

Ruckus FastIron Software Upgrade Guide, 08.0.91

Supporting FastIron Software Release 08.0.91

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Document Conventions

The following table lists the text conventions that are used throughout this guide.

TABLE 1 Text Conventions

Convention	Description	Example
monospace	Identifies command syntax examples	<code>device(config)# interface ethernet 1/1/6</code>
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 .
<i>italics</i>	Publication titles	Refer to the <i>Ruckus Small Cell Release Notes</i> 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.

ATTENTION

An ATTENTION statement indicates some information that you must read before continuing with the current action or task.



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.
<i>italic text</i>	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, <i>member[member...]</i> .
\	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 ruckus-docs@arris.com.

When contacting us, include the following information:

- Document title and release number
- Document part number (on the cover page)
- Page number (if appropriate)

For example:

- Ruckus SmartZone Upgrade Guide, Release 5.0
- Part number: 800-71850-001 Rev A
- Page 7

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 the documentation by product or perform a text search. Access to Release Notes requires an active support contract and a Ruckus Support Portal user account. Other technical documentation content is available without logging in to 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 products, and customers and partners with active support contracts.

For product support information and details on contacting the Support Team, go directly to the Ruckus 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. Requests 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, Central and South America, and Asia Pacific, toll-free numbers are available at <https://support.ruckuswireless.com/contact-us> and Live Chat is also available.
- Worldwide toll number for our support organization. Phone charges will apply: +1-650-265-0903

We suggest that you keep a physical note of the appropriate support number in case you have an entire network outage.

Self-Service Resources

The Ruckus Support Portal at <https://support.ruckuswireless.com> 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>

Preface

Contacting Ruckus Customer Services and Support

- 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/#products_grid
- 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.

About this Document

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What's new in this document

There were no new features for this guide in FastIron software release 08.0.91.

Supported hardware

This guide supports the following Ruckus products:

- Ruckus ICX 7850 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.

Software Upgrade and Downgrade

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Software Upgrade Procedure Overview

You can upgrade FastIron software in several ways: through a manual step-by-step process, through a manifest file, or through a Unified FastIron Image (UFI).

NOTE

Support is available for upgrades beginning with FastIron 08.0.0.

1. Preliminary checks. For any upgrade, follow the instructions in [Initial Steps](#) on page 11 to determine the current software versions, license requirements, and instructions on where to download the software.
If configured, syslogs do not persist across reloads.
2. Upgrade the software. For a step-by-step upgrade, refer to [The Upgrade Process](#) on page 13.

NOTE

For the FastIron 08.0.90 release, UFI image copy is the recommended software upgrade method for both standalone devices and traditional stacks.

NOTE

In the FastIron 08.0.90 release and later releases, all new hardware platforms, starting with ICX 7850 devices, support only UFI images for software upgrade.

NOTE

For a stack or a Campus Fabric (SPX) system, you can perform a full manual upgrade for each unit, or you can download the software as described in [The Upgrade Process](#) on page 13 followed by an In-service software upgrade for the stack or SPX system as described in [In-service Software Upgrade](#) on page 31. Be sure to check [ISSU Limitations and Considerations](#) on page 31 before performing an In-service software upgrade.

Initial Steps

NOTE

You must upgrade to the boot code that supports the current release. Refer to "Image File Names" in the release notes for detailed information.

Ruckus recommends that you always use the manifest file for any image upgrade or downgrade.

If you are upgrading from FastIron release 08.0.80 to release 08.0.90, Ruckus recommends using SCP to transfer files.

Determining the Current Flash Image Version

To determine the current flash image version of the device, enter the **show flash** command at any level of the CLI.

