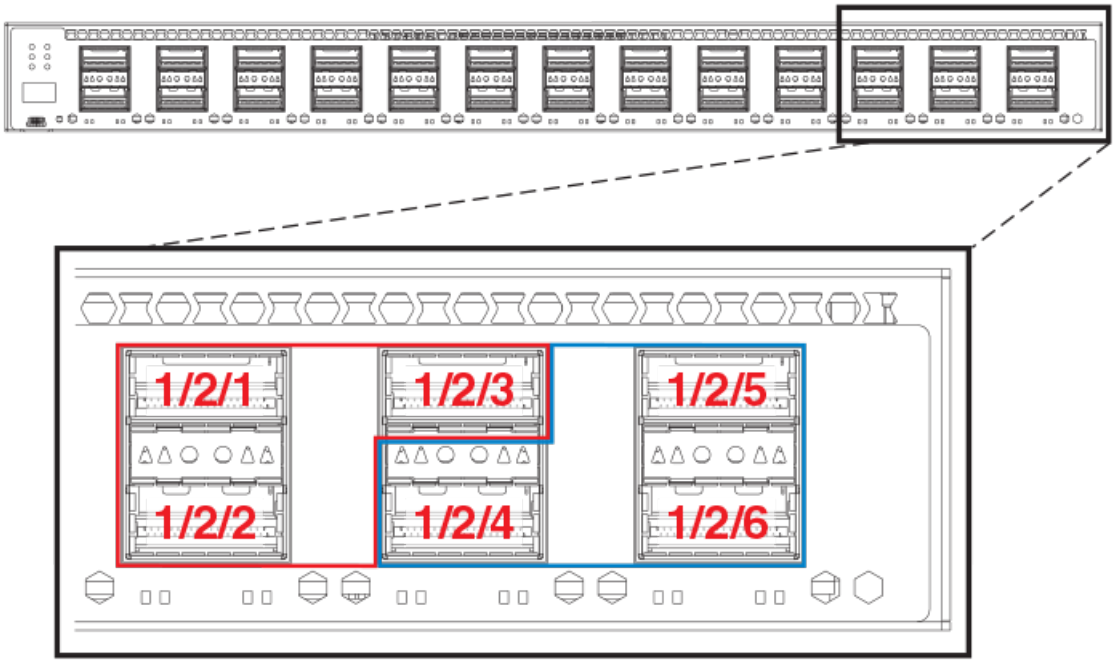


FIGURE 36 Module 2 front panel stacking ports (ICX 7750-48C)

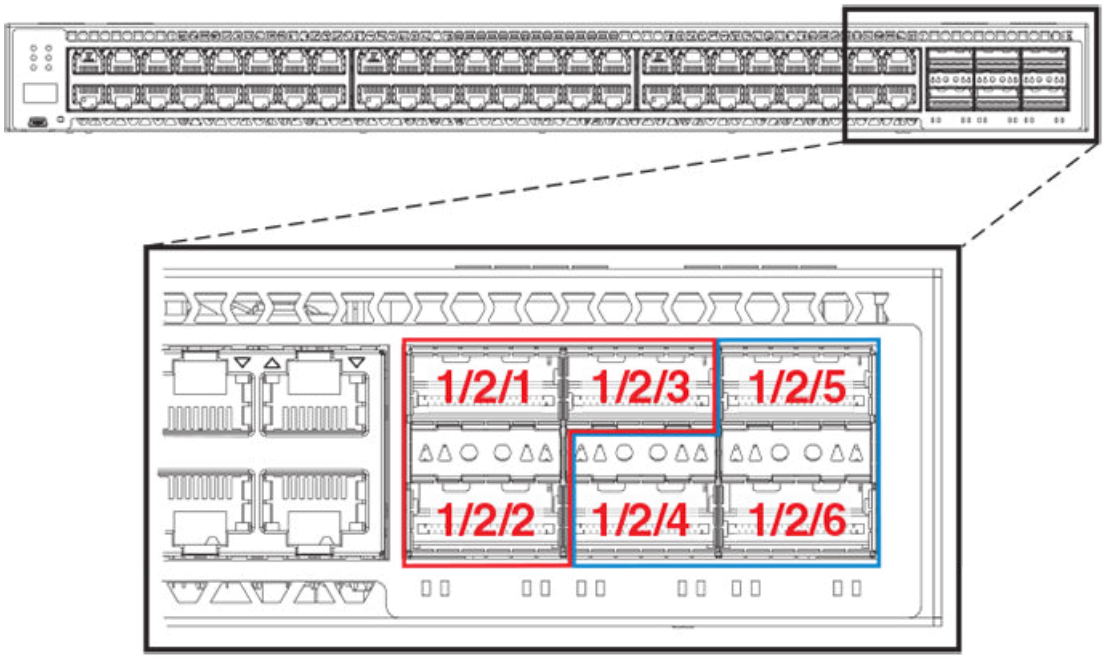
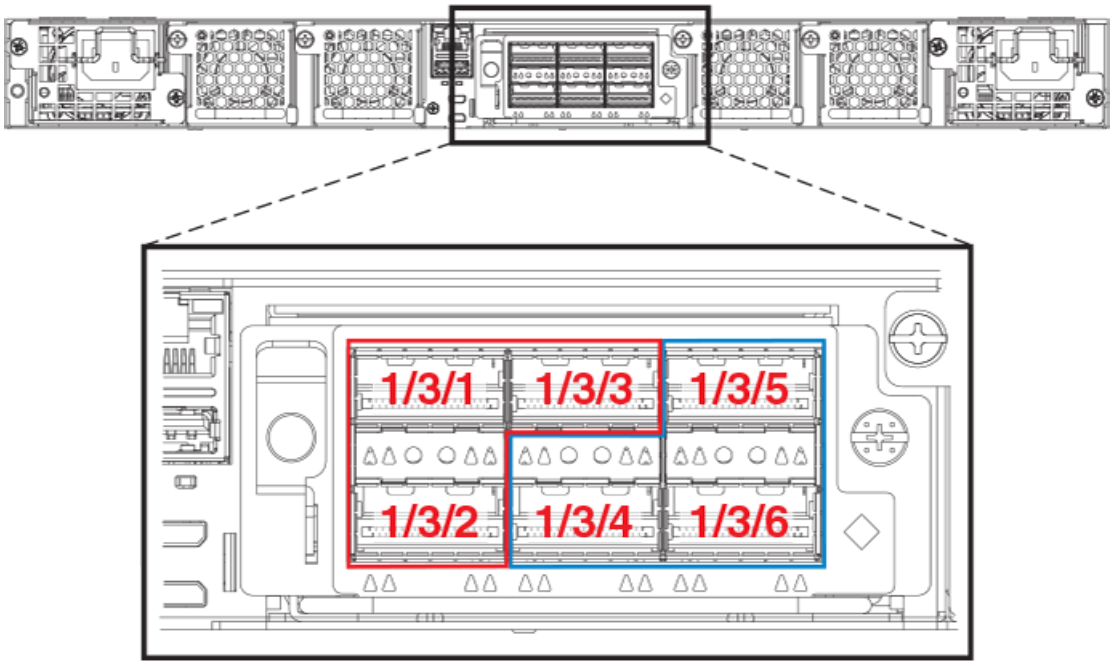


FIGURE 37 Module 3 rear panel stacking ports (ICX 7750-48C)



Refer to FastIron stacking distances and optics by device on page 20 for information on Ruckus cable options and distances supported by different FastIron models.

ICX 7750 stacking configuration notes

- If an ICX 7750 has a 40-Gbps port configured for break-out into sub-ports, any attempt to enable the unit for stacking will fail. Remove the break-out configuration before enabling stacking on the unit. Refer to the *Ruckus FastIron Management Configuration Guide* for more information on break-out cable configuration.
- When adding a new unit on a linear stack, make sure that the last unit of the existing stack has both stack ports configured.
- Unused stacking ports can be used as data ports. For example, you can elect to use only one default port as a stacking port and use the other default port as a data port. Furthermore, when an ICX 7750 stacking module is not configured for stacking, its stacking ports can be used as data ports.
- Only ports recognized as default ports can be used as stacking ports. Before a unit can use non-default stacking ports, the **default-ports** command must be configured on the local console for the unit so the unit can be discovered by the secure-setup utility used to form a stack.
- Default ports cannot be changed on a live stack. The following example shows the error message displayed if you attempt to do so.

```
ICX7750-48F Router# configure terminal
ICX7750-48F Router(config)# stack unit 8
ICX7750-48F Router(config-unit-8)# default-ports 8/3/1 8/3/4
New default-ports 8/3/1 8/3/4 result in removing both old stack ports. Abort
```

- When module 3 on the rear of ICX 7750 devices is used for stacking, before performing secure-setup, change the default ports on the respective units as shown in the following example. Otherwise, the secure-setup utility will not be able to discover the stacking ports in module 3, and invalid stack trunk messages will be displayed.

```
ICX7750-48F Router# configure terminal
ICX7750-48F Router(config)# stack unit 1
ICX7750-48F Router(config-unit-1)# default-ports 1/3/1 1/3/4
```

  NOTE
  For more information on invalid stacking trunk error and network loops, refer to Invalid stacking trunk errors on page 34.

- To configure a stack trunk manually on a stack unit, use the **stack-trunk** command. However, in a live production environment, use the **multi-stack-trunk** command as described in Creating an ICX 7750 stacking trunk in a production environment on page 135.
- Only ports that are in sequential order can be configured as a stacking trunk.
- A default port, either port 1/2/1 or 1/2/4 in module 2 or port 1/3/1 or 1/3/4 in module 3, is always the first sequential port in a trunk.
- A trunk may contain two or three ports. For example, a two-port trunk on slot 3 (module 3) may contain ports 1/3/1 and 1/3/2, and a three-port trunk may contain ports 1/3/1, 1/3/2, and 1/3/3. A second trunk on slot 3 may contain ports 1/3/4 and 1/3/5, or it may contain all three ports, 1/3/4, 1/3/5, and 1/3/6.

ICX 7750 secure-setup example

You can use the **stack secure-setup** command to configure a stack with a special automatic utility. Other options for configuring a stack are also available. For more information on stack construction and secure-setup, refer to Traditional stack construction methods on page 25. A full example of ICX 7750 secure-setup is presented in Using secure-setup to configure a traditional stack in a ring topology on page 27.

The following topics cover specific ICX 7750 configuration issues, such as trunk configuration.

ICX 7750 trunk formation during secure-setup

In FastIron release 08.0.20 and later releases, stack trunks are formed automatically in homogeneous stacks. During ICX 7750 secure-setup, the system prompts you to enter the desired number of links in a trunk, after it displays the available options, from 1 to 3, when all three stack trunk ports are available.

In the following excerpt from **stack secure-setup** output, only two stack trunk ports are available, so options are shown as 1-2. To form a two-port trunk, you would enter "2" at the prompt. To use a single stacking port without forming a stack trunk, you would enter "1" at the prompt.

```
Confirm Stacking Links...

UPSTREAM Unit: Id 12 at 11 hop(s) ICX7750-48XGC cc4e.2439.1280

Enter the desired links(1-2)[1]: 2
```

In the next excerpt, 3 ports are available to form a trunk. You may elect to enter "2" for a two-port trunk or "3" for a full three-port trunk as shown.

```
Confirm Stacking Links...

UPSTREAM Unit: Id 7 at 6 hop(s) ICX7750-20QXG cc4e.2439.3880

Enter the desired links(1-3)[1]: 3
```

It is also possible to modify trunk configuration when you add stack trunks. In the following excerpt, an existing trunk configuration is modified during secure-setup. Available options are shown as 2-3 [2] where a two-port trunk is currently configured. In the example, "3" is entered to modify the configuration and create a three-port trunk.

```
Confirm Stacking Links...

UPSTREAM Unit: Id 5 at 4 hop(s) ICX7750-20QXG cc4e.2439.2a80

Enter the desired links(2-3)[2]: 3

Selected Topology:

Active  Id      Type          Mac Address

        1    ICX7750-48XGF   cc4e.246d.9e00

Selected UPSTREAM units
```

The following output shows secure-setup for a 12-unit ICX 7750 ring that includes some two-port and some three-port stack trunk designations.

```
ICX7750-48F Router# stack secure-setup
ICX7750-48F Router# Discovering the stack topology...

Current Discovered Topology - RING

Available UPSTREAM units
Hop(s)  Id      Type          Mac Address
 1       new  ICX7750-48XGF   cc4e.246d.8d80
 2       new  ICX7750-48XGF   cc4e.246d.9b00
 3       new  ICX7750-48XGF   cc4e.246d.9c80
 4       new  ICX7750-20QXG   cc4e.2439.2a80
 5       new  ICX7750-20QXG   cc4e.2439.3700
 6       new  ICX7750-20QXG   cc4e.2439.3880
 7       new  ICX7750-20QXG   cc4e.2439.2d00
 8       new  ICX7750-48XGC   cc4e.2439.1a00
 9       new  ICX7750-48XGC   cc4e.2439.1680
10       new  ICX7750-48XGC   cc4e.2439.1d80
11       new  ICX7750-48XGC   cc4e.2439.1280

Available DOWNSTREAM units
Hop(s)  Id      Type          Mac Address
 1       new  ICX7750-48XGC   cc4e.2439.1280
 2       new  ICX7750-48XGC   cc4e.2439.1d80
 3       new  ICX7750-48XGC   cc4e.2439.1680
 4       new  ICX7750-48XGC   cc4e.2439.1a00
 5       new  ICX7750-20QXG   cc4e.2439.2d00
 6       new  ICX7750-20QXG   cc4e.2439.3880
 7       new  ICX7750-20QXG   cc4e.2439.3700
 8       new  ICX7750-20QXG   cc4e.2439.2a80
 9       new  ICX7750-48XGF   cc4e.246d.9c80
10       new  ICX7750-48XGF   cc4e.246d.9b00
11       new  ICX7750-48XGF   cc4e.246d.8d80

Do you accept the topology (RING) (y/n)?: y


Confirm Stacking Links...

UPSTREAM Unit: Id new at 4 hop(s) ICX7750-20QXG cc4e.2439.2a80

Enter the desired links(1-3)[1]: 3

UPSTREAM Unit: Id new at 6 hop(s) ICX7750-20QXG cc4e.2439.3880

Enter the desired links(1-3)[1]: 3

UPSTREAM Unit: Id new at 10 hop(s) ICX7750-48XGC cc4e.2439.1d80
```

```
Enter the desired links(1-2)[1]: 2

UPSTREAM Unit: Id new at 11 hop(s) ICX7750-48XGC cc4e.2439.1280

Enter the desired links(1-2)[1]: 2


Selected Topology:
Active  Id      Type          Mac Address
        1    ICX7750-48XGF   cc4e.246d.9e00

Selected UPSTREAM units
Hop(s)  Id      Type        Mac Address
 1       2    ICX7750-48XGF   cc4e.246d.8d80
 2       3    ICX7750-48XGF   cc4e.246d.9b00
 3       4    ICX7750-48XGF   cc4e.246d.9c80
 4       5    ICX7750-20QXG   cc4e.2439.2a80
 5       6    ICX7750-20QXG   cc4e.2439.3700
 6       7    ICX7750-20QXG   cc4e.2439.3880
 7       8    ICX7750-20QXG   cc4e.2439.2d00
 8       9    ICX7750-48XGC   cc4e.2439.1a00
 9       10   ICX7750-48XGC   cc4e.2439.1680
10       11   ICX7750-48XGC   cc4e.2439.1d80
11       12   ICX7750-48XGC   cc4e.2439.1280

Selected DOWNSTREAM units
Hop(s)  Id      Type        Mac Address
 1       12   ICX7750-48XGC   cc4e.2439.1280
 2       11   ICX7750-48XGC   cc4e.2439.1d80
 3       10   ICX7750-48XGC   cc4e.2439.1680
 4       9    ICX7750-48XGC   cc4e.2439.1a00
 5       8    ICX7750-20QXG   cc4e.2439.2d00
 6       7    ICX7750-20QXG   cc4e.2439.3880
 7       6    ICX7750-20QXG   cc4e.2439.3700
 8       5    ICX7750-20QXG   cc4e.2439.2a80
 9       4    ICX7750-48XGF   cc4e.246d.9c80
10       3    ICX7750-48XGF   cc4e.246d.9b00
11       2    ICX7750-48XGF   cc4e.246d.8d80

Do you accept the unit id's (y/n)?: y
ICX7750-48F Router#T=18m45.7: Election, was alone --> active, ID=1, pri=128,
12U(1-12), A=u1, nbr#=11 11, reason: u6: SecureS, ,
T=18m49.7: Election, was active, no change, ID=1, pri=128, 12U(1-12), A=u1,
nbr#=11 11, reason: u1: stk-po-chg, ,
T=18m52.3: reset unit  2: u2 bo-id=1
T=18m52.3: reset unit  3: u3 bo-id=1
T=18m52.3: reset unit  5: u5 bo-id=1
T=18m52.3: reset unit  6: u6 bo-id=1
T=18m52.3: reset unit  7: u7 bo-id=1
T=18m52.3: reset unit  8: u8 bo-id=1
T=18m52.3: reset unit  9: u9 bo-id=1
T=18m52.3: reset unit 10: u10 bo-id=1
T=18m52.3: reset unit 11: u11 bo-id=1
T=18m52.3: reset unit 12: u12 bo-id=1
Reset extra units due to path: 4

Config changed due to add/del units. Do write mem if you want to keep it
T=18m55.3: Unit 1 loses all neighbors.
T=18m55.4: Active U1 deletes U2 and its config because it is learned.
T=18m55.6: Active U1 deletes U3 and its config because it is learned.
T=18m55.8: Active U1 deletes U4 and its config because it is learned.
T=18m55.9: Active U1 deletes U5 and its config because it is learned.
T=18m56.0: Active U1 deletes U6 and its config because it is learned.
T=18m56.1: Active U1 deletes U7 and its config because it is learned.
T=18m56.2: Active U1 deletes U8 and its config because it is learned.
T=18m56.3: Active U1 deletes U9 and its config because it is learned.
T=18m56.4: Active U1 deletes U10 and its config because it is learned.
T=18m56.6: Active U1 deletes U11 and its config because it is learned.
T=18m56.7: Active U1 deletes U12 and its config because it is learned.
ICX7750-48F Router# T=19m55.7: Election, was active, no change, ID=1, pri=128,
3U(1-3), A=u1, nbr#=2 0, reason: u3: port-dw, ,
```

```
T=19m55.8: Synchronize webauth files to u2
T=19m55.8: Synchronize webauth files to u3
T:19m57.1: Done hot swap: active controller u1 sets u2 to Ready.
T:19m57.1: Done hot swap: active controller u1 sets u3 to Ready.

Config changed due to add/del units. Do write mem if you want to keep it
Stack unit 2 Power supply 1 is up
Stack unit 2 Power supply 2 is down
Stack unit 3 Power supply 1 is up
Stack unit 3 Power supply 2 is down
T=20m2.4: Election, was active, no change, ID=1, pri=128, 3U(1-3), A=u1, nbr#=2 0,
reason: u1: port-up, ,
T=20m3.6: 1/2/4 goes down. delete direction 1, trigger election
T=20m7.3: Election, was active, no change, ID=1, pri=128, 12U(1-12), A=u1,
nbr#=11 11, reason: u12: port-up, ,
T=20m7.6: Synchronize webauth files to u10
T=20m7.6: Synchronize webauth files to u11
Detect stack unit 12 has different startup config flash, will synchronize it
T=20m7.6: Synchronize webauth files to u12
Detect stack unit 4 has different startup config flash, will synchronize it
T=20m7.6: Synchronize webauth files to u4
T=20m7.6: Synchronize webauth files to u5
T=20m7.6: Synchronize webauth files to u6
T=20m7.6: Synchronize webauth files to u7
T=20m7.7: Synchronize webauth files to u8
T=20m8.3: Synchronize webauth files to u9
T:20m8.8: Done hot swap: active controller u1 sets u10 to Ready.
T:20m9.0: Done hot swap: active controller u1 sets u11 to Ready.
T:20m9.3: Done hot swap: active controller u1 sets u12 to Ready.
T:20m9.9: Done hot swap: active controller u1 sets u4 to Ready.
T:20m10.2: Done hot swap: active controller u1 sets u5 to Ready.
T:20m10.5: Done hot swap: active controller u1 sets u6 to Ready.
T:20m10.9: Done hot swap: active controller u1 sets u7 to Ready.
T:20m11.4: Done hot swap: active controller u1 sets u8 to Ready.
Stack unit 12 Power supply 1 is up
Stack unit 12 Power supply 2 is down
Stack unit 10 Power supply 1 is up
Stack unit 10 Power supply 2 is down

Config changed due to add/del units. Do write mem if you want to keep it
T:20m13.1: Done hot swap: active controller u1 sets u9 to Ready.
T=20m16.9: Election, was active, no change, ID=1, pri=128, 12U(1-12), A=u1,
nbr#=11 11, reason: u1: stk-po-chg, ,

Config changed due to add/del units. Do write mem if you want to keep it

ICX7750-48F Router#T=21m16.9: Assigned unit 2 to be standby
cT=21m18.9: start running config sync to standby u2
T=21m19.3: Running config sync to standby u2 is complete
```

The following **show stack** command output shows the resulting 12-unit ICX 7750 ring topology.

```
ICX7750-48F Router#  show stack
T=23m12.5: alone: standalone, D: dynamic cfg, S: static, A=10, B=11, C=12
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7750-48XGF active  cc4e.246d.9e00 128 local   Ready
2  D ICX7750-48XGF standby cc4e.246d.8d80   0 remote  Ready
3  D ICX7750-48XGF member  cc4e.246d.9b00   0 remote  Ready
4  D ICX7750-48XGF member  cc4e.246d.9c80   0 remote  Ready
5  D ICX7750-20QXG member  cc4e.2439.2a80   0 remote  Ready
6  D ICX7750-20QXG member  cc4e.2439.3700   0 remote  Ready
7  D ICX7750-20QXG member  cc4e.2439.3880   0 remote  Ready
8  D ICX7750-20QXG member  cc4e.2439.2d00   0 remote  Ready
9  D ICX7750-48XGC member  cc4e.2439.1a00   0 remote  Ready
10 D ICX7750-48XGC member  cc4e.2439.1680   0 remote  Ready
11 D ICX7750-48XGC member  cc4e.2439.1d80   0 remote  Ready
12 D ICX7750-48XGC member  cc4e.2439.1280   0 remote  Ready

    active
     +---+        +---+        +---+        +---+        +---+        +---+
 -2/1| 1 |2/4--2/1| C |2/4==2/1| B |2/4==2/1| A |2/4--2/1| 9 |2/4--2/1| 8 |2/4-
```

```
 |   +---+        +---+        +---+        +---+        +---+        +---+   |
 |                                                                            |
 |  standby                                                                   |
 |   +---+        +---+        +---+        +---+        +---+        +---+   |
-2/4| 2 |2/1--2/4| 3 |2/1--2/4| 4 |2/1==2/4| 5 |2/1--2/4| 6 |2/1==2/4| 7 |2/1-
    +---+        +---+        +---+        +---+        +---+        +---+
Standby u2 - protocols ready, can failover
Current stack management MAC is cc4e.246d.9e00
```

Removing stacking ports from an ICX 7750

Use the **no stack-port** command to remove stack ports from a unit, for example, to change a ring topology to a linear topology.

In the following example, one stacking port, port 3/2/4, is removed from stack unit 3.

```
ICX7750-48F Router# stack unit 3
ICX7750-48F Router(config-unit-3)# no stack-port 3/2/1
Remove stacking port 3/2/1. The remaining stacking port is 3/2/4
```

The **no stack-port** command cannot be used when a trunk is configured. You must first remove the trunk before removing the stacking port.