The following **show flash** output is for releases prior to FastIron 08.0.90.

```
device# show flash
Stack unit 1:
  Compressed Pri Code size = 31768772, Version:08.0.30T213 (SPR08030.bin)
  Compressed Sec Code size = 31768772, Version:08.0.30T213 (SPR08030.bin)
  Compressed Boot-Monitor Image size = 786944, Version:10.1.06T215
  Code Flash Free Space = 1602994176
Stack unit 3:
  Compressed Pri Code size = 31768772, Version:08.0.30T213 (SPR08030.bin)
  Compressed Sec Code size = 31768772, Version:08.0.30T213 (SPR08030.bin)
  Compressed Boot-Monitor Image size = 786944, Version:10.1.06T215
  Code Flash Free Space = 1604464640
Stack unit 4:
  Compressed Pri Code size = 31768772, Version:08.0.30T213 (SPR08030.bin)
  Compressed Sec Code size = 31768772, Version:08.0.30T213 (SPR08030.bin)
  Compressed Boot-Monitor Image size = 786944, Version:10.1.06T215
  Code Flash Free Space = 1588183040
```

Determining the Current Flash and Boot Image Versions

To determine the current boot and flash image versions installed on a device, enter the **show version** command at any level of the CLI.

```
device# show version
Copyright (c) 1996-2016 Brocade Communications Systems, Inc. All rights reserved.
UNIT 3: compiled on Jan 21 2019 at 23:28:08 labeled as SPR08030
(31768772 bytes) from Primary SPR08030.bin
SW: Version 08.0.30T213
UNIT 1: compiled on Jan 21 2019 at 23:28:08 labeled as SPR08030
(31768772 bytes) from Primary SPR08030.bin
SW: Version 08.0.30T213
UNIT 4: compiled on Jan 21 2019 at 23:28:08 labeled as SPR08030
(31768772 bytes) from Primary SPR08030.bin
SW: Version 08.0.30T213
Compressed Boot-Monitor Image size = 786944, Version:10.1.06T215 (spz10106)
HW: Stackable ICX7450-48
Internal USB: Serial #: 9900314061200173
Vendor: ATP Electronics, Total size = 1919 MB
=====
UNIT 1: SL 1: ICX7450-48F 48-port Management Module
Serial #:CYS3333K006
License: ICX7450_L3_SOFT_PACKAGE (LID: eauIIImFFL)
License Compliance: ICX7450-PREM-LIC-SW is Compliant
.
.
The system : started=warm start reloaded=by "reload"
My stack unit ID = 3, bootup role = active
```

Determining the Current Licenses Installed

Use the **show version** command to display the licenses installed on the device.

```
device# show version
!
!
UNIT 1: SL 1: ICX7450-48F 48-port Management Module
Serial #: CYS3333K006
```

```
License: ICX7450_L3_SOFT_PACKAGE (LID: eauIIIIImFFL)
License Compliance: ICX7450-PREM-LIC-SW is Compliant
```

How to Obtain Software Licenses

NOTE

For complete instructions on how to generate a license, refer to the *Ruckus FastIron Software Licensing Guide*.

1. If required, generate a new license from the License Management page on the [Ruckus Support website](#). If you are upgrading to a different type of image that uses a different license from the one already installed on the device, generate a separate license file.
2. Download the required software images for the target release from the [Software Downloads](#) page on the Ruckus Support website. For the list of software image files available for FastIron 08.0.xx, refer to the release notes for the specific release.

The Upgrade Process

NOTE

Before upgrading the software on a Ruckus ICX device, refer to [Upgrade and Downgrade Limitations](#) on page 26. For a stacking system, also refer to [Changes to Upgrade and Downgrade for Stacking from FastIron Release 08.0.90](#) on page 28.

Software images for all Ruckus ICX devices can be uploaded and downloaded between flash modules on the device and a TFTP, SCP, HTTPS, or USB module on the network.

Ruckus ICX devices have two flash memory modules:

- Primary flash - The default local storage device for image files and configuration files
- Secondary flash - A second flash storage device. You can use secondary flash to store redundant images for additional booting reliability or to preserve one software image while testing another one.

Only one flash device is active at a time. By default, the primary image becomes active when you reboot the device.

The following methods are available to upgrade your Ruckus ICX device.