In the following example, an attempt to remove a stack port that is part of a configured trunk results in an error message.

```
ICX7750-48F Router(config)# stack unit 10
ICX7750-48F Router(config-unit-10)# no stack-port 10/2/1
Please remove stack-trunk 10/2/1 to 10/2/2 before removing stacking port 10/2/1
using "stack-trunk" or "multi-stack-trunk" command.
```

Creating an ICX 7750 stacking trunk in a production environment

The **stack-trunk** command cannot be used to form a trunk manually in a live environment. Instead, use the **multi-stack-trunk** command. The **multi-stack-trunk** command configures both ends of a trunk, based on the range of ports you specify for each side.

NOTE
Configure the same size trunk on either side.

In the following example, a port connection is converted to a two-port trunk connection between stack unit 4 and stack unit 5.

```
ICX7750-48F Router# configure terminal
ICX7750-48F Router(config)# stack unit 4
ICX7750-48F Router(config-unit-4)# multi-stack-trunk 4/2/1 to 4/2/2 and 5/2/4  to 5/2/5

stack unit 4
  module 1 icx7750-48-xgf-port-management-module
  module 2 icx7750-qsfp-6port-qsfp-240g-module
  module 3 icx7750-6q-6port-qsfp-240g-module
  stack-trunk 4/2/1 to 4/2/2
  stack-port 4/2/1 4/2/4
stack unit 5
  module 1 icx7750-20-qxg-port-management-module
  module 2 icx7750-qsfp-6port-qsfp-240g-module
  stack-trunk 5/2/4 to 5/2/5
  stack-port 5/2/1 5/2/4
```

Converting an ICX 7750 trunk to a port connection in a live stack

To remove a trunk and create a port connection on a live stack, use the **multi-stack-port** command.

NOTE
Only primary ports (stack module ports 1 and 4) can be designated in the **multi-stack-port** command.

The following code excerpt displays configuration information for stack units 6 and 7.

```
stack unit 6
  module 1 icx7750-20-qxg-port-management-module
  module 2 icx7750-qsfp-6port-qsfp-240g-module
  stack-trunk 6/2/1 to 6/2/3
  stack-port 6/2/1 6/2/4
stack unit 7
  module 1 icx7750-20-qxg-port-management-module
  module 2 icx7750-qsfp-6port-qsfp-240g-module
  stack-trunk 7/2/4 to 7/2/6
  stack-port 7/2/1 7/2/4
```

In the following example, the stack trunk between units 6 and 7 is removed.

```
ICX7750-48F Router# configure terminal
ICX7750-48F Router(config)# stack unit 6
ICX7750-48F Router(config-unit-6)# multi-stack-port 6/2/1 and 7/2/4
```

NOTE
The **no** form of the **multi-stack-port** command removes port configuration on the designated ports.

Restoring a data port from an ICX 7750 trunk in a live stack

The **stack-multi-trunk** command can be used to remove a stacking port for configuration as a data port.

Use the following procedure in a production environment to reduce the size of a trunk and make an end port in the trunk available for configuration as a data port.

The following example reconfigures a six-port trunk between module 2 of stack units 1 and 2.

1. From the active controller for the stack, enter stack-unit configuration mode for a device at one end of the trunk.

   ```
   ICX7750-48F Router(config)# stack unit 1
   ```

2. In stack-unit configuration mode, enter the **multi-stack-trunk** command. Specify the new, smaller port range for the trunk on both ends (stack-unit 1 and stack-unit 2 in the following example). Be sure the port numbers are correct and the size of the trunk is the same on both ends.

   ```
   ICX7750-48F Router(config-unit-1)# multi-stack-trunk 1/2/1 to 1/2/5 and 2/2/1 to 2/2/5
   ```

   The end port of the trunk on each stack unit is dropped from the trunk and is available for configuration on each of the units.

3. Configure one or both of the ports as appropriate.

In the following example, port 2/2/6, which was previously part of a six-port trunk between stack unit 1 and stack unit 2, is ready to configure as a data port.

```
ICX7750-48F Router(config)# interface ethernet 2/2/6
Error - command not allowed for stacking port: 2/2/6

ICX7750-48F Router(config)# stack unit 1
ICX7750-48F Router(config-unit-1)# multi-stack-trunk 1/2/1 to 1/2/5 and 2/2/1 to 2/2/5

ICX7750-48F Router(config-unit-1)#interface ehternet 2/2/6
ICX7750-48F Router(config-if-e40000-2/2/6)#
```

Displaying basic information for an ICX 7750 stack

Enter the **show stack** command at the device level to display general information about the stack, including unit IDs, device type, role, MAC address, priority, status, and connections.

The following **show stack** command output is for a 12-unit ICX 7750 ring. Units 10, 11, and 12 are represented as A, B, and C in the topology diagram.

```
show stack
alone: standalone, D: dynamic cfg, S: static, A=10, B=11, C=12
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7750-48XGF active  cc4e.246d.9e00 128 local   Ready
2  S ICX7750-48XGF standby cc4e.246d.8d80   0 remote  Ready
3  S ICX7750-48XGF member  cc4e.246d.9b00   0 remote  Ready
4  S ICX7750-48XGF member  cc4e.246d.9c80   0 remote  Ready
5  S ICX7750-20QXG member  cc4e.2439.2a80   0 remote  Ready
6  S ICX7750-20QXG member  cc4e.2439.3700   0 remote  Ready
7  S ICX7750-20QXG member  cc4e.2439.3880   0 remote  Ready
8  S ICX7750-20QXG member  cc4e.2439.2d00   0 remote  Ready
9  S ICX7750-48XGC member  cc4e.2439.1a00   0 remote  Ready
10 S ICX7750-48XGC member  cc4e.2439.1680   0 remote  Ready
11 S ICX7750-48XGC member  cc4e.2439.1d80   0 remote  Ready
12 S ICX7750-48XGC member  cc4e.2439.1280   0 remote  Ready

    active
     +---+        +---+        +---+        +---+        +---+        +---+
 -2/1| 1 |2/4--2/1| C |2/4--2/1| B |2/4==2/1| A |2/4--2/1| 9 |2/4--2/1| 8 |2/4=
|    +---+        +---+        +---+        +---+        +---+        +---+   |
|                                                                              |
|  standby                                                                     |
|    +---+        +---+        +---+        +---+        +---+        +---+   |
-2/4| 2 |2/1==2/4| 3 |2/1--2/4| 4 |2/1==2/4| 5 |2/1--2/4| 6 |2/1==2/4| 7 |2/1=
     +---+        +---+        +---+        +---+        +---+        +---+
Standby u2 - protocols ready, can failover
Current stack management MAC is cc4e.246d.9e00
```

Displaying details for an ICX 7750 stack

Enter the **show stack detail** command to display information for the stack, including device type, role, MAC address, priority, status, and connections.

The following **show stack detail** output provides information on a 12-unit stack containing three different ICX 7750 models connected in a ring.

```
ICX7750-48F Router# show stack detail
alone: standalone, D: dynamic cfg, S: static, A=10, B=11, C=12
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7750-48XGF active  cc4e.246d.9e00 128 local   Ready
2  S ICX7750-48XGF standby cc4e.246d.8d80   0 remote  Ready
3  S ICX7750-48XGF member  cc4e.246d.9b00   0 remote  Ready
4  S ICX7750-48XGF member  cc4e.246d.9c80   0 remote  Ready
5  S ICX7750-20QXG member  cc4e.2439.2a80   0 remote  Ready
6  S ICX7750-20QXG member  cc4e.2439.3700   0 remote  Ready
7  S ICX7750-20QXG member  cc4e.2439.3880   0 remote  Ready
8  S ICX7750-20QXG member  cc4e.2439.2d00   0 remote  Ready
9  S ICX7750-48XGC member  cc4e.2439.1a00   0 remote  Ready
10 S ICX7750-48XGC member  cc4e.2439.1680   0 remote  Ready
11 S ICX7750-48XGC member  cc4e.2439.1d80   0 remote  Ready
12 S ICX7750-48XGC member  cc4e.2439.1280   0 remote  Ready

    active
     +---+        +---+        +---+        +---+        +---+        +---+
 -2/1| 1 |2/4--2/1| C |2/4--2/1| B |2/4==2/1| A |2/4--2/1| 9 |2/4--2/1| 8 |2/4=
 |   +---+        +---+        +---+        +---+        +---+        +---+   |
 |                                                                             |
 |  standby                                                                    |
 |   +---+        +---+        +---+        +---+        +---+        +---+   |
 -2/4| 2 |2/1==2/4| 3 |2/1--2/4| 4 |2/1==2/4| 5 |2/1--2/4| 6 |2/1==2/4| 7 |2/1=
     +---+        +---+        +---+        +---+        +---+        +---+
Standby u2 - protocols ready, can failover
Current stack management MAC is cc4e.246d.9e00

Image-Auto-Copy is Enabled.

      Stack Port Status                   Neighbors
Unit# Stack-port1       Stack-port2       Stack-port1       Stack-port2
1     up (1/2/1)        up (1/2/4)        U2 (2/2/4)        U12 (12/2/1)
2     up (2/2/1-2/2/2)  up (2/2/4)        U3 (3/2/4-3/2/5)  U1 (1/2/1)
3     up (3/2/1)        up (3/2/4-3/2/5)  U4 (4/2/4)        U2 (2/2/1-2/2/2)
4     up (4/2/1-4/2/2)  up (4/2/4)        U5 (5/2/4-5/2/5)  U3 (3/2/1)
5     up (5/2/1)        up (5/2/4-5/2/5)  U6 (6/2/4)        U4 (4/2/1-4/2/2)
6     up (6/2/1-6/2/3)  up (6/2/4)        U7 (7/2/4-7/2/6)  U5 (5/2/1)
7     up (7/2/1-7/2/2)  up (7/2/4-7/2/6)  U8 (8/2/4-8/2/5)  U6 (6/2/1-6/2/3)
8     up (8/2/1)        up (8/2/4-8/2/5)  U9 (9/2/4)        U7 (7/2/1-7/2/2)
9     up (9/2/1)        up (9/2/4)        U10 (10/2/4)      U8 (8/2/1)
10    up (10/2/1-10/2/2 up (10/2/4)       U11 (11/2/4-11/2/ U9 (9/2/1)
11    up (11/2/1)       up (11/2/4-11/2/5 U12 (12/2/4)      U10 (10/2/1-10/2/
12    up (12/2/1)       up (12/2/4)       U1 (1/2/4)        U11 (11/2/1)

Unit# System uptime
1     17 hours 20 minutes 8 seconds
2     17 hours 20 minutes 13 seconds
3     17 hours 20 minutes 13 seconds
4     17 hours 20 minutes 12 seconds
5     17 hours 20 minutes 13 seconds
6     17 hours 20 minutes 13 seconds
7     17 hours 20 minutes 13 seconds
8     17 hours 20 minutes 11 seconds
9     17 hours 20 minutes 13 seconds
10    17 hours 20 minutes 15 seconds
11    17 hours 20 minutes 13 seconds
12    17 hours 20 minutes 11 seconds
```

Hitless Stacking

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Hitless stacking overview

Hitless stacking is supported on FastIron units in a traditional stack. It is a High Availability feature set that ensures sub-second or no loss of data traffic during the following events:

- Active controller failure or role change
- Software failure
- Addition or removal of units in a stack
- Removal or disconnection of the stacking cable between the active controller and the standby controller

During such events, the standby controller takes over the active role, and the system continues to forward traffic seamlessly, as if no failure or topology change has occurred. In software releases that do not support hitless stacking, events such as these could cause most of the units in a stack to reset, affecting data traffic.

FastIron stackable units support the following hitless stacking features:

Hitless stacking switchover - A manually-controlled (CLI-driven) or automatic switchover of the active controller and standby controller without reloading the stack and without any packet loss to the services and protocols that are supported by hitless stacking. A switchover is activated by the CLI command **stack switch-over** command. A switchover may also be activated by the **priority** command, depending on the configured priority value.

Hitless stacking failover - An automatic, forced switchover of the active controller and standby controller because of a failure or abnormal termination of the active controller. During a failover, the active controller abruptly leaves the stack, and the standby controller immediately assumes the active role. As with a switchover, a failover occurs without the stack being reloaded. Unlike a switchover, a failover generally occurs without warning and is likely to result in sub-second packet loss (although packets traversing the stacking link may be lost).

Hitless stacking failover is enabled by default beginning with Fastiron release 08.0.20.

Hitless stacking behavior

Hitless stacking is enabled by default for FastIron release 08.0.20 and later releases. In previous releases, the **hitless-failover** command must be set to **enable** in the configuration.

If you install a FastIron 08.0.20 or later image on a new system with no previous configuration, the **hitless-failover** command is enabled by default.

If you upgrade to FastIron release 08.0.20 or later from a previous version that has **hitless-failover** enabled, hitless-failover is retained as the default.

If you upgrade to FastIron release 08.0.20 or later on a system with an earlier release that does not have **hitless-failover** enabled in its configuration, the previous configuration is retained.

Hitless stacking can be disabled using the **no hitless-failover enable** command. When hitless failover is disabled, the following limitations are in effect:

- If a failover occurs, every unit in the stack reloads.
- Manual switchover is not allowed. If the **stack switch-over** command is entered, the following message appears on the console:

```
Switch-over is not allowed. Reason: hitless-failover not configured.
```

- Internal switchover resulting from a priority change is blocked until the entire stack is reloaded or hitless stacking is enabled. A priority change triggers an election, but the newly elected winner does not immediately assume its role.
- If there is no active controller after a reload, the bootup standby assumes the active role after reloading every unit in the stack, including itself.
- During a stack merge, the active controller with the highest priority wins the election and reloads every unit of the losing stack.

  NOTE
  Synchronization between the active controller, standby controller, and stack members occurs whether or not hitless stacking is enabled.

If hitless stacking has been disabled, enable hitless stacking failover as described in "Enabling hitless stacking failover." As soon as hitless stacking is enabled, the following behavior takes effect immediately:

- If a failover occurs, the stack does not reload.
- Manual switchover (CLI command **stack switch-over**) is allowed.
- If a priority change occurred while hitless stacking was disabled and the configured priority value requires a switchover, the system starts a 60-second timer before performing a switchover. After the switchover, the highest priority standby controller becomes the active controller.
- If there is no active controller after a reload, the bootup standby controller assumes the active controller role in approximately 120 seconds without a reload.
- During a stack merge, the active controller with the larger number of units wins the election and reloads every unit of the losing stack.
- If two stacks have the same number of units, the failover unit (in a two-unit stack) and then priority, system up time, ID and finally the MAC address are compared.
- If two stacks have the same number of units and the same priority, then the stack with the longest system up time (by 30 seconds or more) wins the election. Otherwise, the smallest ID is compared next, followed by MAC address. If the losing active controller has the highest priority, it becomes the standby controller after reloading and relearning the protocols. It becomes the active controller after an internal switchover.

  NOTE
  If the active controllers of two merging stacks have different hitless stacking settings (for example, hitless stacking is enabled in one stack and disabled in the other), the winning controller retains its hitless stacking setting and runtime configuration for the merged stack.

You can use the **show stack** command to check whether hitless stacking is enabled.

Supported hitless stacking events

The following events are supported by hitless stacking:

- Failover
- Switchover
- Priority change
- Role change

Non-supported hitless stacking events

The following events are not supported by hitless stacking. These events require a software reload, affecting data traffic.

- Unit ID change - When a stack is formed or when a unit is renumbered using secure-setup.
- Stack merge - When the old active controller comes back up, it reboots. If it has fewer members than the present active controller, it loses the election, regardless of its priority. If it has a higher priority, it becomes the standby controller after the reboot and is synchronized with the active controller. Next, a switchover occurs, and it again becomes the active controller.
- Stack upgrade - Software cannot be upgraded on stack units without impact on traffic, unless the upgrade is performed through ISSU. Refer to the *Ruckus FastIron Software Upgrade Guide* for more information.

Supported hitless stacking protocols and services

The following table highlights the impact of a hitless switchover or failover on the major functions of the system.

NOTE
Services and protocols that are not listed in the following table encounter disruptions, but resume normal operation once the new active controller is back up and running.

TABLE 16 Supported hitless stacking protocols and services

Traffic type	Supported protocols and services	Impact
Layer 2 switched traffic, including unicast and multicast + System-level + Layer 4	• 802.1p and 802.1Q • 802.3ad - LACP • 802.3af - PoE • 802.3at - PoE+ • DSCP honoring and Diffserv • Dual-mode VLAN • IGMP v1, v2, and v3 snooping • Layer 2 switching (VLAN and 802.1Q-in-Q)	Layer 2 switched traffic is not affected during a hitless stacking event. All existing switched traffic flows continue without interruption. New switched flows are not learned by the switch during the switchover process and are flooded to the VLAN members in hardware. After the new active controller becomes operational, new switched flows are learned and forwarded accordingly. The Layer 2 control protocol states are not interrupted during the switchover process.

TABLE 16 Supported hitless stacking protocols and services (continued)

Traffic type	Supported protocols and services	Impact
	• MLD v1 and v2 snooping • MRP • Multiple Spanning Tree (MSTP) • Physical port/link state • PIM SM snooping • Port mirroring and monitoring • Port trunking • Rapid Spanning Tree (RSTP) • Spanning Tree (STP) • ToS-based QoS • Policy Based Routing • Traffic policies • UDLD • VSRP	
Layer 3 IPv4 routed traffic (unicast)	• IPv4 unicast forwarding • Static routes • OSPF v2 • OSPF v2 with ECMP • VRRP • VRRP-E • BGP4+	Layer 3 routed traffic for supported protocols is not affected during a hitless stacking event. Other Layer 3 protocols that are not supported will be interrupted during the switchover or failover. If BGP4+ graceful restart or OSPF graceful restart is enabled, traffic converges to normalcy after the new active module becomes operational. For details about OSPF graceful restart and BGP4+ graceful restart, refer to the *Ruckus FastIron Layer 3 Routing Configuration Guide*.
Layer 3 IPv6 routed traffic (unicast and multicast)	• IPv6 Unicast forwarding • OSPF V3 • VRRP V3 • VRRP-E V3 • BGP 4+	OSPF (V2 or V3) has graceful restart enabled by default. Existing traffic flows will not be disturbed. To achieve hitless functionality, "non-stop routing" must be enabled under OSPF.
Management traffic	N/A	All existing management sessions (SNMP, Telnet, HTTP, HTTPS, FTP, TFTP, SSH, and so on) are interrupted during the switchover process. Sessions are terminated and can be re-established after the new active controller takes over.
Security	• ACLs • Dos attack prevention (TCP syn/ICMP) • DHCP snooping • Dynamic ARP inspection • IP source guard • MAC filter • MAC port security	Supported security protocols and services are not affected during a switchover or failover, with the following exceptions: • IPsec, when enabled on an ICX 7450 stack, does not support hitless stacking because IPsec sessions must be re-established by device firmware. Stacking split, merge, and member reload follow normal stacking behaviors. • Media Access Control Security (MACsec), 802.1ae, when configured on an ICX 7450 stack, does not support hitless stacking because MACsec sessions must be re-established by device firmware. • 802.1X is affected if re-authentication does not occur in a specific time window.

TABLE 16 Supported hitless stacking protocols and services (continued)

Traffic type	Supported protocols and services	Impact
		• MAC authentication is affected if re-authentication does not occur in a variable-length time window. • In some cases, a few IP source guard packets may be permitted or dropped. • If 802.1X and MAC authentication are enabled together on the same port, both will be affected during a switchover or failover. Hitless stacking support for these features applies to ports with 802.1X only or multi-device port authentication only. • For MAC port security, secure MAC addresses are synchronized between the active and standby controllers, so they are hitless. However, denied MAC addresses are lost during a switchover or failover but may be relearned if traffic is present. Configured ACLs will operate in a hitless manner. That is, the system will continue to permit and deny traffic during the switchover or failover process. However, dynamic ACLs are not supported for hitless switchover and failover. After a switchover or failover, the new active controller will re-authenticate 802.1X or MAC authentication sessions that were being forwarded in hardware.
Other services to management	• AAA • DHCP • sFlow • SNMP v1, v2, and v3 • SNMP traps • SNTP • Traceroute	Supported protocols and services are not affected during a switchover or failover. DNS lookups will continue after a switchover or failover. This information is not synchronized. Ping traffic will be minimally affected.

Hitless stacking configuration notes and feature limitations

- Layer 3 multicast traffic is supported by hitless stacking.
- After a switchover or failover, the syslog may contain invalid (non-existent) port numbers in messages such as “Interface *portnum* state up.” This is because some messages from the old active controller remain in the syslog after a switchover or failover.
- Failover for devices connected to the management port is not supported. For example, if during a failover, an end station is connected to the stack through the management port of the active controller, the connection is shut down. After the failover, the management port on the new active controller will work.
- The following describes hitless stacking limitations with software-based licensing for BGP:
  - To enable BGP on a stack unit, you should have an appropriate BGP license installed on all the stack units.
  - If the active controller has a BGP license but any other unit in the stack does not have one, you cannot enable BGP on the stack unit.
  - If the active controller is not running BGP, a stack unit is operational regardless of whether the active controller or stack units have a BGP license.

- If the active controller is running BGP and a unit without a BGP license joins the stack, the unit is put into a non-operational state. However, If the user installs a valid BGP license to a non-operational unit, the unit immediately becomes operational. If the user disables BGP instead, the active controller returns the non-operational units to operation.

What happens during a hitless stacking switchover or failover

This section describes the internal events that enable a controlled or forced switchover to take place in a hitless manner as well as the events that occur during the switchover.

Real-time synchronization among all units in a stack

Hitless stacking requires the active controller, standby controller, and stack members to be fully synchronized at all times. This is accomplished by baseline and dynamic synchronization of all units in a stack.

When a stack is first booted and becomes operational, baseline synchronization occurs across all of the units in the stack. The active controller copies the current state of its CPU to all units of the stack, including the standby controller. The information received from the active controller is programmed locally in the hardware on all units. The information includes:

- Startup and runtime configuration (CLI) - These files are copied to the standby controller only.
- Layer 2 protocols - Layer 2 protocols such as STP, RSTP, MRP, and VSRP run concurrently on both the active controller and standby controller.
- Hardware Abstraction Layer (HAL) - This includes the prefix-based routing table, next hop information for outgoing interfaces, and tunnel information.
- Layer 3 IP forwarding information - This includes the routing table, IP cache table, and ARP table as well as static and connected routes. Layer 3 routing protocols are not copied to any of the units in the stack but remain in standby state on the standby controller until a switchover occurs. Peer adjacency is restored after a switchover. If BGP4 or OSPF graceful restart is enabled during a switchover, the standby controller (new active controller) initiates a graceful restart, and a new set of routes is relearned. The new set of routes will be the same as the old routes, unless the network has changed.
- OSPFv2 and OSPFv3 non-stop routing support - For more information, refer to the *Ruckus FastIron Layer 3 Routing Configuration Guide*.

When control protocols are synchronized and protocol synchronization timers have expired, the standby controller is placed in hot-standby mode, ready to take over as the active controller. If a switchover occurs, the standby controller takes over without interrupting data traffic.

After baseline synchronization, any new events that occur on the active controller are dynamically synchronized on the standby controller. Such events include:

- CLI, HTTP, and SNMP configurations
- Link events
- Interrupts
- Layer 2 and Layer 3 forwarding table updates
- Dynamic user authentication updates such as 802.1X or multi-device port authentication

After a switchover, the new active controller receives updates from the stack members and sends verification information to the stack members to ensure that they are synchronized.

NOTE
The events described previously occur internally and do not create or affect the external network topology.

NOTE
If there is no active controller after a reload, the bootup standby assumes the active role in approximately 60 seconds without a reload. A bootup standby is the device that was the standby controller before the reload. It may not be the current standby controller.

Standby controller role in hitless stacking

In software releases that do not support hitless stacking, the standby controller functions as a dummy device, meaning it provides limited access to CLI commands such as **show**, **stack**, and a few **debug** commands. The active controller can access the full range of the CLI. The standby controller synchronizes its configuration with the active controller at each reset.

With the introduction of hitless stacking, the standby controller shadows the active controller. The role or behavior of the standby controller with hitless stacking is as follows:

- The local console on the standby controller still accepts only **show**, **stack**, and a few **debug** commands.
- The runtime configuration on the standby controller is synchronized with the active controller whenever there is a configuration change.
- Protocols are configured in the runtime configuration, but no protocol packets are sent out on the standby controller.
- The state of every unit is known, including the state of the active controller. The **show** commands display current information such as STP or port states.
- When a failover occurs, the standby controller uses its current runtime configuration. The configuration could be different from the active controller if the last configuration transmission was lost.
- After a failover, the new active controller (the old standby controller) programs all other units in hardware, based on its runtime configuration.

Standby controller election

Candidates for standby controller must meet the following criteria:

- The unit is operational, and the image and module configuration match those of the active controller.
- The runtime configuration matches that of the active controller.

If more than one unit in the stack meets these criteria, the standby controller is chosen according to the following criteria, in the order shown:

- Priority - The unit with the highest priority value.
- Current standby - The unit that is currently the standby controller.
- Bootup master - The unit that was the active controller before the stack was reloaded.
- Bootup standby - The unit that was the standby controller before the stack was reloaded.

Once the standby controller is identified, the following internal events take place.

1. The standby controller is assigned by the active controller 30 to 60 seconds after election (60 seconds if the active controller boots up in less than 120 seconds).

2. The standby controller receives and processes the runtime configuration sent by the active controller.
3. The standby controller learns the protocols within 70 seconds.

   When the standby controller is fully synchronized, the system is ready for a switchover or failover.

Runtime configuration mismatch

In some cases, such as a runtime configuration mismatch between the active controller and candidate standby controller, the standby controller cannot be assigned by the active controller unless the candidate standby controller is reloaded.

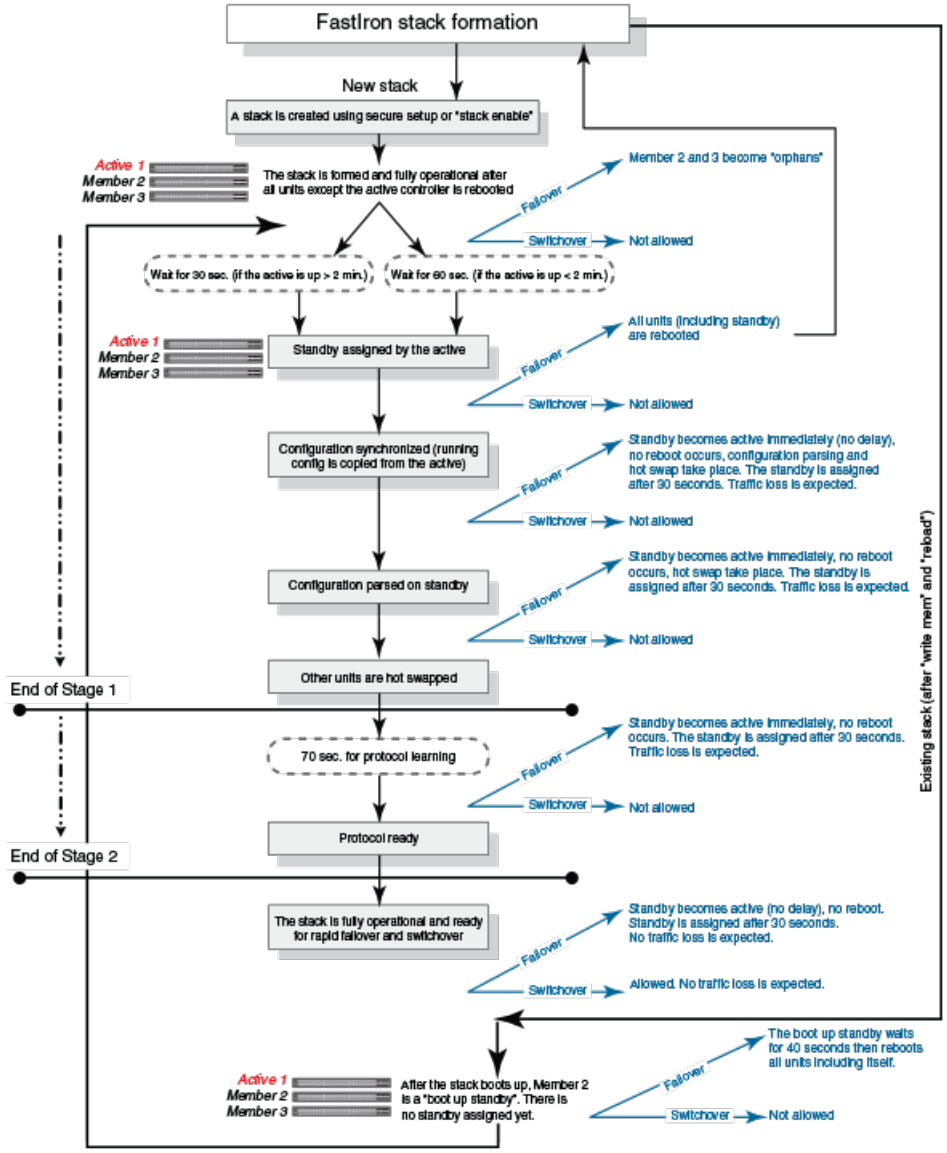
As shown in the following example, the **show stack** command output indicates whether there is a runtime configuration mismatch.

```
device# show stack
alone: standalone, D: dynamic config, S: static config
ID   Type            Role   MAC Address     Pri State  Comment
1  S ICX7750-48XGC   active 0000.0001.0000  30  local  Ready
2  d ICX7750-48XGC   member 0000.0002.0000  20  remote Ready, standby if reload
                  active
     +---+        +---+
 -2/1| 2 |2/2--2/1| 1 |2/2-
     +---+        +---+
Note: There is no standby. Reason: u2: diff runtime config
Current stack management MAC is 0000.0001.0000
Note: no "stack mac" config. My MAC will change after failover.
```

Support during stack formation, stack merge, and stack split

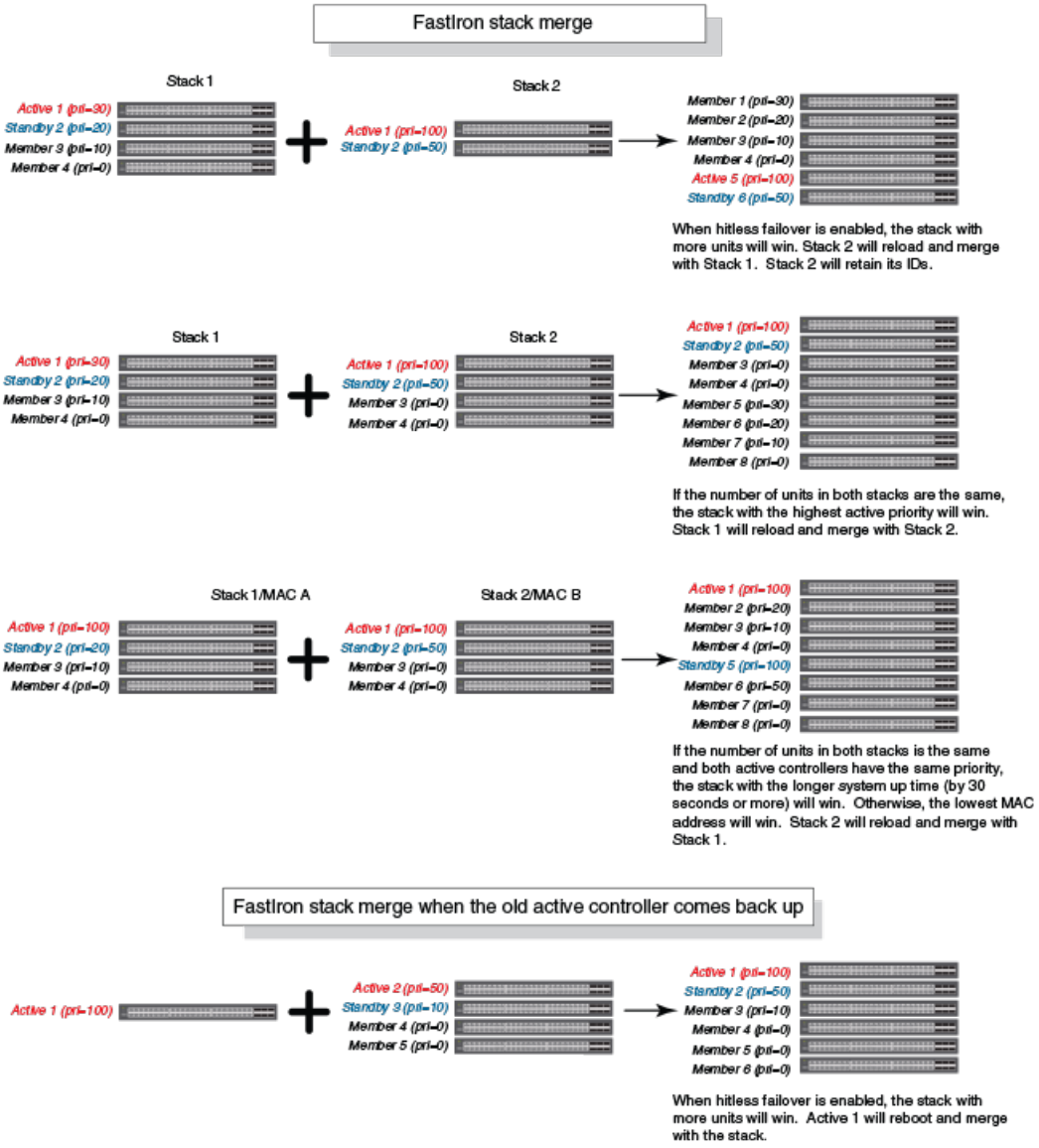
The following figure illustrates hitless stacking support during stack formation. Operational stages 1 and 2 are also shown.

FIGURE 38 Hitless stacking support during stack formation



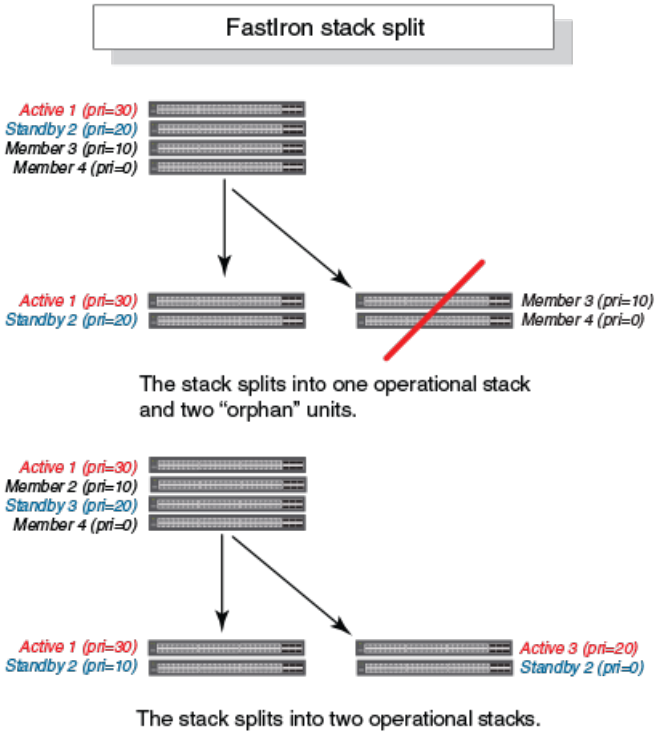
The following figure illustrates hitless stacking support during a stack merge.

FIGURE 39 Hitless stacking support during a stack merge



The following figure illustrates hitless stacking support in a stack split.

FIGURE 40 Hitless stacking support in a stack split



Hitless stacking failover

Hitless stacking failover provides automatic failover from the active controller to the standby controller without resetting any of the units in the stack and with sub-second or no packet loss to hitless stacking-supported services and protocols.

For a description of the events that occur during a hitless failover, refer to What happens during a hitless stacking switchover or failover on page 144.

For a description of this feature's impact on major system functions, refer to Supported hitless stacking protocols and services on page 141.

For an example of hitless failover operation, refer to Hitless stacking failover example on page 150.

For feature limitations and configuration notes, refer to Hitless stacking configuration notes and feature limitations on page 143.

Enabling hitless stacking failover

NOTE
Hitless stacking failover is enabled by default in FastIron release 08.0.20 and later releases.

To enable hitless stacking failover, enter the following command at the global CONFIG level of the CLI:

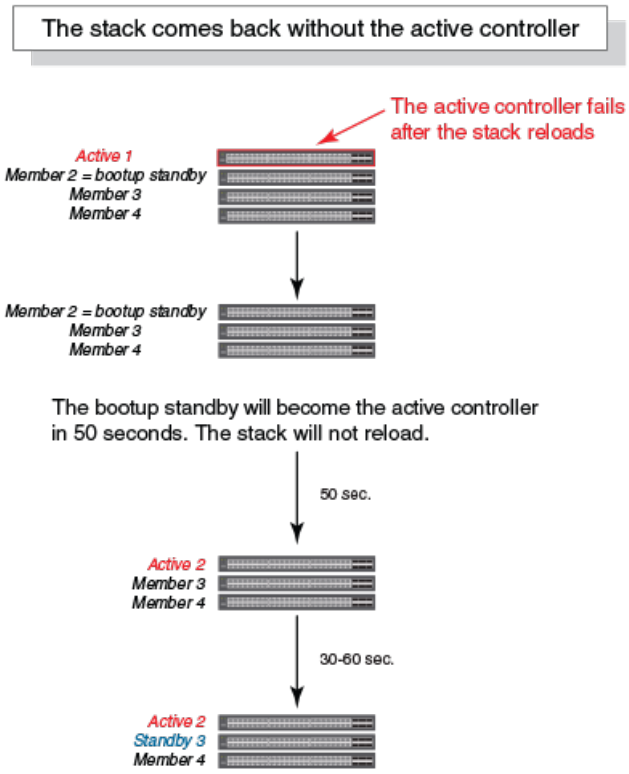
```
device# configure terminal
device(config)# hitless-failover enable
```

The command takes effect immediately. Hitless switchover is allowed, and in the event of a failover, the standby controller takes over the active role without reloading the stack.

NOTE
Use the **no** form of the **hitless-failover enable** command to disable hitless stacking failover once it has been enabled.

Hitless stacking failover example

FIGURE 41 Hitless stacking failover when the active controller fails



Hitless stacking switchover

Hitless stacking switchover is a manually-controlled (CLI-driven) or automatic switchover of the active controller and standby controller without reloading the stack and without any packet loss to the services and protocols that are supported by hitless stacking. A switchover is activated by the **stack switch-over** CLI command. A switchover may also be activated by the **priority** command, depending on the configured priority value.

By default, hitless switchover is allowed on systems with FastIron release 08.0.20 or later installed, as long as hitless failover is configured, and the priority of the two controllers is the same. Hitless switchover behavior is described in Hitless stacking behavior on page 139.

Hitless switchover can be used by a system administrator to perform maintenance on a controller that has been functioning as the active controller.

For a description of the events that occur during a hitless stacking switchover, refer to What happens during a hitless stacking switchover or failover on page 144.

For a description of how hitless stacking switchover affects major system functions, refer to Supported hitless stacking protocols and services on page 141.

For examples of hitless stacking switchover operation, refer to Hitless stacking switchover examples on page 151.

Executing a hitless stacking switchover

The following must be in effect before a hitless switchover (to the standby controller) is allowed:

- Hitless stacking is enabled.
- The stack has a standby controller.
- The standby controller has learned the protocols.
- The standby controller has the same priority as the active controller.
- More than 120 seconds have passed since the previous switchover or failover.

You can use the **show stack** command to check these criteria.

To perform a switchover, enter the following command.

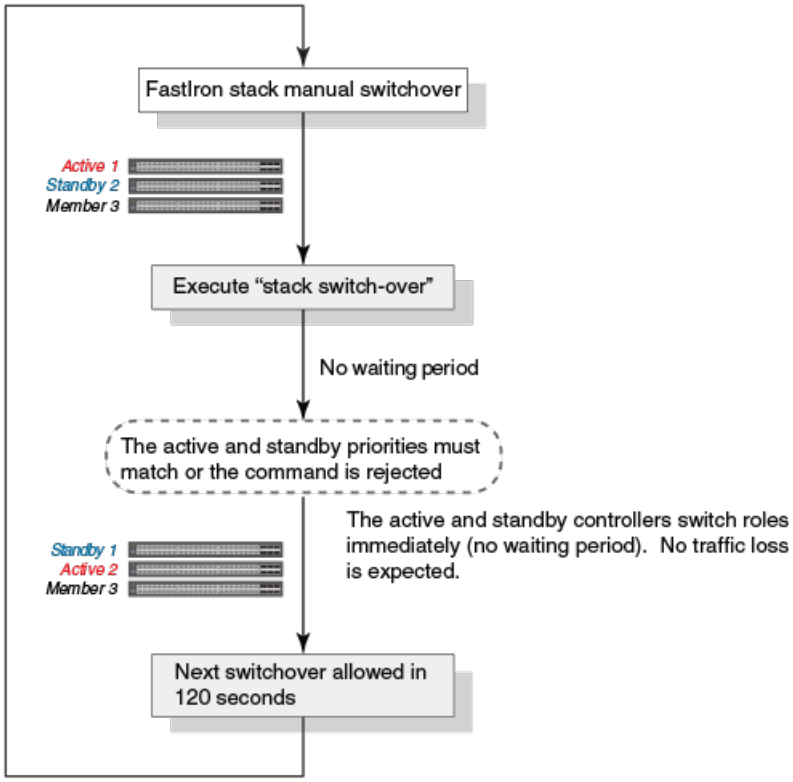
```
device# stack switch-over
Standby unit 8 will become active controller, and unit 1 will become standby
Are you sure? (enter 'y' or 'n'): y
Unit 1 is no longer the active controller
```

Hitless stacking switchover examples

The following examples illustrate hitless stacking failover and switchover operation during a CLI-driven switchover or priority change.

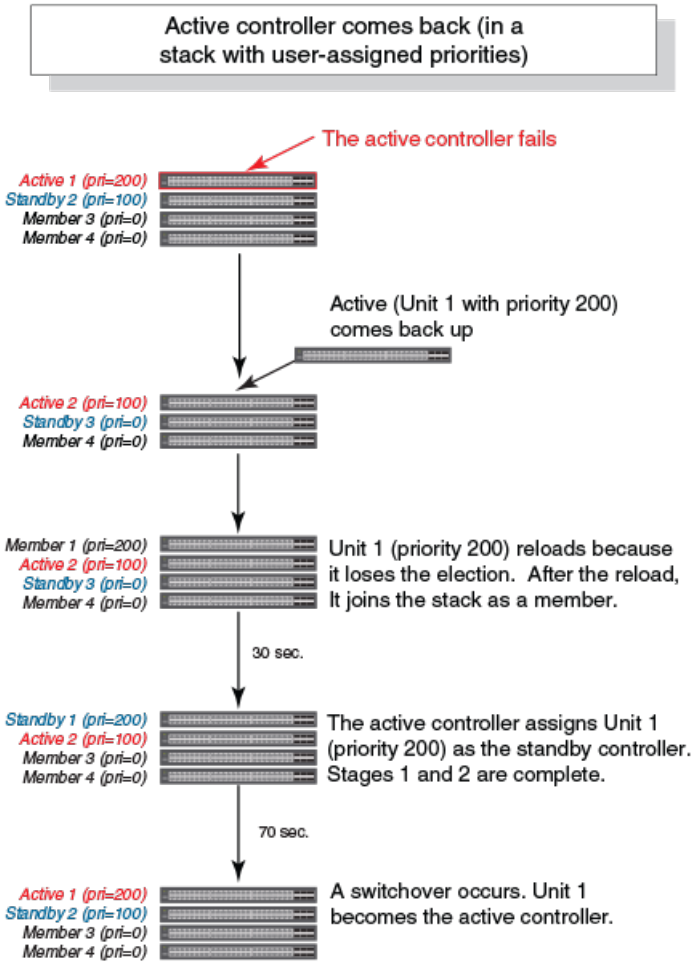
The following figure illustrates a hitless stacking switchover triggered by the **stack switch-over** command.

FIGURE 42 Manual switchover



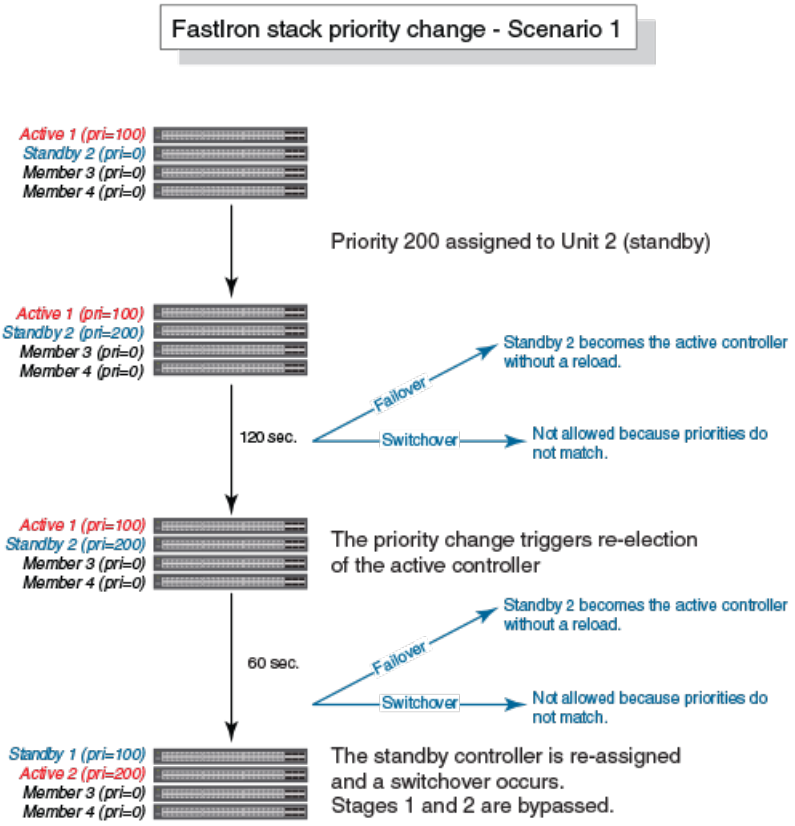
The following figure illustrates a hitless stacking switchover when the active controller goes down and then comes back up. The stack in this example has user-configured priorities.