1. **Trivial File Transfer Protocol (TFTP)** - Use TFTP to copy an image from a TFTP server onto a flash module.
2. **Secure Copy Protocol (SCP)** - Use SCP to copy images to and from a host (recommended).
3. **Hypertext Transfer Protocol Secure (HTTPS)** - From FastIron release 08.0.80, you can use HTTPS, which requires a server that supports HTTP over TLS.
4. **Universal Serial Bus (USB)** - From FastIron release 08.0.30, you can use a USB device that contains the appropriate files and is connected to a standalone unit or the active controller in a stack.

Software Upgrade from a Non-UFI 08.0.80 Version or below to a 08.0.90 UFI Version

Upgrading from a non-UFI version to a FastIron 8.0.90 or later UFI version is a **two-step upgrade** process.

TABLE 2 File Transfer Method and Commands Required

Transfer Method	Commands
TFTP	<pre> 1) device# copy tftp system-manifest 10.176.132.11 FI08090_Manifest.txt all_images_primary 2) device# copy tftp system-manifest 10.176.132.11 FI08090_Manifest.txt primary OR 1a) device# copy tftp flash 10.176.132.11 SPR08090.bin primary 1b) device# copy tftp flash 10.176.132.11 spz10115.bin bootrom & 2) device# copy tftp flash 10.176.132.11 SPR08090ufi.bin primary </pre>
SCP	<pre> 1a) device# copy scp flash 10.176.132.13 SPR08090.bin primary 1b) device# copy scp flash 10.176.132.13 spz10115.bin bootrom 2) device# copy scp flash 10.176.132.11 SPR08090ufi.bin primary </pre>
HTTPS [FastIron release 08.0.80 and above]	<pre> 1a) device# copy https flash 10.176.132.132 SPR08090.bin primary 1b) device# copy https flash 10.176.132.132 spz10115.bin bootrom 2) device# copy https flash 10.176.132.132 SPR08090ufi.bin primary </pre>
USB	<pre> 1a) device# copy disk0 flash SPR08090.bin primary 1b) device# copy disk0 flash spz10115.bin bootrom 2) device# copy disk0 flash SPR08090ufi.bin primary </pre>

Loading the Flash Code Using TFTP

NOTE

When upgrading the flash image version, the image is automatically updated across all stack units. When upgrading from one major release to another (for example, from FastIron 08.0.30 to FastIron 08.0.40), make sure that every unit in the traditional stack has the same major code version. If you reboot the stack while units are running different code versions, the units cannot communicate.

1. a. Download the FastIron 08.0.90 zip file from the Ruckus support portal under software downloads.
- b. Copy the 08.0.90 Non-UI from the TFTP server into flash memory using the **copy tftp system-manifest** command.

```
ICX7450-48P Router# copy tftp system-manifest 10.176.132.11 FI08090_Manifest.txt all-images-primary
ICX7450-48P Router# Flash Memory Write (8192 bytes per dot).....
DOWNLOADING MANIFEST FILE Done.
ICX7450-48 Router# Flash Memory Write (8192 bytes per dot)
Automatic copy to member units: 1 4
...
COPY ICX7450 SIGNATURE TFTP to Flash Done
ICX7450-48 Router#Load to buffer (8192 bytes per dot)
Automatic copy to member units: 1 4
.....
.....
SYNCING IMAGE TO FLASH. DO NOT SWITCH OVER OR POWER DOWN THE UNIT (8192 bytes per dot)...
.....
Copy ICX7450 from TFTP to Flash Done.
ICX7450-48 Router#Load to buffer (8192 bytes per dot)
Automatic copy to member units: 1 4
.....
.....
DOWNLOAD OF ICX7450 BOOT SIGNATURE Done.
ICX7450-48 Router#Load to buffer (8192 bytes per dot)
Automatic copy to member units: 1 4
.....
.....
SYNCING IMAGE TO FLASH. DO NOT SWITCH OVER OR POWER DOWN THE UNIT (8192 bytes per dot)...
.....
ICX7450 Boot IMAGE COPY IS DONE.
Manifest file upgrade done, please reload the system
```