FIGURE 43 Hitless stacking switchover when the active controller comes back up



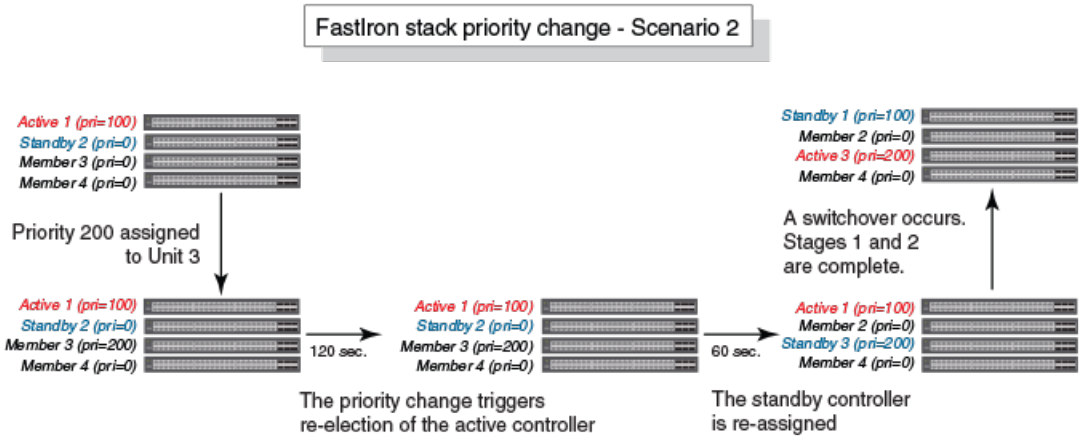
The following figure illustrates a hitless stacking switchover after the network administrator increases the priority value of the standby controller.

FIGURE 44 Scenario 1 - Hitless stacking switchover after a priority change



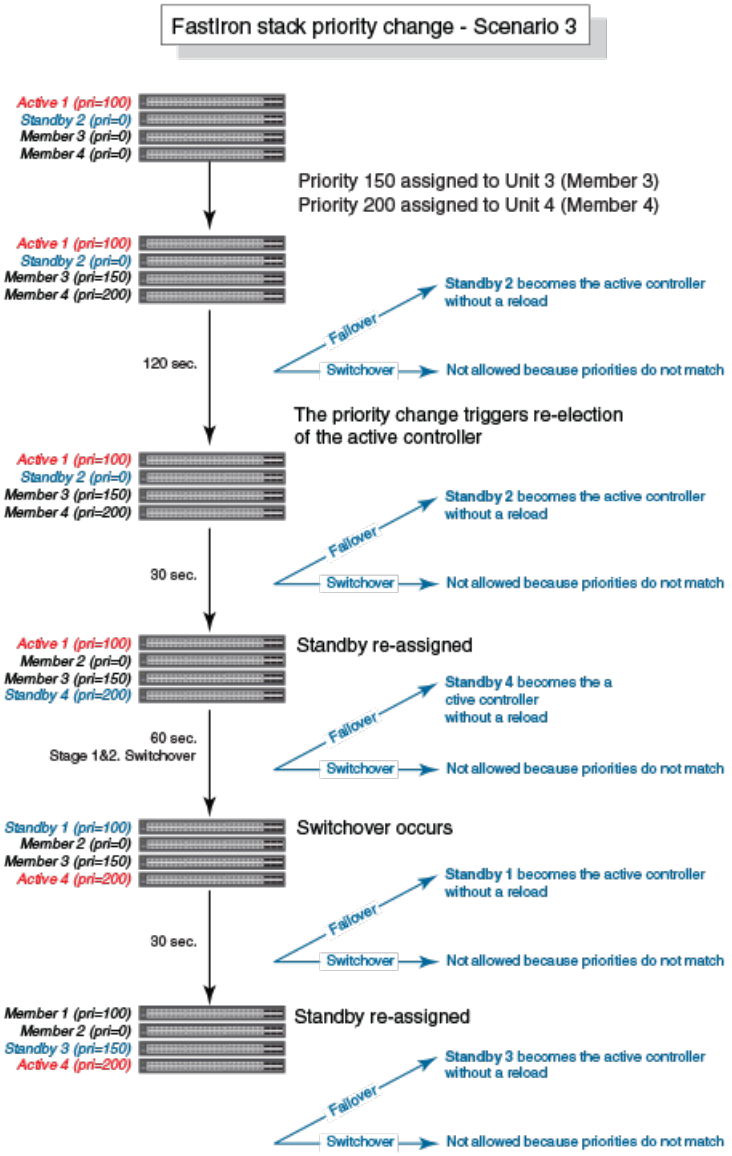
The following figure illustrates a hitless stacking switchover after the network administrator increases the priority value of one of the stack members.

FIGURE 45 Scenario 2 - Hitless stacking switchover after a priority change



The following figure illustrates a hitless stacking switchover after the network administrator increases the priority value for two of the stack members.

FIGURE 46 Scenario 3 - Hitless stacking switchover after a priority change



Displaying information about hitless stacking

Use the **show stack** command to view information pertinent to a hitless stacking switchover or failover. The command output illustrates the active controller and standby controller, as well as the readiness of the standby controller to take over the role of active controller, if needed.

```
ICX7750-26Q Router# show stack
T=11h25m50.2: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7750-20QXG active  748e.f8f9.6300 255 local   Ready
2  S ICX7750-20QXG standby cc4e.2438.7280 240 remote  Ready
3  S ICX7750-20QXG member  cc4e.2438.7500   0 remote  Ready

    active                    standby
```

```
     +---+        +---+        +---+
-2/1| 1 |2/4--2/1| 3 |2/4--2/1| 2 |2/4-
|   +---+        +---+        +---+   |
|                                     |
|-------------------------------------|
Standby u2 - protocols ready, can failover
Current stack management MAC is 748e.f8f9.6300
```

Displaying information about stack failover

Use the **show stack failover** command to view information about rapid failover.The **show stack failover** command provides information on the current standby controller and its status as shown in the following example.

```
device# show stack failover
Current standby is unit 2. state=ready
Standby u2 - protocols ready, can failover
```

Displaying hitless stacking status

The **show stack** command indicates whether hitless stacking is enabled. The following example shows that hitless stacking is disabled.

```
ICX7750-26Q Router(config-unit-1)# show stack
T=17m47.9: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7750-20QXG active  748e.f8f9.6300   0 local   Ready
2  D ICX7750-20QXG member  cc4e.2438.7280   0 remote  Ready
3  D ICX7750-20QXG standby cc4e.2438.7500   0 remote  Ready

    active       standby
     +---+        +---+        +---+
=2/1| 1 |2/4==2/1| 3 |2/4--2/1| 2 |2/4=
|   +---+        +---+        +---+   |
|                                     |
|-------------------------------------|

Standby u3 - No hitless failover. Reason: hitless-failover not configured
```

Displaying pending device roles

When hitless stacking is disabled, a priority change triggers an election, but the newly-elected winner does not assume its role until the entire stack is reloaded or hitless stacking is enabled. You can use the **show stack** command to view pending device roles. The “Role” column displays the current role for each unit. The “Comment” column displays the role that will take effect after a reload or when hitless stacking is enabled.

```
ICX7750-26Q Router(config-unit-1)# show stack
T=17m47.9: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7750-20QXG active  748e.f8f9.6300   0 local   Ready, member if reloaded
2  D ICX7750-20QXG member  cc4e.2438.7280 128 remote  Ready, standby if reloaded
3  D ICX7750-20QXG standby cc4e.2438.7500 200 remote  Ready, active if reloaded
```

Displaying information about link synchronization status

Use the **show stack link-sync status** command to view the status of the link synchronization.

```
ICX7750-26Q Router# show stack link-sync status
STACKING_LINK_GLOBAL_CTRL messages sent: 0,  received: 0
STACKING_LINK_INDIVIDUAL_CTRL messages sent: 0,  received: 0
STACKING_LINK_STATUS messages sent: 235,  received: 225
```

```
STACKING_POE_SCTRL messages sent: 0,  received: 0
STACKING_POE_STATUS messages sent: 0,  received: 0
global_ctrl_dest: 0
individual_ctrl_dest: 0
status_dest: 2
```

Syslog messages for hitless stacking failover and switchover

Syslog messages are generated for the following events:

- Switchover
- Failover
- Standby controller assignment

The following table lists the supported syslog messages for hitless stacking failover and switchover.

TABLE 17 Supported syslog messages for hitless stacking faiilover and switchover

Message level	Message	Explanation
Informational	Stack: Stack unit u*nit_number* has been assigned as STANDBY unit of the stack system	Indicates that the unit has been assigned as the standby controller.
Informational	Stack: Stack is operational due to SWITCH-OVER	Indicates that a switchover has occurred.
Informational	Stack: Stack is operational due to FAIL-OVER	Indicates that a failover has occurred.

To view the system log or the traps logged on an SNMP trap receiver, enter the **show log** command at any level of the CLI. The following sample output shows what the log may look like after a switchover or assignment of the standby controller.

```
device# show log
Syslog logging: enabled (0 messages dropped, 1 flushes, 0 overruns)
    Buffer logging: level ACDMEINW, 8 messages logged
    level code: A=alert C=critical D=debugging M=emergency E=error
                I=informational N=notification W=warningDynamic Log Buffer (50 lines):
0d00h05m34s:I:System: Interface ethernet mgmt1, state up
0d00h05m33s:I:Stack: Stack unit 8 has been assigned as STANDBY unit of the stack system
0d00h05m33s:I:Stack: Stack is operational due to SWITCH-OVER
0d00h05m32s:I:Stack: Stack unit 1 has been elected as ACTIVE unit of the stack system
0d00h05m29s:W:System:Stack unit 2 Fan speed changed automatically to 2
0d00h05m25s:W:System:Stack unit 5 Fan speed changed automatically to 2
0d00h05m00s:I:System: Interface ethernet mgmt1, state down
0d00h05m00s:I:Security: Telnet server enabled by  from  session
```

The following sample output shows what the log may look like after a failover of the active controller.

```
device# show log
Syslog logging: enabled (0 messages dropped, 0 flushes, 0 overruns)
    Buffer logging: level ACDMEINW, 12 messages logged
    level code: A=alert C=critical D=debugging M=emergency E=error
                I=informational N=notification W=warning

Dynamic Log Buffer (50 lines):
0d00h04m41s:I:Stack: Stack unit 3 has been assigned as STANDBY unit of the stack system
0d00h04m12s:I:System: Interface ethernet mgmt1, state up
0d00h04m10s:I:System: Interface ethernet mgmt1, state down
0d00h04m10s:I:System: Interface ethernet mgmt1, state up
0d00h04m09s:I:STP: VLAN 1 Bridge is RootBridge: 800000e052010000 (MgmtPriChg)
0d00h04m09s:I:System: Management MAC address changed to 0000.0001.0000
0d00h04m09s:I:Stack: Stack is operational due to FAIL-OVER
0d00h04m08s:I:Stack: Stack unit 1 has been elected as ACTIVE unit of the stack system
```

```
0d00h04m08s:I:STP: VLAN 1 Port 8/1/1 STP State -> DISABLED (PortDown)
0d00h04m08s:I:STP: VLAN 1 Port 8/1/1 STP State -> FORWARDING (PortDown)
0d00h04m08s:I:System: Interface ethernet 1/2/2, state down
0d00h04m06s:I:System: Interface ethernet 8/2/2, state down
```

Traditional Stack Management

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Managing a traditional stack through one IP address

Your Ruckus traditional stack can be managed through a single IP address. You can manage the stack using this IP address even if you remove the active controller or any member from the stack. You can also connect to the active controller through Telnet or SSH using this address. All management functions, such as SNMP, use this IP address to acquire MIB information and other management data.

Enabling or disabling stacking mode

When a unit is stack-enabled or joins a stack either actively or passively, it reserves priority queue 7 for stacking traffic control, assigns buffers for the stacking ports, and configures the first two 10-Gbps ports as stacking ports.

> **NOTE**
> Designated stacking ports cannot contain any configuration information, such as VLAN membership. If configuration information exists, **stack enable** will fail. You must remove all configuration information from the port and re-issue the **stack enable** command.

To enable stacking mode on a new unit before you add it to the stack, enter the following command.

```
device(config)# stack enable
Enable stacking. This unit actively participates in stacking
```

To see the configuration of the stack at any time, enter the **show running-config** command. Refer to Displaying running configuration information on page 185 for details.

Disabling stacking mode

To remove stacking capability, enter the **no stack enable** command. This prevents the unit from actively sending out probe messages; however, the unit could still be called to join a stack by an active controller. To prevent this, enter the **stack disable** command in device configuration mode.

The **stack disable** command prevents a unit from sending or listening for any stacking probe messages. In this mode, the unit cannot be forced to join a stack.

```
device# configure terminal
device(config)# stack disable
```

To restore the capability of the device to send and receive stacking probe messages, enter the **no stack disable** command in device configuration mode.

Traditional stack unit identification

Stack units are identified by numbers 1 though 12. You can display stack unit IDs by entering the **show stack** command.

A new device (one that has not been connected in a traditional stack or that has not been manually assigned a stack unit number) ships with a default number of 1. Once you enable stacking and the unit becomes part of a traditional stack, its default stack unit number changes to the lowest available number in the stack. You can configure the **stack suggested-id** command in a standalone unit before it joins a stack to assign this unit the suggested ID.

Stack units must each have a unique identification number. Every stack member, including any standalone units, retains its stack unit number unless that number is already being used in the stack, or until you manually renumber the unit using secure-setup. For more information about how to renumber stack IDs using secure-setup, refer to Renumbering stack units on page 179.

Controlling the stack through the CLI

A Ruckus traditional stack can be configured and managed using the command line interface (CLI). You can access the traditional stack and the command CLI in two ways:

- Through a direct serial connection to the console port
- Through a local or remote Telnet session using the stack IP address

You can initiate a local Telnet or SNMP connection by attaching a cable to a port and specifying the assigned management station IP address.

The stacking commands in the CLI are organized into the following levels:

- **Global** - Commands issued in global mode are applied to the entire stack.
- **Configuration mode** - In this mode, you can make configuration changes to the entire stack. To save changes across reloads, you must save them to the active controller startup-config file. The configuration mode contains sub-levels for individual units and ports, VLANs, routing protocols, and other configuration areas.
- **Stack unit configuration mode** - Commands issued in this mode apply to the specified stack unit. Configuration information resides in the active controller.

  NOTE
  By default, any user who can open a serial or Telnet connection to the traditional stack can access all of these CLI levels. To secure access, you can configure Enable passwords or local user accounts, or you can configure the active controller to use a RADIUS or TACACS/TACACS+ server for authentication. Refer to the *Ruckus FastIron Security Configuration Guide*.

Logging in through the console port

When a device becomes a stack member in a traditional stack, it establishes a remote connection to a virtual console port on the active controller. Input and output are relayed between the physical console port on the stack member and the virtual console port on the active controller. Because each stack member connects to an independent virtual console port on the active controller, the console ports on multiple stack units may be used simultaneously.

When a stack unit establishes communication with the active controller, it also establishes a remote console session to the active controller. In a normally functioning traditional stack, a console cable may be connected to any of the stack units and provide access to the same commands on the active controller.

To establish a remote console session on a stack unit, enter the **rconsole** command followed by the stack unit ID as shown in the following example.

```
device# rconsole 1
```

You can terminate a session between stack members in any of these ways:

- Enter the **logout** command at any level.
- Enter the **exit** command from the User EXEC level.

NOTE
For **rconsole** connections from stack units to the active controller, the escape sequence and other methods of terminating the session are not available.

NOTE
Error messages that are generated during a reload of the active controller do not appear on **rconsole** connections from stack units to the active controller. To see these error messages, you must connect a console cable to the active controller itself.

The following example shows how to establish a remote console session to a stack member and obtain status information. Notice that the **show stack** command on the stack member displays different information from what is shown when the **show stack** command is entered on the active controller.

A remote console session is established with stack unit 2 in the following example.

```
device# rconsole 2
Connecting to unit 2... (Press Ctrl-O X to exit)
rconsole-2@device# show stack
ID   Type          Role      Mac Address      Prio  State    Comment
2 D  ICX7750-48XGF standby   cc4e.246d.8d800  0     local    Ready
rconsole-2@device# exit
rconsole-2@device> exit
Disconnected.  Returning to local session...
```

NOTE
You can also use the **rconsole** command followed by the PE ID from a CB unit to reach a PE unit.

CLI command syntax for stack units

CLI syntax that refers to stack units must contain all of the following parameters:

- *stack-unit* - If the device is operating as a standalone, the stack-unit is 1. Stack unit IDs can be any number from 1 through 8.
- *slotnum* - This refers to a specific group of ports on each device.
- *portnum* - This must be a valid port number.

Traditional stack CLI commands

For more information about a specific traditional stacking command, refer to its command reference page in the *FastIron Command Reference*.

TABLE 18 Traditional stack configuration commands

Configuration command	Location of command description
default-ports	Configuring default ports on FastIron devices on page 163, the overview section for a specific device, or the configuration notes for the device
hitless-failover enable	Enabling hitless stacking failover on page 149
priority	Traditional stack unit priority on page 169
stack enable	Enabling or disabling stacking mode on page 159
stack disable	Enabling or disabling stacking mode on page 159
stack mac [mac-address]	Traditional stack management MAC address on page 163
stack persistent-mac-timer	Command deprecated in FastIron release 08.0.20
stack suppress-warning	Suppressing background stack diagnostic warnings on page 198
stack-port	Configuring default ports on FastIron devices on page 163

TABLE 19 Traditional stack executive commands

Executive command	Location of command description
clear stack ipc	Troubleshooting an unsuccessful stack build on page 198
copy flash flash	Copying the flash image to a stack unit from the active controller on page 175
image-auto-copy disable	Disabling Auto Image Copy on page 174
kill console	"Configuring TACACS/TACACS+ for devices in a traditional stack" in the *Ruckus FastIron Security Configuration Guide*
rconsole	Logging in through the console port on page 161
reload	Reloading a stack unit on page 180
stack secure-setup	The secure-setup utility on page 26
stack unconfigure	Unconfiguring a traditional stack on page 182
stack switch-over	Executing a hitless stacking switchover on page 151

TABLE 20 Traditional stack show commands

Show command	Location of command description
show chassis	Displaying traditional stack chassis information on page 188
show flash	Displaying traditional stack flash information on page 187
show interfaces stack-ports	Displaying stacking port interface information on page 195
show memory	Displaying traditional stack memory information on page 188
show module	Displaying stack module information on page 190
show running-config	Displaying running configuration information on page 185
show stack	Displaying general or detailed information about stack members on page 190 Displaying information about hitless stacking on page 155
show stack connection	Displaying stacking topology on page 184

TABLE 20 Traditional stack show commands (continued)

Show command	Location of command description
show stack detail	Displaying general or detailed information about stack members on page 190
show stack failover	Displaying information about stack failover on page 156
show stack flash	Displaying traditional stack flash information on page 187
show stack ipc	Troubleshooting an unsuccessful stack build on page 198
show stack link-sync status	Displaying information about link synchronization status on page 156
show stack neighbors	Displaying information about stack neighbors on page 194
show stack rel-ipc stats	Displaying reliable IPC statistics for stack units on page 193
show stack rel-ipc stats unit #	Displaying IPC statistics for a stack on page 192
show stack resource	*FastIron Command Reference Guide*
show stack stack-ports	Displaying stack port information on page 194
show statistics stack-ports	Displaying stacking port statistics on page 195
show version	Displaying software version information on page 186

Configuring default ports on FastIron devices

FastIron stackable devices typically ship with two default stacking ports configured. Use the **stack-port** command if you want to select only one of these factory default ports as the stacking port. If you do not configure **stack-port**, both default ports will operate as stacking ports.

Use the **default-ports** command to designate ports other than the factory default ports as stacking ports. You must designate any additional potential stacking ports using the **default-ports** command on each unit that will be included in the stack before building a stack. Once you have designated these ports using the **default-ports** command on all units, you can use any construction method to build a stack. The active controller then learns the port configuration for each unit.

NOTE
You cannot change the setting for a default port if the port is in use.

Refer to the section on a specific device in "Traditional Stacking by Device" for more information.

Traditional stack management MAC address

The traditional stack is identified in the network by a single MAC address, usually the MAC address of the active controller (the default). If a new active controller is elected, the MAC address of the new active controller (by default) becomes the MAC address for the entire stack. However, you can manually configure your stack to use a specified MAC address.

In a traditional stack, the management MAC address is generated by the software and is always the MAC address of the first port of the active controller. This ensures that the management MAC address remains consistent across stack reboots and helps prevent frequent topology changes that result from protocol enable, disable, and configuration changes.

When you are configuring Layer 2 protocols, such as STP, RSTP, and MSTP, on stack units, the management MAC address of the active controller acts as the Bridge ID.

Manually allocating the traditional stack MAC address

Beginning with FastIron release 08.0.20, when a stack is enabled, “hitless-failover enable” configuration is added, and a default stack MAC address is assigned if none is configured. The address assigned is the MAC address of the unit as shown in the output of the **show stack** command.

If necessary, you can manually configure your traditional stack to use a specific MAC address.

NOTE
The **stack mac** command may be useful for administration purposes; however, it should be used with caution to prevent duplication of MAC addresses.

```
ICX7750-26Q Router# configure terminal
ICX7750-26Q Router(config)# stack mac 0000.0000.0011
ICX7750-26Q Router(config)# show running-config
Current configuration:
!
ver 08.0.40b1T203
!
stack unit 1
  module 1 icx7750-20-qxg-port-management-module
  module 2 icx7750-qsfp-6port-qsfp-240g-module
  module 3 icx7750-6q-6port-qsfp-240g-module
  priority 255
  stack-port 1/2/1 1/2/4
stack unit 2
  module 1 icx7750-20-qxg-port-management-module
  module 2 icx7750-qsfp-6port-qsfp-240g-module
  module 3 icx7750-6q-6port-qsfp-240g-module
  priority 240
  stack-port 2/2/1 2/2/4
stack enable
stack mac 0000.0000.0011
!
```

To configure a stack MAC address manually, enter the following command in device configuration mode.

```
device# configure terminal
device(config)# stack mac 0000.0000.0011
```

The MAC address is a hexadecimal number in the format xxxx.xxxx.xxxx.

NOTE
Enter the **no** form of this command to revert to the use of the active controllers' MAC address.

The following example shows the stack MAC address being configured manually as confirmed in the **show running-config** command output.

```
ICX7750-26Q Router# configure terminal
ICX7750-26Q Router(config)# stack mac 0000.0000.0011
ICX7750-26Q Router(config)# show running-config
Current configuration:
!
ver 08.0.40b1T203
!
stack unit 1
  module 1 icx7750-20-qxg-port-management-module
  module 2 icx7750-qsfp-6port-qsfp-240g-module
  module 3 icx7750-6q-6port-qsfp-240g-module
  priority 255
  stack-port 1/2/1 1/2/4
stack unit 2
  module 1 icx7750-20-qxg-port-management-module
  module 2 icx7750-qsfp-6port-qsfp-240g-module
  module 3 icx7750-6q-6port-qsfp-240g-module
  priority 240
```

```
  stack-port 2/2/1 2/2/4
stack enable
stack mac 0000.0000.0011
!
```

To display the stack MAC address, enter the **show chassis** command.

```
ICX7450-48F Router# show chassis
The stack unit 1 chassis info:

Power supply 1 (AC - Regular) present, status ok
        Model Number:   23-0000144-02
        Serial Number:  0L8
        Firmware Ver:    A
Power supply 1 Fan Air Flow Direction:  Front to Back
Power supply 2 not present

Fan 1 ok, speed (auto): [[1]]<->2
Fan 2 ok, speed (auto): [[1]]<->2

Fan controlled temperature: 62.5 deg-C

Fan speed switching temperature thresholds:
                Speed 1: NM<----->63       deg-C
                Speed 2:       53<-----> 80 deg-C (shutdown)

Fan 1 Air Flow Direction:  Front to Back
Fan 2 Air Flow Direction:  Front to Back
Slot 1 Current Temperature: 44.5 deg-C (Sensor 1), 62.5 deg-C (Sensor 2), 52.0 deg-C (Sensor 3), 41.5 deg-C
(Sensor 4), 54.5 deg-C (Sensor 5)
Slot 2 Current Temperature: 41.0 deg-C (Sensor 1)
Slot 3 Current Temperature: 45.0 deg-C (Sensor 1)
Slot 4 Current Temperature: 45.0 deg-C (Sensor 1)
        Warning level.......: 70.0 deg-C
        Shutdown level......: 80.0 deg-C
Boot Prom MAC : cc4e.246d.1378
Management MAC: cc4e.246d.1378
```

NOTE
For field descriptions of the **show chassis** command, refer to Displaying traditional stack chassis information on page 188.

Traditional stack device roles and elections

There are three distinct roles played by units that are part of a traditional stack:

- Active controller
- Standby controller
- Stack member

Active controller

The active controller contains the saved and running configuration files for each stack member. The configuration files include the system-level settings for the stack and the interface-level settings for each stack member, as well as MIB counters and port status. The standby controller also has a synchronized copy of the active controller startup-config file in case the active controller fails.

When a stack is formed, the console function for each stack member is automatically redirected to the active controller console. The active controller console port handles all stack management functions, as well as ping activity, Telnet sessions, and TFTP

image downloads for every stack member. If you connect to the console port on a stack member that is not the active controller, you are automatically directed through the console of the active controller.

The active controller synchronizes its startup configuration with the standby controller and the rest of the stack members. You can recover the previous flash configuration of the standby controller and the stack members by issuing the **stack unconfigure** command. For an example of this command and the output generated, refer to Unconfiguring a traditional stack on page 182.

The active controller may reset the rest of the stack members, if necessary. However, if the active controller itself must be reset because of a role or ID change, you must issue the **reset** command.

If the active controller fails, the standby controller waits 30 seconds and then takes over as active controller, resetting itself and all other stack members. If the old active controller becomes operational, it may or may not resume its role as active controller, depending on the configured priorities.

Standby controller

In addition to the active controller, another stack member is elected as the standby controller. If the active controller fails, the standby controller takes over after a default interval of 30 seconds. If hitless stacking failover is enabled, the standby controller can take over immediately without reloading any unit.

The standby controller synchronizes its configuration with the active controller at each reset.

Bootup role

When a stack unit boots, it boots in a particular role, active controller, standby controller, or stack member, or as a standalone device. When the bootup role is standby controller or stack member, the CLI available to the unit is limited to **show** and **stack** commands. A unit in the role of standby controller or stack member does not act without instructions from the active controller.

The last line of the **show version** output identifies the unit role unless the unit is in standalone mode.

```
My stack unit ID = 1, bootup role = active
My stack unit ID = 3, bootup role = standby
```

NOTE
To convert a standby controller or stack member to a standalone device, use the **stack unconfigure me** command (refer to Unconfiguring a traditional stack on page 182).

Active controller and standby controller elections

Whenever there is a topology change in the stack (a reset, unit failure, or the addition or removal of members), elections are held to determine the status of the active controller and standby controller. The results of the election take effect after the next stack reset.

Certain conditions, in a particular order, determine which units serve as active controller and standby controller after an election. The hierarchy of factors achieves a predictable winner, regardless of the boot up sequence for a unit.

Active and standby controller elections are determined in a slightly different way when hitless failover (the default) is enabled. The order reduces traffic interruptions during unit reset.

- Boot as active controller - Indicates that a unit was previously active controller before the current boot sequence and will again assume the role of active controller when two standalone units are combined into a stack. When a third standalone unit joins the stack, the current active controller becomes subject to the other factors in this list. You can upgrade your current active controller to "boot as active controller" status by executing the **write memory** command.

The system interprets the **write memory** action as a directive to maintain the current active controller role regardless of resets or a new unit joining the stack.

- Greater number of members - The unit that has control over the greater number of stack members.
- Failover unit - In a two-unit stack, the unit that is active controller after a failover and has an up time of more than 10 minutes, when the second unit has an up time of less than three minutes.
- Priority - The unit with the highest priority value.
- Longer up time - The unit with the longest up time if the up time is at least 30 seconds longer than for any other unit. When up times are compared, there is no effect if the difference is less than 30 seconds.
- Lowest boot stack ID - The unit that has the lowest boot stack ID. Unit ID 1 is the lowest. The unit ID may be 1 through 12.
- MAC address - The member with the lowest MAC address.

When hitless failover is disabled, the following factors, in the order shown, are used to determine active and standby controllers.

- Boot as active controller - Indicates that a unit was previously active controller before the current boot sequence and will again assume the role of active controller when two standalone units are combined into a stack. When a third standalone unit joins the stack, the current active controller becomes subject to the other factors in this list. You can upgrade your current active controller to "boot as active controller" status by executing the **write memory** command. The system interprets the **write memory** action as a directive to maintain the current active controller role regardless of resets or a new unit joining the stack.
- Priority - The unit with the highest priority value.
- Greater number of members - The unit that has control over the greater number of stack members.
- Longer up time - An up time that is more than 30 seconds longer than the next one in size is considered. Where up times are compared, there is no effect if the difference is less than 30 seconds.
- Lowest boot stack ID - The unit that has the lowest boot stack ID. Unit ID 1 is the lowest. The unit ID may be 1 through 12.
- MAC address - The member with the lowest MAC address.

Active controller and standby controller resets

If hitless stacking failover is enabled, when an active controller is reset or removed from the stack, the standby controller takes over immediately.

NOTE
Hitless stacking failover is enabled by default in FastIron release 08.0.20 and later releases.

If hitless stacking failover is not enabled, the stack behaves differently when a failover occurs. When hitless stacking failover is not enabled and the active controller is reset or removed from the stack, the entire stack reloads, and active controller and standby controller elections are initiated. If the unit that previously functioned as the active controller is no longer part of the stack, the standby controller unit becomes the active controller. After a reset, if no stack member qualifies as active controller, the existing standby controller waits 120 seconds and then assumes the role of active controller.

If both the active and the standby controllers are removed, the rest of the stack continues to function because the other stack members are operating on whatever is programmed in the hardware. However, the stack members are not able to learn any new addresses. In this case, the following message is displayed every few minutes.

```
Stack member is non-operational because of no Active or standby controller
You can recover to standalone mode by "stack unconfigure me"
```

Use the **stack unconfigure me** command to restore the units as standalone devices with a pre-stacking configuration.

Standby controller selection based on priority configuration

You can choose a standby controller by configuring a stack unit with the second highest priority or with the same priority as the active controller. If the two stack units have the same priority configured, the standby controller takes over when the active controller fails. If the original active controller becomes active again, it does not win back its active role, which helps to minimize traffic interruption on the stack. However, if the original active controller has the higher priority and hitless failover is enabled, the active controller regains its role without resetting other stack units. If hitless failover is disabled, the active controller resets the other stack units after it regains control.

Two-unit stack controller selection scenario

In a two-unit stack, you can ensure that one unit resumes the active-controller role after a reset by assigning it a higher priority. However, assigning the two units the same priority reduces the number of resets during failover.

The following steps occur on failover when hitless failover is enabled and both members of a two-unit stack are configured with the same priority:

1. Unit 1 (the active-controller) resets.
2. The stack fails over to the standby controller (Unit 2).
3. Unit 1 returns to operation with the role of stack member.
4. Unit 2 (now acting as controller) sends a stack merge request to Unit 1.
5. Unit 1 resets and rejoins the stack as the standby controller.

If the active controller has a higher priority than the standby controller in a two-unit stack, the following steps occur:

1. Unit 1 (the active-controller) resets.
2. The stack fails over to the standby controller (Unit 2).
3. Unit 1 returns to operation.
4. Unit 2 (now acting as controller) sends a stack merge request to Unit 1.
5. Unit 1 resets and rejoins the stack as the active controller.
6. Unit 2 resets and returns to the stack as standby controller.

Standby controller election criteria

Standby controller election is based on the following criteria:

- The highest priority
- Bootup as active controller
- Bootup as standby controller
- The lowest boot stack ID
- The lowest MAC address

Because standby election candidates must have startup configurations that have been synchronized with the active controller, if the active controller does not have a startup-config.txt file, no standby controller is elected. Once the **write memory** command is executed on the active controller, the startup-config.txt file is written and synchronized to all stack members, and a standby controller can be elected.

Traditional stack unit priority

A unit with a higher priority is more likely to be elected active controller. The priority value can be from 0 through 255, with a priority of 255 being the highest. The default priority value assigned to the active controller and standby controller is 128.

You can assign the highest priority value to the stack unit you want to function as the active controller. When you enter a new priority value for a stack unit, that value takes effect immediately but does not affect the current active controller until the next reset. However, with hitless stacking failover enabled, the stack unit with the highest priority will become the active controller in about five minutes.

NOTE
Hitless stacking failover is enabled by default.

You can give your active controller and standby controllers the same priority or different priorities (active controller highest, standby controller second-highest). If the active controller and standby controller have the same priority, when the active controller fails and a standby controller with more members attached takes over, the original active controller is not able to resume its role.

However, if the priority of the active controller is higher than the priority of the standby controller, and if hitless stacking failover is disabled, the old active controller will regain its role and will reset the other units. If hitless stacking failover is enabled, the old active controller (with the higher priority) will become a standby controller, and later, the system will perform an internal switchover to make the old active controller the active controller without resetting other units.

As an example, suppose both the active controller and standby controller have the same priority. If there are more than two units in a stack and the active controller leaves and comes back, it cannot win back the active role because the new active controller now has more members, and the old active controller has none.

If hitless stacking failover is enabled (the default) and there are only two units in a stack, both the old active controller and the new active controller have no members, so the unit with the higher priority wins the active role. If the active and standby controller have the same priority, then the unit with the longer up time wins. If the old active controller stops responding or reloads, the standby controller takes over immediately. When the old active controller reloads and comes back as an active controller, there are two active controllers, which causes the stacks to merge. The old active controller loses the active controller election regardless of its priority because the new active controller is a failover unit (assuming it has an up time of more than 10 minutes and the other unit has an up time of less than three minutes, due to reset). Consequently, the old active controller is reloaded by the new active controller and boots up as a member. Then it is assigned the standby controller role. If the former active controller has a higher priority, the system triggers an internal switchover to make it the new active controller. If the former active controller has an equal priority, it remains the standby controller.

When the active controller and standby controller have the same priority, the system allows a stack switchover as long as hitless stacking failover is enabled. Hitless stacking failover allows the active controller and standby controller to switch roles without traffic interruption.

If you want to assign the same priority to the active controller and the standby controller, you must do so after the stack is formed. This prevents the intended standby controller from becoming the active controller during stack construction.

Changing the priority of a stack member triggers an election that takes effect immediately unless the active controller role changes and hitless stacking failover is disabled, in which case the member priority changes do not take effect until after the next stack reload. With hitless stacking failover, the stack unit with the highest priority becomes the active controller without reload.

To display stack member priority values, enter the **show stack** command.

```
ICX7750-48XGC# configure terminal
ICX7750-48XGC(config)# stack unit 3
ICX7750-48XGC(config-unit-3)# show stack
alone: standalone, D: dynamic config, S: static config
ID    Type          Role      Mac Address     Pri  State    Comment
```

```
1 S   ICX7750-48XGC active    0000.00eb.a900        128  local    Ready
2 S   ICX7750-48XGC standby   0000.004f.4243        0    remote   Ready, member after reload
3 S   ICX7750-48XGC member    0000.005d.a100        200  remote   Ready, active after reload
```

Changing the priority of a stack unit

To change the priority value for a stack unit, enter the **priority** command at the stack unit configuration level. The priority can be a value from 0 through 255, where 255 is the highest priority.

```
device# configure terminal
device(config)# stack unit 1
device(config-unit-1)# priority 128
```

Traditional stack software images

Consider the notes in this section when upgrading from a pre-stacking release to a stacking release or when reverting from a stacking release to a pre-stacking release.

Refer to the release notes and to the *Ruckus FastIron Software Upgrade Guide* for instructions about upgrading the software.

Confirming traditional stack software versions

All units in a traditional stack must be running the same software image. To confirm this, check the software version on all devices that you want to add to a traditional stack. Upgrade any units that are running older versions of the software before you build the stack.

To check the software version for each stack member, perform the following steps.

1. Use Telnet or SSH or connect to any of the console ports in the stack.
2. Enter the **show version** command. Output similar to the following is displayed.

```
ICX7750-26Q Router# show version
  Copyright (c) 2017 Ruckus Wireless, Inc. All rights reserved.
    UNIT 1: compiled on Jul 31 2015 at 18:37:27 labeled as SWR08040b1
      (20197181 bytes) from Primary SWR08040b1.bin
        SW: Version 08.0.40b1T203
    UNIT 2: compiled on Jul 31 2015 at 18:37:27 labeled as SWR08040b1
      (20197181 bytes) from Primary SWR08040b1.bin
        SW: Version 08.0.40b1T203
    UNIT 3: compiled on Jul 31 2015 at 18:37:27 labeled as SWR08040b1
      (20197181 bytes) from Primary SWR08040b1.bin
        SW: Version 08.0.40b1T203
      Compressed Boot-Monitor Image size = 1835008, Version:10.1.01T205 (swz10101)
       Compiled on Fri Jun 27 22:01:35 2014
```

NOTE
If any unit in the traditional stack is running an incorrect version of the software, it will appear as non-operational. You must install the correct software version on that unit for it to operate properly in the stack.

Stack mismatches

When a stack mismatch occurs, the active controller can put any stack member into a non-operational state, which disables all of the ports except the stacking ports. Stack mismatches can occur for a variety of reasons.

NOTE
After a stack mismatch, the active controller can still download an image to the non-operational unit.

The active controller generates a log message whenever it puts a stack unit into a non-operational state. The following examples describe the types of mismatches and the related log message:

- Advanced feature mismatch - The active controller is enabled for advanced features (such as BGP), and the stack unit is not enabled.

```
Stack: Unit 2 0000.0020.0100 doesn't have the matching advanced feature privileges
```

- Image mismatch - A stack unit is running a different software image than the active controller is running.

```
Stack: Unit 2 0000.0020.0100 image mismatch
```

- Configuration mismatch - The module configuration for a stack unit does not match the reserved configuration on the active controller.

```
Stack: Unit 2 0000.0020.0100 config mismatch
```

- Memory allocation mismatch - The active controller does not have enough memory to accommodate the stack unit.

```
Stack: Malloc failure for unit 2.0000.0020.0100
```

Advanced feature privilege mismatch

Advanced feature privileges must be enabled to run features such as BGP. For advanced features to operate across the stack, both the active controller and standby controller must be enabled for advanced features. A unit that is not enabled for these features is put into a non-operational state.

If the active controller is *not* enabled for advanced features, these features will not operate on the stack.

Minor mismatch for stack units

With a minor mismatch, an operating stack can still exist, but traffic is dropped from all ports except the stacking ports for units with the mismatched software. You can download the correct image to the mismatched devices from the active controller. A minor software mismatch means that there is no IPC or election algorithm change, but there is a release version disparity. Minor software mismatches can occur with patch release upgrades. The system logs and displays a message similar to the following.

```
Warning! put stack unit 2 to non-operational reason=image mismatch
```

The **show stack** command displays output similar to the following.

```
T=1h10m1.8: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7750-20QXG active  748e.f8f9.6300   0 local   Ready
2  S ICX7750-20QXG member  cc4e.2438.7280   0 remote  NON-OP: image mismatch
3  S ICX7750-20QXG standby cc4e.2438.7500   0 remote  Ready

    active       standby
     +---+        +---+        +---+
=2/1| 1 |2/4==2/1| 3 |2/4--2/1| 2 |2/4=
|   +---+        +---+        +---+   |
|                                     |
|-------------------------------------
```

Normally, the system recovers from a minor image mismatch using the Auto Image Copy feature. However, if the feature has been disabled or if the configuration of a stack unit does not match the configuration of the active controller, the stack unit does

not function. In this example, unit 2 is non-operational due to an image mismatch. To correct this situation, use the **copy flash flash** command. Refer to Copying the flash image to a stack unit from the active controller on page 175.

Major mismatch for stack units

A major mismatch indicates an Interprocessor Communications (IPC)-related data structure change, an election algorithm change, or a version of the software that does not support stacking. This can happen when the software undergoes a major change (such as a change from 05.0.00 to 05.1.00). When a major mismatch occurs, the system logs and displays a message similar to the following.

```
Warning! Recv 424 IPC in 1m from 0000.001b.a900 e1/1/25: wrong version 5 !=6. Please make sure all units
run the same image.
```

In a major mismatch, the stack cannot be built and will not operate. You must download the correct version of the software to the mismatched units individually.

Configuration mismatch for stack units

Generally, when a stack unit is added to or removed from the stack, its static configuration is not overwritten by the active controller. However, the active controller deletes the dynamic configuration for a unit if it leaves the stack.

A configuration mismatch occurs when the base module configuration for a replacement stack unit does not match the runtime configuration on the active controller. If the configuration on the active controller is static, it cannot be overwritten by the new configuration, and a configuration mismatch occurs.

Configuration mismatches can occur during manual setup when a unit is moved from one stack to another stack or when the ID of a unit is changed by secure-setup.

When you renumber identical units using secure-setup, the configurations are not mapped to the new units (because they match exactly). However, if you switch the IDs of units that are not identical, a configuration mismatch occurs.

When a configuration mismatch occurs, port-related functions on all ports are disabled on the mismatched unit (except for the stacking ports). All other functions are unaffected. For example, the active controller can still copy the unit's image or reset the unit.

Recovering from a stack unit configuration mismatch

When a configuration mismatch occurs, the active controller logs and displays a configuration mismatch message and puts the mismatched unit into a non-operational state. In the following example, the original stack unit 3 has failed, and a replacement unit has been installed that does not match the configuration of the original unit. You should see the following message.

```
Warning! put stack unit 3 to non-operational reason= config mismatch
```

Complete the following steps to recover from a configuration mismatch.

1. Enter the **show stack** command to see the status of the stack, and the **show running-config** command to see the configurations of the stack units.

```
ICX7750-26Q Router# show stack
T=1h38m40.5: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7750-20QXG active  748e.f8f9.6300   0 local   Ready
2  D ICX7750-20QXG member  cc4e.2438.7280   0 remote  Ready
3  S ICX7750-20QXG member  cc4e.2438.7500   0 remote  NON-OP: config mismatch

ICX7750-26Q Router# show running-config
Current configuration:
!
ver 08.0.40b1T203
!
stack unit 1
  module 1 icx7750-20-qxg-port-management-module
  module 2 icx7750-qsfp-6port-qsfp-240g-module
  module 3 icx7750-6q-6port-qsfp-240g-module
  stack-trunk 1/2/1 to 1/2/2
  stack-trunk 1/2/4 to 1/2/6
  stack-port 1/2/1 1/2/4
stack unit 2
  module 1 icx7750-20-qxg-port-management-module
  module 2 icx7750-qsfp-6port-qsfp-240g-module
  module 3 icx7750-6q-6port-qsfp-240g-module
  stack-trunk 2/2/4 to 2/2/5
  stack-port 2/2/1 2/2/4
stack unit 3
  module 1 icx7750-48-xgc-port-management-module
  module 2 icx7750-qsfp-6port-qsfp-240g-module
  stack-port 3/2/1 3/2/4
stack enable
stack mac 748e.f8f9.6300
!
```

2. To resolve the mismatch, you must remove the configuration for stack unit 3. Use the **no stack unit** command in configuration mode.

```
device# configure terminal
device(config)# no stack unit 3
```

   This removes configuration related to unit 3.

   If you are unable to remove the configuration because of a multi-slot trunk configuration or other configuration identified by system output, you must first manually remove the problem configuration.

   When you have successfully deleted the mismatched stack unit, a re-election is triggered, and the active controller learns the correct module configuration from the standby controller or from other stack members. No reload is required.

Memory allocation failure

A memory allocation (malloc) failure occurs when the active controller does not have enough memory to run a stack unit. This failure may occur if you configure a large number of VLANs (for example, 4000) or STP instances (for example, 255) in the router image. A memory allocation failure message means that the active controller is low on memory after allocating these resources and does not have enough remaining memory to control a stack member. You can correct this by reducing the number of VLANs or STP instances.

NOTE
After you make configuration changes, such as the number of VLANs or STP instances, you must reset the stack.

Auto Image Copy for stack units

The Auto Image Copy feature ensures that all units in a stack are running the same flash image after a stack merge. This feature also enables automatic reload of the stack units. It prevents the image mismatch that occurs when one or more member units join the stack with a different running image and signature than the active controller and standby controller.

Auto Image Copy is enabled by default on devices, and the user does not have to manually copy the active controller's running image to the mismatched members.

Auto Image Copy limitations

The following limitations apply to the Auto Image Copy feature:

- Auto Image Copy is applicable only to those stack units that are in a non-operational image mismatch state.
- Auto Image Copy does not work if there is a major image mismatch, when the image version of the IPC is different from the stack unit version.
- Auto Image Copy does not work if the user has copied a different image into the flash, creating a mismatch in versions between the flash and the running image on the active controller for the stack.

Verifying Auto Image Copy

Use the **show stack detail** command to check for any units in the mismatch state after the stack is formed. The following example shows that stack unit 2 is not operational, due to an image mismatch.

```
T=1h10m1.8: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7750-20QXG active  748e.f8f9.6300   0 local   Ready
2  S ICX7750-20QXG member  cc4e.2438.7280   0 remote  NON-OP: image mismatch
3  S ICX7750-20QXG standby cc4e.2438.7500   0 remote  Ready

    active       standby
     +---+        +---+        +---+
=2/1| 1 |2/4==2/1| 3 |2/4--2/1| 2 |2/4=
|   +---+        +---+        +---+   |
|                                     |
|-------------------------------------
```

Disabling Auto Image Copy

Auto Image Copy is enabled by default. However, if you wish to disable this feature, enter the following command in global configuration mode.

```
device(config)# image-auto-copy disable
```

Use the **no image-auto-copy disable** command to enable Auto Image Copy. This restarts Auto Image Copy immediately and ensures that all stack units have the same image.

NOTE
You can use the **show running-config** or the **show stack detail** command to see if Auto Image Copy is disabled.

Copying the flash image to a stack unit from the active controller

You can replace a bad image on a stack unit or an image that does not match the active controller's image by copying the correct flash image from the active controller.

> **NOTE**
> In most cases, you do not have to manually copy the flash image to a mismatched stack unit. For more information, refer to Auto Image Copy for stack units on page 174.

To copy the flash image to a stack unit from the active controller primary or secondary flash, enter the following command at the device prompt.

```
device# copy flash flash unit-id-pri 2
```

Syntax: copy flash flash [**primary** | **secondary** | **unit-id-pri** *unit-num* |**unit-id-sec** *unit-num*]

- **primary** - Copy secondary to primary
- **secondary** - Copy primary to secondary
- **unit-id-pri** - Copy active primary image to unit ID
- **unit-id-sec** - Copy active secondary image to unit ID

The **unit-id-pri** and **unit-id-sec** keywords are used to copy images to a stack member from the active controller primary and secondary flash, respectively. For *unit-num*, enter a valid stack unit number from 1 through 12.

Configuring stacking trunks in a live environment

To create or modify a trunk in a production environment, use the **multi-stack-trunk** command. The **multi-stack-trunk** command is used to ensure that a stack trunk is formed on two directly connected stack units at the same time. The **multi-stack-trunk** command can only be enabled on the active controller unit.

By configuring a multi-stack trunk on two sets of connected stack ports, a trunk-to-port connection is avoided. A trunk-to-port connection is formed when one side of the ports forms a trunk, and the other side of the ports does not. A trunk-to-port connection can result in dropped packets and can potentially break a stacking link.

The following example shows a trunk being formed between stack units 1 and 2 and another trunk being formed between stack units 2 and 3.

```
device(config)# stack unit 1
device(config-unit-1)# multi-stack-trunk 1/2/3 to 1/2/4 and 2/2/1 to 2/2/2
device(config-unit-1)# stack unit 2
device(config-unit-2)# multi-stack-trunk 2/2/3 to 2/2/4 and 3/2/1 to 3/2/2
```

Use the **no** form of the **multi-stack-trunk** command to disable the configuration of the two connected stack trunk ports.

A stack trunk cannot be removed if the primary port is down. The primary ports of the stack trunk must be connected and operational to use the **no multi-stack-trunk** command. If the primary stack trunk ports are not connected and are not operational, the command is rejected, and the following error message is displayed.

```
Error- Primary trunk port 1/2/3 is not UP; removing the trunk might break the stack
```

Displaying multi-trunk stacking configuration

The **multi-stack-trunk** command is used on live stacks and is effectively a combination of two **stack-trunk** commands to ensure that a trunk-to-trunk connection is created on both ends of a stack link simultaneously. When the **multi-stack trunk** command is used to create a trunk, the configuration is saved as stack trunk ports, and the running configuration displays the stack trunk details on both ends under the heading `stack unit <unit> configuration`. Use the **show running-config** command to display the related configuration under **stack-trunk** and**stack-port** as shown in the following example.

In the following code sample, a two-port trunk is created between stack units 1 and 2.

```
ICX7750-48C Router(config-unit-1)# multi-stack-trunk 1/2/4 to 1/2/6 and 2/2/4 to 2/2/6
```

For the multi-stack trunk created in the previous example, the running or startup configuration displays the following configuration for the **show running-config** command.

```
ICX7750-48C Router# show running-config
Current configuration:
!
ver 08.0.30aT203
!
stack unit 1
module 1 icx7750-48-xgc-port-management-module
module 2 icx7750-qsfp-6port-qsfp-240g-module
stack-trunk 1/2/4 to 1/2/6
stack-port 1/2/1 1/2/4
stack unit 2
module 1 icx7750-48-xgc-port-management-module
module 2 icx7750-qsfp-6port-qsfp-240g-module
stack-trunk 2/2/4 to 2/2/6
stack-port 2/2/1 2/2/4
stack enable
```

Error messages encountered when configuring a stacking trunk

The following error messages may occur when you configure a trunk on a FastIron traditional stack:

- If you form a multi-trunk connection on two sets of stack ports that are not directly connected on neighboring units, the **multi-stack-trunk** command is rejected, and an error message similar to the follow example is displayed.

  ```
  Error! 1/2/3 has no connection. Please use "stack-trunk".
  ```

- When a unit joins or leaves a stack, or a stack trunk is configured using the **stack-trunk** command, a stack election is triggered. The **multi-stack-trunk** command triggers a stack election among the stack units and reprograms (or removes) the stack trunk port in the hardware. A timer is set on all units to coordinate a stack election. Traffic is generally interrupted for less than 5 seconds for the system to detect the port down event and reprogram hardware. You must wait for the stack election to be completed before entering another command. If you do not wait for the stack election to finish, the following warning message is displayed.

  ```
  Stack port or trunk change is in progress, please try later.
  ```

- You cannot enter the **stack switch-over** command until the stack election is completed or until the **multi-stack-trunk** command configuration is complete. If you enter the **stack switch-over** command too early, the following warning message is displayed.

  ```
  Please try later, reason: during stack port or trunk deployment.
  ```

- You cannot use the **stack-port** command to remove a stacking port if the port is part of a stack trunk. You must first remove the stack trunk and then remove the stack port. Use the **stack-trunk** command or the **multi-stack-trunk**

command to remove the stack trunk. If you attempt to remove the stack port before removing the stack trunk, an error message similar to the following example is displayed.

```
Please remove stack-trunk 1/2/3 - 1/2/4 using "stack-trunk" or "multi-stack-trunk" command before
removing stack port 1/2/3.
```

Adding, removing, or replacing units in a traditional stack

You can add, remove, or replace traditional stack units using secure-setup or manually using static configuration. The recommended method is to connect units to the stack before you supply power to the units; however, you can also connect powered units.

Installing a new unit in a traditional stack using secure-setup

This method can be applied to clean units or units that have existing configurations.

1. Connect the new unit to the stack by connecting the appropriate stacking ports.
2. Run secure-setup on the active controller, and assign an ID to the new unit. The active controller resets the new unit.
3. Once the new unit boots and joins the stack, enter the **write memory** command on the active controller.

Installing a new unit using static configuration

If the new unit is a clean unit and the connection is sequential, you can add the unit to a stack using the static setup process.

1. Enter the module configuration of the new unit into the active controller configuration.
2. Connect the new unit to the stack using the 10-Gbps stacking ports. The sequence in which you connect the unit must match the sequence in the active controller configuration. The active controller automatically resets the unit.
3. Once the new unit boots and joins the stack, enter the **write memory** command on the active controller. You should see a message similar to the following example.

```
Done hot swap: Set stack unit 3 to Fully-Operational:16
```

Configuration notes

Configuration of a new unit can be learned in the following ways.

- If the active controller has no configuration information for the new unit, it learns the new unit's configuration. This is a dynamic configuration that disappears if the new unit leaves the stack. To retain the configuration on the active controller (to make it a static configuration), you must execute the **write memory** command on the active controller.
- If the active controller has configuration information for a new unit that matches the base module (module 1) of the new unit, the new unit may be placed in the operational or configuration mismatch (non-operational) state depending on the matching of other modules. For example, if the active controller has configuration information for another module (such as module 3), but the new unit has no module 3, the new unit will be operational. However, if the new unit has a module 3, but it does not match the configured module type, the new unit will be non-operational due to configuration mismatch.
- A user can return a configuration-mismatched unit to operation by configuring the **no stack unit** command for the non-operational unit from the active controller. This removes the entire stack configuration so the active controller can learn

the configuration-mismatched unit as a new unit. The active controller triggers an election and learns the unit. Refer to Recovering from a stack unit configuration mismatch on page 172.

Removing a unit from a traditional stack

To remove a unit from the stack, disconnect the cables from the stacking ports. This can be done whether the units are powered on or powered off. When you remove a unit that is powered on, it is still in stacking-enabled mode. To remove the stacking files, enter the **stack unconfigure me** or **stack unconfigure clean** command.

The **stack unconfigure me** command returns a unit to the state it had before joining a stack and recovers its startup configuration. The **stack unconfigure clean** command removes the unit's startup configuration. When you issue either command, the unit operates as a standalone unit once it reboots.

When a unit is removed from a stack, the active controller deletes the unit configuration if it has been dynamically learned. Refer to Traditional stacking terminology on page 17 for definitions of static and dynamic configurations.

Replacing traditional stack units

Use one of the following methods to replace older stack units. The first section describes how to replace an individual unit. The following sections explain how to replace multiple units and how to use secure-setup.

Replacing one traditional stack unit with a clean traditional stack unit

If the stack unit ID numbering is sequential, you can swap a failed unit with an identical clean unit using this procedure.

1. Remove the old unit from the stack.
2. Make sure that the hardware (module) configuration of the replacement unit is identical to the hardware configuration of the failed unit.
3. Connect the new unit to the stack using the same stacking ports as the old unit.
4. If the replacement unit configuration matches the configuration retained on the active controller, the active controller resets the new unit. The new unit automatically becomes active in the stack, and the stack keeps its original topology.

Replacing multiple traditional stack units with multiple clean traditional stack units

If you are replacing multiple old units with clean units, the active controller replaces the unit with the lowest ID first. For example, if you remove units 5 and 6, the active controller assigns ID 5 to the first new device you install. If you wanted this particular unit to replace unit 6 instead of unit 5, you must use secure-setup.

Using secure-setup to replace traditional stack units

You must use secure-setup to replace traditional stack units in the following cases:

- The replacement is not a clean unit.
- The connection is not sequential.
- You do not want the active controller to trigger an automatic replacement.

Use the following steps.

1. Remove the old stack unit from the stack.
2. Connect the new unit to the existing stack using the same stacking ports as the old unit.

3. Run secure-setup to select the ID of the old unit for the new unit. The active controller resets the unit, and it joins the stack.

NOTE
Adding, removing, or replacing a stack unit that is not at the end of a linear topology may cause the other units in the stack to reset if these units lose their path to the active controller during the change. Adding or removing a unit in a ring topology should not cause the other units to reset because each unit can still find a path to the active controller.

Moving a unit to another stack

Moving a member from one stack to another stack can cause non-sequential ID assignment. The active controller will honor the original ID of the newly added unit if the ID is not already in use. The active controller assigns a new ID if the original ID is already in use. To prevent non-sequential stack ID assignments, configure the unit as a clean unit before adding it to the stack.

Removing an active controller from a powered stack

To remove an active controller from a powered stack, disconnect the active controller. The standby controller waits for 30 seconds and then assumes the role of active controller. If hitless failover is enabled on the stack, the standby controller takes over immediately. A single active controller device functions as a standalone unit even if it is still stacking-enabled. You do not have to issue a **stack unconfigure me** command for an active controller.

Renumbering stack units

You can use the **stack secure-setup** command to renumber stack units in a previously constructed stack. The most effective way to number your stack members is sequentially. You can skip numbers, but stack ID numbers should still be sequential. Sequential numbering makes it easier to replace stack units or to troubleshoot issues.

NOTE
In a ring topology, 1, 2, 4, 5, and 1, 5, 4, 2 are both sequential.

In the following example, three units make up a stack, but two of the units are numbered 5 and 6 (the active controller is numbered 1). Because this stack only contains three units, you can renumber the other units so that they are unit 2 and unit 3.

```
ICX7750-48XGC# stack secure-setup
ICX7750-48XGC# Discovering the stack topology...
Available UPSTREAM units
Hop(s)  Type           MAC Address
1       ICX7750-48XGC  0000.00d5.2100
2       ICX7750-48XGC  0000.005d.9940
Enter the number of the desired UPSTREAM units (1-2)[1]: 2
Selected topology:
Active id  Type          MAC Address
     1     ICX7750-48XGC 0000.0039.2d40
Selected UPSTREAM units
Hop(s)   id  Type           MAC Address
1         5  ICX7750-48XGC  0000.00d5.2100
2         6  ICX7750-48XGC  0000.005d.9940
Do you accept the unit ids? (y/n)?: n
Enter an unused id for the UPSTREAM ICX7750-48XGC unit a 1 hop(s) (1-8)[5]: 2
Enter an unused id for the UPSTREAM ICX7750-48XGC unit at 2 hop(s) (1-8) [6]: 3
ICX7750-48XGC# Election, was active, no role change, assigned-ID=1
reset unit 2: diff bootup id=5
reset unit 3: diff bootup id=6
```

```
Election, was active, no role change, assigned-ID=1
ICX7750-48XGC# show stack
ID  Type          Role    MAC Address        Pri  State    Comment
1 S ICX7750-48XGC active  0000.0039.2d40     128  local    Ready
2 S ICX7750-48XGC standby 0000.00d5.2100       0  remote   Ready
3 S ICX7750-48XGC member  0000.005d.9940       0  remote   Ready
```

Configuration notes for renumbering stack units

- Renumbering may cause loss of a unit configuration if the stack unit base module does not match the configuration on the active controller. However, secure-setup renumbering never changes the interface configuration. For example, if you switch the IDs of identical units 2 and 3, the active controller does not change 2/1/5 to 3/1/5 and vice versa.
- If you assign an ID with an associated configuration to a stack unit with a different configuration, secure-setup changes the static configuration into a dynamic configuration so it can be overwritten by the learned configuration.
- Swapping IDs for two or more identical units (for example, if units 2, 3, and 4 are identical, changing 2 to 3, 3 to 4, and 4 to 2) does not affect unit configuration except that the units are reset and assume the new IDs.
- If you swap IDs for two units that are not identical (for example, unit 2 has 48 ports, and unit 3 has 24 ports), you may cause a configuration mismatch. If this happens, the active controller removes the configurations and resets both units. When both units boot with new IDs, the active controller learns their module types and creates new *unit* configurations for both. However, all *interface configuration* information related to units 2 and 3 is removed.
- When you renumber identical units using secure-setup, the configurations are not mapped to the new units (because the configurations match exactly). However, if you switch IDs on units that are not identical, a configuration mismatch occurs. Refer to Recovering from a stack unit configuration mismatch on page 172.
- When you assign an unused ID to a stack unit, the unit is reset with the new ID. All unit and interface configuration information related to the old stack ID is deleted. The active controller learns the configuration for the new unit.
- Secure-setup does not swap configuration information for units that have had their IDs changed. For example, it does not change the 2/1/3 interface configuration or VLAN membership information into 3/1/3 information if the unit ID changes from 2 to 3.
- If the configuration for a unit being replaced does not match the new unit type, the active controller removes the unit configuration and associated interface configuration.
- All configurations learned following mismatches or the addition of new units are dynamic configurations. To convert them into static configurations, execute a **write memory** command on the active controller. This command preserves the configuration if a unit is removed from the stack.

Reloading a stack unit

Use the **reload** command to reload one or more stack units, for example, when necessary to repair a malfunctioning unit. Stack units can be reloaded only if they are not the active controller. When hitless stacking failover is enabled, the active controller is automatically reloaded.

When the **reload** command is entered on the active controller without the **unit-id** parameter as shown in the following example, the entire stack reloads.

NOTE

```
device# reload
```

Syntax: reload [**after** *duration* | **at** *time* | **cancel** | **unit-id** *unit-list*]

- **after** - Schedules reloading after a specified length of time (*duration* in seconds, entered as a value from 1 to 4096)

- **at** - Schedules reloading at an exact later time (*time*, entered in the format: hh:mm:ss, where hh represents hours from 01 to 24, mm represents minutes, from 00 to 59, and ss represents seconds, from 0 to 59)
- **cancel** - Cancels scheduled reload
- **unit-id** - Designates stack member or members to reload. The *unit-list* variable can be a single ID, a list of IDs, a range of IDs, or a combination, such as 2,4-6,8. Values must be separated by a comma, with no space.

If you need to reload the active controller, use the **stack switch-over** command. When switchover occurs, the original active controller can be reloaded using the **reload unit-id** command.

Managing traditional stack partitioning

Ring topology stacks do not partition when a stack member fails. Operation is interrupted briefly while the stack recalculates a new path. Ring topologies are more stable than linear topologies because they provide redundant pathways in case of accidental failure.

When a unit in a traditional stack with a linear topology fails, the traditional stack divides (partitions) into two or more separate stacks that all have the same configuration. This may cause an IP address conflict in the network. To keep the stacks separate, change the IP address of each new stack.

When a stack breaks into partitions, the partition with the active controller remains operational. If a partition contains the standby controller, this partition becomes operational because the standby controller assumes the active role and reloads the partition units. However, if hitless failover is enabled, the partition units are not reloaded. A partition without an active controller or standby controller does not function. To reconfigure these units to act in standalone mode, you must first enter a **stack unconfigure me** command on each unit.

To reverse the partitioning, reconnect all of the units into the original stack topology using the stacking ports. This is the same as merging stacks. If the original active controller again has the highest priority, it regains its role. If two partition active controllers have the same priority, the active controller with the most stack members is elected. This process helps minimize traffic interruption.

Merging traditional stacks

Traditional stacks may be merged, but the total number of stack units must not exceed the maximum stack supported by the device. For example, you could combine two stacks of ICX 7750 devices with four units each into a single stack of eight units.

NOTE
You cannot use secure-setup to merge stacks because secure-setup does not work across stack boundaries.

You can merge stacks by connecting them together using the stacking ports. Before doing this, make sure that no stacking ports (for example, ports on an end unit in a linear stack topology) have been reconfigured as data ports.

When stacks are merged, an election is held among the active controllers. The winning controller retains its configuration and the IDs of all of its original stack members. The remaining stack units lose their configuration and are reset. If the IDs of the losing stack units conflict with the IDs of the winning units, they may change, and the IDs will no longer be sequential.

NOTE
You can use secure-setup to renumber the members in the newly merged stack. Refer to Renumbering stack units on page 179 for more information.

The following examples show how stack merging works:

- If a stack partitions into multiple stacks because of a connection failure, you can fix the connection and the stack partitions will merge back into the original stack with no change to stack IDs because all stack IDs are distinct.
- In a linear stack topology, the end units of the stack have only one stacking port configured. Before you can merge two linear stacks, you must reconfigure the end units so that both ports are stacking ports.

Unconfiguring a traditional stack

The **stack unconfigure** command is a runtime command that returns stack units to their pre-stacking state. When a stack unit is unconfigured, its stacking flash is removed, and its startup-config.txt flash file is recovered. These actions apply to all units to which this command is applied, regardless of the role of the unit in the stack.

When the **stack unconfigure** command is applied to the active controller, it removes **stack enable** from the runtime configuration but not from the startup configuration. If you want to remove the **stack enable** command from the active controller permanently, you must enter the **write memory** command after the **stack unconfigure** command.

When the **stack unconfigure** command is applied to the standby controller or a stack member (besides the active controller), it removes **stack enable** from the recovered startup-config.txt file and resets the unit.

NOTE
When a stack member becomes a standalone unit after the **stack unconfigure** command, it could become a clean unit if it had no startup configuration flash. When a clean unit matches the active controller's static configuration, the active controller integrates the clean unit into the stack. Thus, the standalone unit is reloaded to be a member of the stack. Users can avoid this problem by disconnecting the member unit from the stack and issuing the **stack unconfigure me** command on the unit to change it to a standalone unit.

To remove the configuration from a specific traditional stack unit or from the entire stack, enter a command similar to the following.

```
device# stack unconfigure me
```

Syntax: stack unconfigure [*stack-unit* | **all** | **me** | **clean**]

- *stack-unit* - Unconfigures the stack member with this ID
- **all** - Unconfigures every unit including this unit
- **me** - Unconfigures this unit only
- **clean** - Removes all startup configuration files including v4 and v5 and makes this a clean unit

NOTE
The **stack unconfigure me** command can be entered from any unit; however, **stack unconfigure all** and **stack unconfigure** *stack-unit* commands can be issued only on the active controller.

The following example shows a session where stack unit 2 is unconfigured.

```
ICX7750-48XGC# show stack
alone: standalone, D: dynamic config, S: static config
ID   Type          Role    MAC Address       Pri State    Comment
1 S  ICX7750-48XGC active  0000.00eb.a900    128 local    Ready
2 S  ICX7750-48XGC standby 0000.004f.4243      0 remote   Ready
3 S  ICX7750-48XGC member  0000.0001.0100      0 remote   Ready
ICX7750-48XGC# stack unconfigure 2
Will recover pre-stacking startup config of this unit, and reset it. Are you sure? (enter 'y' or 'n'): y
Stack 2 deletes stack bootup flash and recover startup-config.txt from .old
ICX7750-48XGC# show stack
alone: standalone, D: dynamic config, S: static config
```

```
ID   Type          Role    MAC Address       Pri State    Comment
1 S  ICX7750-48XGC active  0000.00eb.a900    128 local    Ready
2 S  ICX7750-48XGC member  0000.0000.0000      0 reserved
3 S  ICX7750-48XGC standby 0000.0001.0100      0 remote   Ready
```

When the **stack unconfigure 2** command is issued, stack unit 2 recovers the startup-config.txt from the startup-config.old configuration file that was saved when this unit downloaded its configuration from the active controller. As the output shows, stack member 2 has been removed from the stack, and ID 2 is now reserved for a replacement unit. Stack member 3 is now the standby controller.

Syslog, SNMP, and traps for stack units

Syslog messages from stack units are forwarded to, and can be viewed from, the active controller.

All stack units support SNMP gets, sets, and traps, which are managed by the active controller. An SNMP trap is sent from a stack unit to the stack active controller and forwarded from the active controller to an SNMP-configured server. An external network management station can execute SNMP gets and sets for MIBs and collect information about any port on the stack.

SNMP traps can be configured for the insertion or removal of a stack unit or uplink module, and for optic identification.

For more information about syslog messages, refer to the *Ruckus FastIron Management Configuration Guide*.

Configuring SNMP for a traditional stack

SNMP server and feature configuration is the same for a traditional stack as for standalone units. In a traditional stack, SNMP gets and sets are processed by the active controller for the standby controller and all stack members. SNMP traps generated by the standby controller and stack members are propagated to the configured SNMP server through the active controller. For more information about how to configure an SNMP server for FastIron devices, refer to the *Ruckus FastIron Management Configuration Guide*.

SNMP engine IDs for stackable devices

NOTE
Beginning with FastIron release 08.0.20, when a stack is enabled, "hitless-failover enable" configuration is added, and a default stack MAC address is assigned if none is configured. The MAC address of the unit is displayed in **show stack** command output.

For Ruckus stacking devices, if an engine ID is not manually created or a stack MAC address is not specified and saved, the stack loses its engine ID when the active controller fails and the standby controller takes over because the standby controller creates a new engine ID at bootup. To prevent this from happening, create a new engine ID or a new stack MAC address to save the engine ID to the startup configuration. This should be done before the SNMPv3 user is created.

If a new active controller is elected (for example, the standby controller becomes the active controller), you will see the following results:

- If you have configured the engine ID and saved it to the startup configuration file, the new stack configuration uses the saved engine ID.
- If you have not configured an engine ID, but a stack MAC address is configured, the new stack configuration retains the original engine ID because it is based on the stack MAC address.

- If you have not configured an engine ID and no stack MAC address is configured, the new stack configuration uses the default engine ID. The default engine ID is based on the stack's own management MAC address for the new active controller. Because the engine ID has changed, any SNMPv3 clients must be reconfigured with the new engine ID.

Displaying traditional stack information

This section describes the **show** commands for a traditional stack and includes output examples and field descriptions.

Displaying stacking topology

The **show stack connection** command displays the topology and a detailed connection report. It also displays connection errors or hardware failures as shown in the following sample output.

```
ICX7750-48F Router# show stack connection
Probing the topology. Please wait ...
ICX7750-48F Router#
active
    +---+        +---+        +---+        +---+        +---+        +---+
-2/1| 1 |2/4--3/1| C |3/4==2/1| B |2/4==2/1| A |2/4--2/1| 9 |2/4--2/1| 8 |2/4-
|   +---+        +---+        +---+        +---+        +---+        +---+   |
|                                                                             |
|  standby                                                                    |
|   +---+        +---+        +---+        +---+        +---+        +---+   |
-2/4| 2 |2/1--2/4| 3 |2/1--2/4| 4 |2/1==2/4| 5 |2/1--2/4| 6 |2/1==2/4| 7 |2/1-
    +---+        +---+        +---+        +---+        +---+        +---+
trunk probe results: 12 links
Link 1: u1 -- u2, num=1
1: 1/2/1 (P0) <---> 2/2/4 (P1)
Link 2: u1 -- u12, num=1
1: 1/2/4 (P1) <---> 12/3/1 (P0)
Link 3: u2 -- u3, num=1
1: 2/2/1 (P0) <---> 3/2/4 (P1)
Link 4: u3 -- u4, num=1
1: 3/2/1 (P0) <---> 4/2/4 (P1)
Link 5: u4 -- u5, num=2
1: 4/2/1 (T0) <---> 5/2/4 (T1)
2: 4/2/2 (T0) <---> 5/2/5 (T1)
Link 6: u5 -- u6, num=1
1: 5/2/1 (P0) <---> 6/2/4 (P1)
Link 7: u6 -- u7, num=3
1: 6/2/1 (T0) <---> 7/2/4 (T1)
2: 6/2/2 (T0) <---> 7/2/5 (T1)
3: 6/2/3 (T0) <---> 7/2/6 (T1)
Link 8: u7 -- u8, num=1
1: 7/2/1 (P0) <---> 8/2/4 (P1)
Link 9: u8 -- u9, num=1
1: 8/2/1 (P0) <---> 9/2/4 (P1)
Link 10: u9 -- u10, num=1
1: 9/2/1 (P0) <---> 10/2/4 (P1)
Link 11: u10 -- u11, num=2
1: 10/2/1 (T0) <---> 11/2/4 (T1)
2: 10/2/2 (T0) <---> 11/2/5 (T1)
Link 12: u11 -- u12, num=2
1: 11/2/1 (T0) <---> 12/3/4 (T1)
2: 11/2/2 (T0) <---> 12/3/5 (T1)
CPU to CPU packets are fine between 12 units.
```

TABLE 21 Field definitions for the show stack connection command

Field	Description
T0	Identifies Trunk 0
T1	Identifies Trunk 1

Displaying running configuration information

The **show running-config** command displays information about the current stack configuration.

```
ICX7750-48C Router#
ICX7750-48C Router# show running-config
Current configuration:
!
ver 08.0.30aT203
!
stack unit 1
module 1 icx7750-48-xgc-port-management-module
module 2 icx7750-qsfp-6port-qsfp-240g-module
stack-trunk 1/2/4 to 1/2/6
stack-port 1/2/1 1/2/4
stack unit 2
module 1 icx7750-48-xgc-port-management-module
module 2 icx7750-qsfp-6port-qsfp-240g-module
stack-trunk 2/2/4 to 2/2/6
stack-port 2/2/1 2/2/4
stack enable
stack mac cc4e.2439.1680
!!
ip dns domain-list englab.ruckuswireless.com
ip dns server-address 10.31.2.10
!!
hitless-failover enable
!!
interface management 1
ip address 10.21.242.124 255.255.255.128 dynamic
!!
end
ICX7750-48C Router#
```

TABLE 22 Field descriptions for the show running-config command

Field	Description
ver	Software version the stack is running
stack unit #	The stack identification number for this unit
module #	Identifies the configuration for each module installed in the stack unit
priority	Indicates the priority assigned to the stack unit
stack-port	Lists stacking ports configured on the stack unit
stack-trunk	Indicates the trunk configuration
stack enable	Indicates whether the stack is enabled
stack mac	Specifies the mac address for the stack
ip dns domain-list	Indicates the DNS domain for the stack
ip dns server-address	Indicates the address of the DNS server for the stack
hitless-failover enable/disabled	Indicates whether hitless failover is enabled
interface management 1	Indicates management port
ip address	Indicates the IP address that identifies the stack

How the show running-config command displays configured stacking ports

The stacking ports may be displayed in three different ways in the output from the **show running-config** command.

1. When stacking is enabled, the output shows both stacking ports.

```
stack unit 1
module 1 icx7750-48-xgc-port-management-module
module 2 icx7750-qsfp-6port-qsfp-240g-module
stack-port 1/2/1 1/2/4
```

2. When stacking is not enabled, neither stacking port is displayed.

```
stack unit 1
module 1 icx7750-48-xgc-port-management-module
module 2 icx7750-qsfp-6port-qsfp-240g-module
```

3. If one stacking port is configured, that port is displayed, whether or not stacking is enabled.

```
stack unit 1
module 1 icx7750-48-xgc-port-management-module
module 2 icx7750-qsfp-6port-qsfp-240g-module
stack-port 1/2/1
```

Displaying software version information

The **show version** command shows the software version that the stack is running. The last line of the output shows the bootup ID and role for the unit. Output resembles the following example.

```
ICX7750-26Q Router# show version
  Copyright (c) 2017 Ruckus Wireless, Inc. All rights reserved.
    UNIT 1: compiled on Aug  3 2015 at 11:45:48 labeled as SWR08040b1
      (20194935 bytes) from Primary SWR08040b1.bin
        SW: Version 08.0.40b1T203
    UNIT 2: compiled on Aug  3 2015 at 11:45:48 labeled as SWR08040b1
      (20194935 bytes) from Primary SWR08040b1.bin
        SW: Version 08.0.40b1T203
    UNIT 3: compiled on Aug  3 2015 at 11:45:48 labeled as SWR08040b1
      (20194935 bytes) from Primary SWR08040b1.bin
        SW: Version 08.0.40b1T203
      Compressed Boot-Monitor Image size = 1835008, Version:10.1.01T205 (swz10101)
       Compiled on Fri Jun 27 22:01:35 2014

  HW: Stackable ICX7750-26Q
  Internal USB: Serial #: 40D509003CF9007D
      Vendor: UNIGEN, Total size = 1910 MB
==========================================================================
UNIT 1: SL 1: ICX7750-20QXG 20-port Management Module
      Serial  #:CRK2234J00J
      License: ICX7750_L3_SOFT_PACKAGE   (LID: etmHHIJlFFl)
      P-ASIC  0: type B850, rev 03  Chip BCM56850_A2
==========================================================================
UNIT 1: SL 2: ICX7750-QSFP 6-port QSFP 240G Module
==========================================================================
UNIT 1: SL 3: ICX7750-6Q 6-port QSFP 240G Module
      Serial  #:4J04N
==========================================================================
UNIT 2: SL 1: ICX7750-20QXG 20-port Management Module
      Serial  #:CRK2246J01Y
      License: ICX7750_L3_SOFT_PACKAGE   (LID: etmHHJLlFGa)
==========================================================================
UNIT 2: SL 2: ICX7750-QSFP 6-port QSFP 240G Module
==========================================================================
UNIT 2: SL 3: ICX7750-6Q 6-port QSFP 240G Module
      Serial  #:CRK2246J010
==========================================================================
UNIT 3: SL 1: ICX7750-20QXG 20-port Management Module
      Serial  #:CRK2246J023
      License: ICX7750_L3_SOFT_PACKAGE   (LID: etmHHJLlFHI)
==========================================================================
UNIT 3: SL 2: ICX7750-QSFP 6-port QSFP 240G Module
==========================================================================
```

```
UNIT 3: SL 3: ICX7750-6Q 6-port QSFP 240G Module
      Serial  #:CRK2246J01C
==============================================================================
1500 MHz Power PC processor (version 8023/0022) 88 MHz bus
8192 KB boot flash memory
2048 MB code flash memory
3840 MB DRAM
STACKID 1  system uptime is 2 minute(s) 29 second(s)
STACKID 2  system uptime is 1 minute(s) 26 second(s)
STACKID 3  system uptime is 2 minute(s) 41 second(s)
The system : started=warm start   reloaded=by "reload"
My stack unit ID = 1, bootup role = active
```

The **show version unit** *unit-num* command displays the software version running on an individual unit. The command output is similar to the following example.

```
ICX7750-26Q Router# show version unit 1
  Copyright (c) 2017 Ruckus Wireless, Inc. All rights
reserved.
   UNIT 1: compiled on Aug  3 2015 at 11:45:48 labeled as SWR08040b1
      (20194935 bytes) from Primary SWR08040b1.bin
        SW: Version
08.0.40b1T203
            1)
       Compiled on Thu Apr 10 01:01:43 2014

  HW: Stackable ICX7750-26Q
  Internal USB: Serial #: 40E41502FFFD02B7
      Vendor: UB90QBK, Total size = 1910 MB
==============================================================================
UNIT 1: SL 1: ICX7750-20QXG 20-port Management Module
      Serial  #:CRK2234J00J
      License: ICX7750_L3_SOFT_PACKAGE   (LID: etmHHIJlFFl)
      P-ASIC  0: type B850, rev 03  Chip BCM56850_A2
==============================================================================
UNIT 1: SL 2: ICX7750-QSFP 6-port QSFP 240G Module
==============================================================================
1500 MHz Power PC processor (version 8023/0022) 88 MHz bus
8192 KB boot flash memory
2048 MB code flash memory
3840 MB DRAM
STACKID 1  system uptime is 3 day(s) 6 hour(s) 7 minute(s) 22 second(s)
The system : started=warm start   reloaded=by "reload"
```

Displaying traditional stack flash information

Use the **show flash** command to display flash memory information for all members of a stack or for a specified stack member.

The following example shows output from the active controller for the entire stack (the stack has three members).

```
ICX7750-26Q Router# show flash
Stack unit 1:
  Compressed Pri Code size = 20197181, Version:08.0.40T203 (SWR08040b1.bin)
  Compressed Sec Code size = 20194299, Version:08.0.40T203 (SWR08040.bin)
  Compressed Boot-Monitor Image size = 1835008, Version:10.1.01T205
  Code Flash Free Space = 837304320
Stack unit 2:
  Compressed Pri Code size = 20197181, Version:08.0.40T203 (SWR08040b1.bin)
  Compressed Sec Code size = 20194299, Version:08.0.40T203 (SWR08040.bin)
  Compressed Boot-Monitor Image size = 1835008, Version:10.1.05T205
  Code Flash Free Space = 838119424
Stack unit 3:
  Compressed Pri Code size = 20197181, Version:08.0.40T203 (SWR08040b1.bin)
  Compressed Sec Code size = 20194299, Version:08.0.40T203 (SWR08040.bin)
  Compressed Boot-Monitor Image size = 1835008, Version:10.1.03T205
  Code Flash Free Space = 838475776
```

The following example shows output for stack member 3 only.

```
ICX7750-26Q Router# show flash 3
Stack unit 3:
  Compressed Pri Code size = 20197181, Version:08.0.40T203 (SWR08040b1.bin)
  Compressed Sec Code size = 20194299, Version:08.0.40T203 (SWR08040.bin)
  Compressed Boot-Monitor Image size = 1835008, Version:10.1.03T205
  Code Flash Free Space = 838475776
```

TABLE 23 Field definitions for the show flash command

Field	Description
Compressed Pri Code size	The compressed size, version, and image name for the Primary Code
Compressed Sec Code size	The compressed size, version, and image name for the Secondary Code
Compressed Boot-Monitor Image size	The compressed size and version for the BootROM Code
Code Flash Free Space	The amount of available free space in Flash memory

Displaying traditional stack memory information

The **show memory** command displays information about stack units. The following example shows output for a stack with three units.

```
ICX7750-26Q Router# show memory
Stack unit 1:
Total DRAM: 4026531840 bytes
  Dynamic memory: 3853291520 bytes total, 3162103808 bytes free, 16% used
Stack unit 2:
Total DRAM: 4026531840 bytes
  Dynamic memory: 3853291520 bytes total, 3178409984 bytes free, 15% used
Stack unit 3:
Total DRAM: 4026531840 bytes
  Dynamic memory: 3853291520 bytes total, 3160649728 bytes free, 16% used
ICX7750-26Q Router#
```

TABLE 24 Field definitions for the show memory command

Field	Description
Total DRAM	The size (in bytes) of DRAM
Dynamic memory	The total number of bytes in dynamic memory, including the number of bytes that are available (free or unused) and the percentage of memory used.

Displaying traditional stack chassis information

The **show chassis** command displays chassis information for each stack unit. Output resembles the following example for the first unit in a stack.

```
ICX7750-48F Switch# show chassis
The stack unit 1 chassis info:

Power supply 1 present, status failed
Power supply 2 (AC - Regular) present, status ok
        Model Number:    3I50
        Serial Number:  P148121227
        Firmware Ver:   1.41
Power supply 2 Fan Air Flow Direction:  Front to Back

Fan 1 ok, speed (auto): [[1]]<->2
Fan 2 ok, speed (auto): [[1]]<->2
Fan 3 ok, speed (auto): [[1]]<->2
```

```
Fan 4 ok, speed (auto): [[1]]<->2

Fan controlled temperature: 49.5 deg-C

Fan speed switching temperature thresholds:
                Speed 1: NM<----->58       deg-C
                Speed 2:       50<-----> 82 deg-C (shutdown)

Fan 1 Air Flow Direction:  Front to Back
Fan 2 Air Flow Direction:  Front to Back
Fan 3 Air Flow Direction:  Front to Back
Fan 4 Air Flow Direction:  Front to Back
CPU Temperature Readings:
        Current temperature : 33.5 deg-C
Left Fan Temperature Readings:
        Current temperature : 49.5 deg-C
Right Fan Temperature Readings:
        Current temperature : 42.5 deg-C
Module Fan Temperature Readings:
        Current temperature : 47.0 deg-C
Left PSU Temperature Readings:
        Current temperature : 39.0 deg-C
Right PSU Temperature Readings:
        Current temperature : 34.0 deg-C
Left Front Temperature Readings:
        Current temperature : 37.0 deg-C
Middle Front Temperature Readings:
        Current temperature : 38.0 deg-C
Right Front Temperature Readings:
        Current temperature : 33.0 deg-C
Back 40G module Temperature Readings:
        Current temperature : 44.5 deg-C
        Warning level.......: 70.0 deg-C
        Shutdown level......: 82.0 deg-C
Boot Prom MAC : 748e.f8f9.2500
Management MAC: 748e.f8f9.2500
```

TABLE 25 Field definitions for the show chassis command

Field	Description
Power supply 1	The status of the primary power supply
Power supply 2	The status of the secondary power supply, if present
Fan 1 through Fan 4	The status of the cooling fans, including speed, temperature reading, temperature range, and airflow direction
Fan controlled temperature	Measured temperature reading
Fan speed switching temperature thresholds (Speed 1, Speed 2)	Operating ranges for fan speeds 1 and 2, with the shutdown temperature indicated at the upper end of the temperature range for speed 2
Current temperature (by component)	Current temperature readings, in degrees Centigrade, for CPU, left fan, right fan, module fan, left power supply, right power supply, left front, middle front, right front, and back 40 Gbps module
Back 40G module Temperature Readings	For the rear 40 Gbps module, current temperature, warning level temperature, and shutdown level temperature
Exhaust Side Temperature Readings	From the air exhaust side of the chassis, the current temperature reading, the warning level temperature setting, and the shutdown level temperature setting
Intake Side Temperature Readings	The current temperature reading from the air intake side of the chassis
Boot Prom MAC	The MAC address of the boot prom
Management MAC	For the active controller only, the management MAC address

Displaying stack module information

The **show module** command displays information about stack unit modules. Output resembles the following.

```
ICX7750-26Q Router# show module
      Module                                    Status Ports Starting MAC
U1:M1  ICX7750-20QXG 20-port Management Module   OK     56   748e.f8f9.6300
U1:M2  ICX7750-QSFP 6-port QSFP 240G Module      OK     24   748e.f8f9.6315
U1:M3  ICX7750-6Q 6-port QSFP 240G Module        OK     24   748e.f8f9.631b
U2:M1  ICX7750-20QXG 20-port Management Module   OK     56   cc4e.2438.7280
U2:M2  ICX7750-QSFP 6-port QSFP 240G Module      OK     24   cc4e.2438.7295
U2:M3  ICX7750-6Q 6-port QSFP 240G Module        OK     24   cc4e.2438.729b
U3:M1  ICX7750-20QXG 20-port Management Module   OK     56   cc4e.2438.7500
U3:M2  ICX7750-QSFP 6-port QSFP 240G Module      OK     24   cc4e.2438.7515
U3:M3  ICX7750-6Q 6-port QSFP 240G Module        OK     24   cc4e.2438.751b
```

TABLE 26 Field definitions for the show module command

Field	Description
Module	Identifies the module by stack unit ID, module number, and module type
Status	The status of this module
Ports	The number of ports in this module
Starting MAC	The starting MAC address for this module

Displaying general or detailed information about stack members

You can display information about any member in a traditional stack by entering **show** commands from the active controller console port. If you enter **show** commands from a unit that is not the active controller, the information may not be displayed correctly.

The **show stack** command displays general information about a traditional stack, for all members, for a specified member, or for all members with additional detail.

The following output covers the entire stack and includes role history for each unit, beginning with the initial role the unit held.

```
ICX7750-20Q Router# show stack
T=29m36.7: alone: standalone, D: dynamic cfg, S: static
ID Type          Role    Mac Address    Pri State  Comment
1S ICX7750-20QXG standby 748e.f8f9.6300 128 remote Ready
2S ICX7750-20QXG member  cc4e.2438.7280   0 remote Ready
4S ICX7750-20QXG active  cc4e.2438.7500 128 local  Ready

active                 standby
    +---+        +---+        +---+
-2/1| 4 |2/4--2/1| 2 |2/4--2/1| 1 |2/4-
|   +---+        +---+        +---+   |
|                                     |
|-------------------------------------|

Standby u1 -protocols ready, can failover or manually switch over

Role history: N: standalone, A: active, S: standby, M: member

U1: N->A->S->M->S, U2: M->S->A->S->M, U4: M->S->A
```

If you add a stack member ID, output is displayed for that member only.

```
ICX7750-26Q Router# show stack 1
T=12m6.2: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7750-20QXG active  748e.f8f9.6300   0 local   Ready
```

```
ICX7750-26Q Router# show stack 2
T=12m16.3: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
2  D ICX7750-20QXG member  cc4e.2438.7280   0 remote  Ready

ICX7750-26Q Router# show stack 3
T=12m20.6: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
3  D ICX7750-20QXG standby cc4e.2438.7500   0 remote  Ready
```

If you add the **detail** keyword to the **show stack** command, output resembles the following example.

```
ICX7750-26Q Router# show stack detail
T=18m33.4: alone: standalone, D: dynamic cfg, S: static
ID   Type          Role    Mac Address    Pri State   Comment
1  S ICX7750-20QXG active  748e.f8f9.6300   0 local   Ready
2  D ICX7750-20QXG member  cc4e.2438.7280   0 remote  Ready
3  D ICX7750-20QXG standby cc4e.2438.7500   0 remote  Ready

    active       standby
     +---+        +---+        +---+
=2/1| 1 |2/4==2/1| 3 |2/4--2/1| 2 |2/4=
|   +---+        +---+        +---+   |
|                                     |
|-------------------------------------|
Will assign standby in 11 sec due to all ready

Standby u3 - protocols ready, can failover
Current stack management MAC is 748e.f8f9.6300

Image-Auto-Copy is Enabled.

      Stack Port Status                        Neighbors
Unit# Stack-port1         Stack-port2          Stack-port1         Stack-port2
1     up (1/2/1-1/2/2)    up (1/2/4-1/2/6)     U2 (2/2/4-2/2/5)    U3 (3/2/1-3/2/3)
2     up (2/2/1)          up (2/2/4-2/2/5)     U3 (3/2/4)          U1 (1/2/1-1/2/2)
3     up (3/2/1-3/2/3)    up (3/2/4)           U1 (1/2/4-1/2/6)    U2 (2/2/1)

Unit# System uptime
1     18 minute(s) 33 second(s)
2     17 minute(s) 30 second(s)
3     18 minute(s) 46 second(s)
```

TABLE 27 Field descriptions for the show stack command

Field	Description
alone: Standalone	This device is operating as a standalone device.
S: static configuration	The configuration for this unit is static (has been saved with a **write memory** command).
D: dynamic configuration	The configuration for this unit is dynamic and may be overwritten by a new stack unit. To change to a static configuration, enter the **write memory** command.
ID	The stack identification number for this unit
Type	The model of this unit
Role	The role of this unit within the stack
MAC address	The MAC address of this unit
Pri (Priority)	The priority assigned to this unit
State	The operational state of this unit
Comments	Additional information about this unit (optional)
Role history	Tracks up to six role changes per stack unit. The initial state is always displayed. Overflow is indicated by ellipses (...). Standby to member role changes are not displayed. Role history also does not display the

TABLE 27 Field descriptions for the show stack command (continued)

Field	Description
	transition after bootup of a non-active controller unit from member to standby.

NOTE
The active controller removes the dynamic configuration of a unit when the unit leaves the stack. However, if there is a static trunk configuration associated with the unit, the active controller cannot remove the dynamic configuration. In this case, you must remove the static trunk and use the **no stack unit** *stack-unit* command to manually remove the configuration.

TABLE 28 Field descriptions for the show stack detail command

Field	Description
Stack Port Status	Indicates stacking port status for each stack unit
Neighbors	Identifies stack neighbors (by unit ID) for each stack unit
Unit #	The stack identification number for this unit
Stack-port 1	Indicates the port state (up or down) and identifies the port by number (stack-ID/slot/port)
Stack-port 2	Indicates the port state (up or down) and identifies the port by number (stack-ID/slot/port)

Displaying IPC statistics for a stack

To display IPC statistics for the stack, enter the **show stack ipc stats** command as shown in the following example.

```
ICX7750-26Q Router# show stack ipc stats
V80, G4, src=748e.f8f9.6300, max_pkt_size=10264, delay_buf=10264
Recv: SkP0: 10823, P1: 12954, sum: 23777, since t=2163.7 ago
Message types have callbacks:
Send message types:
    [1]=9086,          [5]=10922,         [6]=3,             [7]=809,
    [9]=630,           [13]=209,          [22]=17,           [24]=644,
    [28]=29,           [31]=1880,         [40]=15,           [60]=4,
    [77]=130,
Recv message types:
    [1]= 0:3295, 1:4896,      [5]= 0:5269, 1:5622,      [6]= 0:1, 1:2,
   [7]= 0:398, 1:411,        [9]= 0:996, 1:1139,       [13]= 0:544, 1:559,
    [23]= 0:319, 1:325,       [34]= 0:1,

Statistics:
    send pkt num          :     24369,    recv pkt num          :     23777,
    send msg num          :     24369,    recv msg num          :     23777,
    send frag pkt num     :         0,    recv frag pkt num     :         0,
    pkt buf alloc         :     24376,                          :         0,
    send_delay_msg        :         0,    send_delay_pkt        :         0,
    fwd_stby_msg          :         0,    fwd_stby_pkt          :         0,

    Reliable-mail        send  success  receive   duplic  T (us)
    target ID               2        2        0        0    82226
    target MAC              0        0        0        0    82226
    unrel target ID         5                 0
    unrel target MAC        4                 0
There is 0 current jumbo IPC session

Possible errors:
ICX7750-26Q Router#
```

Displaying reliable IPC statistics for stack units

Use the **show stack rel-ipc stats** command to display session statistics for stack units. The following example shows reliable IPC statistics for stack unit 3.

```
ICX7750-26Q Router# show stack rel-ipc stats unit 3

Unit 3 statistics:
Msgs: sent 907  recv 384, Pkt sends failed: 0, KA: sent 1522 recv 1522

Message types sent:
    [9]=846,          [13]=2,           [15]=31,          [59]=1,
    [76]=3,           [87]=24,

Message types received:
    [9]=366,          [13]=1,           [15]=17,

Session: base-channel, to U3, channel 0
buf size: xmt=4194312, rcv=65544, max msg=32776
State: established (last 19 minute(s) 16 second(s) ago) cnt: 1
Remote resets:                    0,      Reset packets sent:              0
Connection statistics (for current connection, if established):
Msgs sent:                      520,      Msgs rcvd:                     308
Atomic batches sent:              0,      Atomic batches rcvd:             0
Pkts sent:                     1325,      Pkts rcvd:                     945
Msg bytes sent:              262915,      Msg bytes rcvd:             131550
Pkt bytes sent:              631680,      Pkt bytes rcvd:             247560
Keepalive sent:                 231,      Keepalive rcvd:                231
Keepalive age:                    0,      Keepalive NBR age :              1
Flushes requested: 10, Suspends: 0, Resumes: 0
Packets sent with data (DAT), ACKs, and window updates (WND):
Other:      259,  ACK:          300,  WND:             6,  ACK+WND:         0
DAT:        753,  DAT+ACK:        7,  DAT+WND          0,  DA+AC+WND        0
Data retransmits done:          430,      Zero-window probes sent:         9
Dup ACK pkts rcvd:               40,      Pkts rcvd w/dup data:            0
Pkts rcvd w/data past window: 0

Session: ACL, to U3, channel 3
buf size: xmt=409608, rcv=131080, max msg=1472
State: established (last 19 minute(s) 16 second(s) ago) cnt: 1
Remote resets:                    0,      Reset packets sent:              0
Connection statistics (for current connection, if established):
Msgs sent:                      291,      Msgs rcvd:                      58
Atomic batches sent:              0,      Atomic batches rcvd:             0
Pkts sent:                      681,      Pkts rcvd:                     205
Msg bytes sent:              277656,      Msg bytes rcvd:              82128
Pkt bytes sent:              349288,      Pkt bytes rcvd:              84820
Keepalive sent:                 231,      Keepalive rcvd:                231
Keepalive age:                    0,      Keepalive NBR age :              1
Flushes requested: 0, Suspends: 0, Resumes: 0
Packets sent with data (DAT), ACKs, and window updates (WND):
Other:      232,  ACK:           12,  WND:             1,  ACK+WND:         2
DAT:        429,  DAT+ACK:        5,  DAT+WND          0,  DA+AC+WND        0
Data retransmits done:          272,      Zero-window probes sent:         5
Dup ACK pkts rcvd:               20,      Pkts rcvd w/dup data:            0
Pkts rcvd w/data past window: 0

Session: sync-reliable, to U3, channel 4
buf size: xmt=153608, rcv=10248, max msg=1472
State: established (last 16 minute(s) 38 second(s) ago) cnt: 1
Remote resets:                    0,      Reset packets sent:              0
Connection statistics (for current connection, if established):
Msgs sent:                       53,      Msgs rcvd:                       1
Atomic batches sent:              0,      Atomic batches rcvd:             0
Pkts sent:                      256,      Pkts rcvd:                      35
Msg bytes sent:               77380,      Msg bytes rcvd:               1460
Pkt bytes sent:              270984,      Pkt bytes rcvd:               1884
Keepalive sent:                 200,      Keepalive rcvd:                200
Keepalive age:                    0,      Keepalive NBR age :              1
Flushes requested: 0, Suspends: 0, Resumes: 0
```

```
Packets sent with data (DAT), ACKs, and window updates (WND):
Other:      201,  ACK:            1,  WND:             0,  ACK+WND:         0
DAT:         54,  DAT+ACK:        0,  DAT+WND          0,  DA+AC+WND        0
Data retransmits done:           41,      Zero-window probes sent:          0
Dup ACK pkts rcvd:               17,      Pkts rcvd w/dup data:             0
Pkts rcvd w/data past window: 0


Session: rcon-svr-to-3, to U3, channel 12
buf size: xmt=4008, rcv=8008, max msg=2668
State: established (last 19 minute(s) 14 second(s) ago) cnt: 1
Remote resets:                    0,      Reset packets sent:               0
Connection statistics (for current connection, if established):
Msgs sent:                       31,      Msgs rcvd:                       17
Atomic batches sent:              0,      Atomic batches rcvd:              0
Pkts sent:                      300,      Pkts rcvd:                       49
Msg bytes sent:                3592,      Msg bytes rcvd:                 155
Pkt bytes sent:               21836,      Pkt bytes rcvd:                 996
Keepalive sent:                 231,      Keepalive rcvd:                 231
Keepalive age:                    0,      Keepalive NBR age :               1
Flushes requested: 23, Suspends: 0, Resumes: 0
Packets sent with data (DAT), ACKs, and window updates (WND):
Other:      237,  ACK:           14,  WND:             0,  ACK+WND:         0
DAT:         49,  DAT+ACK:        0,  DAT+WND          0,  DA+AC+WND        0
Data retransmits done:           26,      Zero-window probes sent:          0
Dup ACK pkts rcvd:               10,      Pkts rcvd w/dup data:             0
Pkts rcvd w/data past window: 0
```

Displaying information about stack neighbors

The **show stack neighbors** command displays information about stack member neighbors.

```
ICX7750-26Q Router# show stack neighbors
U#     Stack-port1                          Stack-port2
1    (1/2/1-1/2/2) to U2 (2/2/4-2/2/5)    (1/2/4-1/2/6) to U3 (3/2/1-3/2/3)
2          (2/2/1) to U3 (3/2/4)          (2/2/4-2/2/5) to U1 (1/2/1-1/2/2)
3    (3/2/1-3/2/3) to U1 (1/2/4-1/2/6)          (3/2/4) to U2 (2/2/1)
```

TABLE 29 Field descriptions for the show stack neighbors command

Field	Description
U#	The stack identification number for this unit
Stack-port1	Identifies the neighbor stack unit for stack-port1 for this unit ID
Stack-port2	Identifies the neighbor stack unit for stack-port2 for this unit ID

Displaying stack port information

The **show stack stack-ports** command displays information about stack port status. Equal signs (=) in command output show connections between trunk ports.

```
ICX7750-26Q Router# show stack stack-ports
    active       standby
     +---+        +---+        +---+
=2/1| 1 |2/4==2/1| 3 |2/4--2/1| 2 |2/4=
|   +---+        +---+        +---+   |
|                                     |
|-------------------------------------|

U#  Stack-port1                                  Stack-port2
1   up (1/2/1-1/2/2)                            up (1/2/4-1/2/6)
    up ports: 1/2/1
    up ports: 1/2/4

2   up (2/2/1)                                  up (2/2/4-2/2/5)
```

```
    up ports: 2/2/4

3   up (3/2/1-3/2/3)                          up (3/2/4)
    up ports: 3/2/1
```

TABLE 30 Field descriptions for the show stack stack-ports command

Field	Description
ID	The stack identification number for this unit
Stack-port1	Indicates port state (up or down) and identifies the port by number (stack-ID/slot/port)
Stack-port 2	Indicates port state (up or down) and identifies the port by number (stack-ID/slot/port)

Displaying stacking port statistics

The **show statistics stack-ports** command displays information about all stacking ports in a traditional stack topology.

```
device# show statistics stack-ports
Port     In Packets   Out Packets   In Errors   Out Errors
1/2/1         22223          4528           0            0
1/2/2         35506          3844           0            0
2/2/1          3161         34173           0            0
2/2/2         24721          3676           0            0
3/2/1          3048         23881           0            0
3/2/2         13540          2857           0            0
4/2/1          2862         13537           0            0
4/2/2          3626          3184           0            0
5/2/1          3183          3621           0            0
5/2/2          3265         13508           0            0
6/2/1         14020          3655           0            0
6/3/1          3652         17705           0            0
7/2/1         17705          3658           0            0
7/3/1          4047         21802           0            0
TOTAL        154559        153629           0            0
```

TABLE 31 Field definitions for the show statistics stack-ports command

Field	Description
Port	The stack identification number for this unit
In Packets	The number of incoming packets on this port
Out Packets	The number of outgoing packets on this port
In Errors	The number of incoming errors on this port
Out Errors	The number of outgoing errors on this port

Displaying stacking port interface information

The **show interfaces stack-ports** command displays information about the stacking ports for all members in a stack.

```
ICX7750-26Q Router# show interfaces stack-ports

Port       Link    State   Dupl Speed Trunk Tag Pvid Pri MAC             Name
1/2/1      Up      Forward Full 40G   None  No  N/A  0   748e.f8f9.6315
1/2/2      Down    None    None None  None  No  N/A  0   748e.f8f9.6319
1/2/4      Up      Forward Full 40G   None  No  N/A  0   748e.f8f9.6321
1/2/5      Down    None    None None  None  No  N/A  0   748e.f8f9.6325
1/2/6      Down    None    None None  None  No  N/A  0   748e.f8f9.6329
2/2/1      Up      Forward Full 40G   None  No  N/A  0   cc4e.2438.7295
2/2/4      Up      Forward Full 40G   None  No  N/A  0   cc4e.2438.72a1
2/2/5      Down    None    None None  None  No  N/A  0   cc4e.2438.72a5
3/2/1      Up      Forward Full 40G   None  No  N/A  0   cc4e.2438.7515
```

```
3/2/2      Down    None    None None  None  No  N/A  0   cc4e.2438.7519
3/2/3      Down    None    None None  None  No  N/A  0   cc4e.2438.751d
3/2/4      Up      Forward Full 40G   None  No  N/A  0   cc4e.2438.7521
```

TABLE 32 Field descriptions for the show interfaces stack-ports command

Field	Description
Port	Specifies the stack identification number for this unit
Link	Identifies the configuration for modules on this unit
State	Indicates that a priority has been assigned to this stack unit
Dupl	Indicates whether the port is configured as half- or full-duplex
Speed	Indicates the port speed
Trunk	Indicates whether the port is part of a trunk
Tag	Indicates whether the port is tagged or untagged
Pvid	Port VLAN ID, if applicable
Pri	Specifies port priority
MAC	Provides the MAC address of the port
Name	Displays the optional name assigned to the port if present

NOTE
If a unit is provisional (that is, if it is reserved and does not have a physical unit associated with the unit ID), its interface MAC address shows as 0000.0000.0000.

Displaying ICX 7650 rear module information

Enter the **show rear-module** command in Privileged-Exec mode to display operational and status information on the ICX 7650 rear module ports.

The following example...

```
device# show rear-module
```

MIB support for traditional stack configurations

All statistics about packets received and sent, RMON, jumbo frames (greater than 1518 bytes), runts, giants, and other instances are gathered through the stack interfaces and are accessible through SNMP. MIB support for traditional stack configurations is the same as for a standard interface. Information includes types of modules, including optics modules.

Traditional Stack Troubleshooting

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Problems commonly diagnosed with stack formation

The most common reason for an unsuccessful stack build is a hardware configuration mismatch, a software configuration mismatch, or a combination of both.

After a stack forms, the system performs background problem diagnosis, which helps to reveal common problems with stack formation. For information on background diagnostics and manual control, refer to Background problem diagnosis on page 197.

The following common problems may be encountered when building stacks:

- Ports on the same trunk connect to different units.
- Ports on the same trunk connect to different trunks on the same unit.
- Sub-ports of the 4 x 10-Gbps module are down.
- One end of a 10-Gbps port is up, but the other end is down.
- Communication problems exist between units in the stack.

A common connection error is that the two cables of a trunk go to different units or to different trunks on the same unit. A stack may still form in these cases, but the incorrect connection may cause an internal forwarding loop, or the unit may have forwarding problems.

Background problem diagnosis

After a stack forms, the system periodically probes the topology to check connections between units in the stack. This diagnosis, which is run in the background, can detect user connection errors and hardware failures. Related error messages are provided approximately every 20 minutes. No messages are displayed if no problem is detected.

Manually triggering stack diagnosis

You can manually trigger the diagnosis using the **show stack connection** command. This command can provide additional detail on connections that are identified as problems in the diagnostic report. The command can also be used when periodic diagnostic warnings have been suppressed.

NOTE
Periodic background stack diagnosis is performed every minute. When you manually trigger stack diagnosis, the system may print the following message:

```
There is a trunk probe going on. Please try later.
```

Suppressing background stack diagnostic warnings

You can control the automatic background stacking diagnosis that runs periodically when stacking is enabled.

To stop periodic output of background diagnostic reports, enter the **stack suppress-warning** command at the configuration level on the active controller.

To start receiving diagnostic warnings again, enter the **no** form of the command.

Troubleshooting an unsuccessful stack build

If you are unable to build a stack (for example, the **show stack** command does not display any stack units), perform the following steps.

1. Enter the **show run** command on each unit to make sure the configuration contains "stack enable." If it does not, enter the **stack enable** command on the unit. Before a stack is formed, you can still access the console port on each device. Once a stack is successfully formed, you are redirected to the active controller.

   NOTE
   If you are building a stack using secure-setup, you do not have to enter the **stack enable** command on each unit.

2. Check that all of your stacking port connections are secure and working properly. Enter **show interfaces stack** on each device to confirm that the stacking port links are up and the ports are in the forward state.

```
device# show interfaces stack
Port  Link  State    Dupl Speed  Trunk   Tag  P MAC    Name
1/2/1 Up    Forward  Full 10G    None    No   1 0000.00eb.a902
1/2/2 Up    Forward  Full 10G    None    No   1 0000.00eb.a904
```

3. Confirm that all of the devices are running the same software image.
4. Use the **show log** command to display any IPC version mismatch messages. These messages appear in one minute when receiving mismatched probe packets, and then once every 10 minutes.

5. Use the **show stack ipc** command to see if any traffic has been sent or received. Enter **clear stack ipc** to clear the traffic statistics and then enter **show stack ipc** again so you can easily see differences in traffic flow.

```
ICX7750-26Q Router# show stack ipc
V80, G4, src=748e.f8f9.6300, max_pkt_size=10264, delay_buf=10264
Recv: SkP0: 13788, P1: 16488, sum: 30276, since t=3028.1 ago
Message types have callbacks:
Send message types:
    [1]=12422,        [5]=12600,        [6]=3,            [7]=1145,
    [9]=875,          [13]=294,         [22]=17,          [24]=644,
    [28]=41,          [31]=2651,        [40]=15,          [60]=4,
    [77]=188,
Recv message types:
    [1]= 0:4609, 1:6737,     [5]= 0:6106, 1:6459,     [6]= 0:1, 1:2,
    [7]= 0:566, 1:579,       [9]= 0:1413, 1:1597,     [13]= 0:773, 1:789,
    [23]= 0:319, 1:325,      [34]= 0:1,

Statistics:
    send pkt num          :     30890,    recv pkt num          :     30276,
    send msg num          :     30890,    recv msg num          :     30276,
    send frag pkt num     :         0,    recv frag pkt num     :         0,
    pkt buf alloc         :     30897,                          :         0,
    send_delay_msg        :         0,    send_delay_pkt        :         0,
    fwd_stby_msg          :         0,    fwd_stby_pkt          :         0,

    Reliable-mail        send  success  receive   duplic  T (us)
    target ID               2        2        0        0    82226
    target MAC              0        0        0        0    82226
    unrel target ID         5                 0
    unrel target MAC        4                 0
There is 0 current jumbo IPC session

Possible errors:
```

If the "Send message types" field is empty, **stack enable** has not been configured. If the number of "Recv IPC packets" increases, but there are no "Recv message types," then the packets are being dropped for various reasons, including the wrong IPC version, or a checksum error. The "Possible errors" field lists reasons for packet loss.

NOTE
A small "***state not ready" count is normal, but if it continues to increase, a problem is indicated.

6. If the results of a **show stack** command show other stack members, but lists them as non-operational, this could be due to an image mismatch, or a configuration mismatch. In the event of an image mismatch, you can download the correct images to the entire stack from the active controller.

NOTE
If your intended stacking ports are connected in a ring topology, they will not all appear to be in the forwarding state because of Spanning Tree Protocol, but secure-setup can still build the stack.

7. Check to be sure you do not have any stacking to non-stacking connections. The following message indicates that you may have a connection between a stacking port and a non-stacking port.

```
Warning! Proc ???? packet in 2m from 0012.f2222.8300, Wrong dev/port: dev=4, port=18, DSA=4971100
497--E
You might have stacking to non-stacking port connections
```

This message appears every 10 minutes after the first display. If you see this message only once and your connections are correct, your stack should be operating properly. Only repeat displays of this message indicate a problem.

8. If you run out of flash memory while performing a **write memory**, your stack devices may contain very large startup-config.v4 or startup-config.old files, which are preserved for recovery purposes. Enter the **show dir** command at the privileged EXEC level to see all flash files. If you identify these old files and they are not needed, you can delete them by entering the **flash delete** command at the privileged EXEC level as shown in the following example.

```
ICX7450-48F Router# show dir
Type       Size   Name
----------------------
F        27615428 primary
F        27851652 secondary
F              21 sil_logs
F            2361 startup-config.backup
F            2361 startup-config.old
F            2442 startup-config.txt
F             256 secondary.sig
F             256 bootrom.sig
F           77002 debug.boot

       55551779 bytes 9 File(s) in FI root

     1766779193 bytes free in FI root
     1766779193 bytes free in /


ICX7450-48F Router# flash delete
  ASCII string   flash file name to delete
ICX7450-48F Router# flash delete startup-config.old
```

Troubleshooting secure-setup

Secure-setup can be used to form linear and ring stack topologies. For information about the procedure, refer to The secure-setup utility on page 26. During this procedure, if secure-setup does not detect all the units that should be detected, perform the following checks:

- Make sure that all the cables are properly connected.
- Make sure that all the relevant ports are in the UP state.
- Make sure that all the units are running the same image.
- Issue the **stack enable** command only on the unit that will serve as the active controller.
- Make sure that **stack disable** is not configured on any prospective members (for example, by entering the **show running-config** command on the unit).
- Make sure that the connection is sequential (refer to the definition of sequential connection in Traditional stacking terminology on page 17).

If secure-setup times out (this may happen due to inactivity), you will not be able to make any changes in your configuration or stack topology until you restart the session by entering the **stack secure-setup** command.

The stack unit discovery process is triggered when secure-setup is initiated. However, if the stack unit is placed in a topology where another unit in the stack is already running the discovery process, the current discovery process is terminated. If this is the case, a message similar to the following one is displayed.

```
"Topology discovery is already in progress originated from mac-address. Please try later."
```

This means a discovery process is already active and was initiated from the unit with the MAC address mentioned in the message. You will need to re-issue secure-setup.

If there is already an active discovery process, secure-setup may not discover all the intended units. If this is the case, you will need to restart the secure-setup process.

Troubleshooting unit replacement issues

If you are unsuccessful in building a stack using the automatic setup process (refer to Scenario 2 - Configuring a three-member traditional stack in a ring topology using the automatic setup process on page 35), or cannot add or replace a unit in a stack, verify the following items.

- The number of units in your stack does not exceed the maximum allowed (12 units).
- The replacement unit is a clean unit (does not contain a startup-config.txt file).
- The replacement unit running configuration does not contain the **stack enable** command.
- The replacement unit running configuration does not contain the **stack disable** command.
- The configurations for the stack ports on the active controller match the physical connections to the unit.

Checking hardware after an upgrade failure

You can perform a few basic checks if you suspect a hardware failure.

When the system resets as the result of an upgrade failure, you may see output similar to the following example.

```
###### LOGS ####################
Sent SIGTERM to all processes
Sent SIGKILL to all processes
Requesting system reboot
Restarting system.

Ruckus Bootloader: 10.1.05b008T215 (Jul 08 2015 - 07:49:47)

Validate Shmoo parameters stored in flash ..... OK
Restoring Shmoo parameters from flash .....
Running simple memory test ..... OK
ICX7450-48 Fiber (Non-POE), A1
SYS CPLD VER: 0xe, Released Ver: 0
CPLD1 VER: 0xf, Released Ver: 0
CPLD2 VER: 0xf, Released Ver: 0

Enter 'b' to stop at boot monitor:  0
```

1. To stop the reset and open the boot prompt, enter **b**.
2. At the boot prompt, enter the **hwinfo** command to display basic hardware information as shown in the following example.

```
ICX7450-Boot> hwinfo
SKU                                     : 48 Fiber (Non-POE), A1
System CPLD Version                     : 0xe
CPLD1 Version                           : 0xf
CPLD2 Version                           : 0xf
CPLD Chip Select                        : 1
Bank Select                             : 0
Watchdog PCA9561 Enabled                : 0
Watchdog Enabled                        : 0x30
Booted from                             : 1
Uboot partition 1 Failure Record        : 0
Uboot partition 2 Failure Record        : 0
Reset Cause                             : WARM_RESET (CPU_RESET_REQ)
Write Protect NOR Enabled               : 0
Write Protect RCW Enabled               : 0
Write Protect PCA9561 Enabled           : 0
```

3. To verify installed image files, enter the **show_image** command at the boot prompt as shown in the following example.

```
ICX7450-Boot> show_image
============================
Primary  : SPS08030b(28590276)
Secondary: SPR08030b(31547588)
```

4. To reset hardware and memory, enter the **powercycle** command at the boot prompt. This causes the system to execute a cold boot as shown in the following example.

```
ICX77xx-Boot> powercycle

Bootloader Version: 10.1.01T205 (Jun 11 2014 - 16:29:55)

SVR: 0x82180111, PVR: 0x80230022
Sidewinder:48C,A1
SYS CPLD VER: 0xe, Released Ver: 0
Enter 'b' to stop at boot monitor:  0
bootdelay: ===
Booting image from Secondary
## Booting kernel from Legacy Image at 0300a200 ...
   Created:      2015-02-19   6:23:46 UTC
   Data Size:    17787567 Bytes = 17 MiB
   Load Address: 00000000
   Entry Point:  00000000
   Verifying Checksum ... OK
   Uncompressing Kernel Image ... OK
setup_arch: bootmem
```

Troubleshooting image copy issues

The **copy tftp flash** command copies the image to all stack units including the active controller. The **copy flash flash** command copies the image from the primary or secondary flash on the active controller to the primary or secondary flash image of a stack member. If you are unable to copy an image to one or more stack units, check the following:

- Make sure the unit is actually part of the stack. Use the **show stack** command.
- If a unit joins a stack after the **image copy** command was issued, you will need to copy the image to this unit separately.

Configuration, startup configuration files, and stacking flash

Stacking system behavior is defined by the runtime configuration, which can be displayed using the **show run** command. The **write memory** command stores the runtime configuration in a flash file called startup-config.txt. During bootup, the system reads and applies the startup-config.txt file to the runtime configuration. The startup-config.txt file can be shown using the **show config** command.

The stacking system installs a stacking.boot file on each unit that tells the unit what its role is during the boot process. The stacking.boot file is generated whenever there is an election that defines the roles for all units.

When an active controller is booted or a **write memory** command is issued, the active controller synchronizes its startup-config.txt file to every stack unit. The original startup-config.txt files in the standby controller and other stack members are renamed to startup-config.old. If you issue the **stack unconfigure me** command on the standby controller or stack member directly, these units recover their original startup-config.txt files and reboot as standalone devices. If you enter the **stack**

unconfigure all command from the active controller, all devices recover their old startup-config.txt files and become standalone devices. When this happens, the startup-config.old file is renamed to startup-config.txt, and the stacking.boot file is removed.

Whenever a stack unit configuration parameter, such as the priority setting, is changed, an election is held to determine the active controller, and the result is written into the stacking.boot file. A prompt message appears on the console that recommends you use the **write memory** command. For an active controller role change to take effect, you must reset the entire stack.

If you do not use the **write memory** command but reset the stack, the stack units continue to operate in their roles as defined by the stacking.boot file. After the reset, each unit readjusts based on the current runtime configuration. However, you may observe different results depending on what has not been saved. If you have renumbered the stack unit IDs, you may see a configuration mismatch because your changes no longer match the active controller configuration.

If you change priorities to elect an active controller, the new active controller assumes its role after a reboot, whether or not you have used the **write memory** command. If you do not save your priority change before the next reboot, the reboot triggers an election that may result in a different winner based on the priority in the unsaved configuration. The new winner assumes the active controller role after the next reboot.

If you change the stacking port configuration and do not save your changes, you may encounter connectivity errors. To recover from a configuration error, define the correct stacking port by running secure-setup.

NOTE
You should always execute the **write memory** command after making stacking-related configuration changes such as changing priority or changing stacking ports. If you do not want to keep the changes, change the configuration back to the previous version, and then execute the **write memory** command. Do not discard configuration changes by using a reset without executing the **write memory** command.

Stacking unit role transition considerations

An active or standby controller contains the stacking system configuration and its internal data structures. When an active or standby controller becomes a member, the configuration and data structures are not cleared. This does not affect its capability to function as a member. However, if the user changes the configuration, this member unit cannot become a standby again because of the difference in configuration. A member unit can become a standby only if the member was never a standby or active controller (with no configuration) or if it has the same configuration as the current active controller.

Port down and aging

Aging is only used as a safeguard. If a unit is powered down or the stacking link is removed, the system immediately detects that the port is down and knows that its neighbor is gone. That unit is immediately removed from the active controller.

If a stacking port does not receive keep-alive messages from its neighbor within 60 seconds, it ages out the neighbor. When a unit is no longer stack-enabled or when one stacking port becomes a non-stacking port, it sends a notification that the port is no longer a stacking port. When the neighboring port receives the notification from its neighbor, it immediately removes the neighbor.

The following message is logged and displayed when a port is aged out.

```
Warning! my mac=0000.004f.4243, age out up-stream
```



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