- c. Enter the **show flash** command to verify that the correct image and uboot files have been installed in the correct primary partition flash.

```
ICX7450-48P Router# show flash
Stack unit 1:
Compressed Pri Code size = 32454468, Version:08.0.90T213 (SPR08090.bin)
Compressed Sec Code size = 31768772, Version:08.0.30tT213 (SPR08030.bin)
Compressed Boot-Monitor Image size = 786944, Version:10.1.06T215
Code Flash Free Space = 1602994176
Stack unit 3:
Compressed Pri Code size = 32454468, Version:08.0.90T213 (SPR08090.bin)
Compressed Sec Code size = 31768772, Version:08.0.30T213 (SPR08030.bin)
Compressed Boot-Monitor Image size = 786944, Version:10.1.06T215
Code Flash Free Space = 1604464640
Stack unit 4:
Compressed Pri Code size = 32454468, Version:08.0.90T213 (SPR08090.bin)
Compressed Sec Code size = 31768772, Version:08.0.30tT213 (SPR08030.bin)
Compressed Boot-Monitor Image size = 786944
```

- d. Reboot the device with the 08.0.90 image using the **boot system** command.

NOTE

Use the **boot system flash primary** command to boot the image from the primary flash memory.

```
ICX7450-48P Router# boot system flash primary
```

NOTE

The system does not support full functionality such as third-party packages (DHCPv6, HTTP, Python, etc.) without a UFI update. If the user stops the upgrade process after the reboot without downloading the UFI, the following warning message is displayed on the console.

```
WARNING: FI image is not booted from UFI. Please download UFI image and reboot the system
for full functionality.
```

e. Enter the **show version** command to display the flash image running on the device.

```
ICX7450-48P Router# show version
Copyright (c) Ruckus Networks, Inc. All rights reserved.
UNIT 2: compiled on Feb 19 2019 at 13:48:49 labeled as SPR08090
(32454872 bytes) from Primary SPR08090.bin (Non-UFI) <-- Note non-UFI label.
SW: Version 08.0.90T213
Compressed Primary Boot Code size = 786944, Version:10.1.15T215 (spz10115)
Compiled on Sun May 17 14:50:23 1936
UNIT 1: compiled on Feb 19 2019 at 13:48:49 labeled as SPR08090
(32454872 bytes) from Primary SPR08090.bin (Non-UFI)
SW: Version 08.0.90T213
Compressed Primary Boot Code size = 786944, Version:10.1.15T215 (spz10115)
UNIT 3: compiled on Feb 19 2019 at 13:48:49 labeled as SPR08090
(32454872 bytes) from Primary SPR08090.bin (Non-UFI)
SW: Version 08.0.90T213
Compressed Primary Boot Code size = 786944, Version:10.1.15T215 (spz10115)

HW: Stackable ICX7450-48-HPOE
Internal USB: Serial #: 9900515110300090
Vendor: ATP Electronics, Total size = 1919 MB
=====
UNIT 1: SL 1: ICX7450-48P POE 48-port Management Module
Serial #:CYR3344K00D
Software Package: ICX7450_L3_SOFT_PACKAGE (LID: eatIIJmFFf)
Current License: l3-prem
--More--, next page: Space, next line: Return key, quit: Control-c
SYSLOG: <14> Feb 20 15:41:19 CLI CMD: "show version" by un-authenticated user from
console
=====
===== WARNING: FI image is not booted from UFI!!! ===== <-- Note non-
UFI warning.
===== Please download UFI image and reboot the system for full functionality =====
=====
```


2. a. Perform any of the following step to copy the 08.0.90 UFI.

- Copy the 08.0.90 UFI from the TFTP server into flash memory using the **copy tftp system-manifest** command.

```
ICX 7450-48P Router# copy tftp system-manifest 10.176.132.11 SPR08090_manifest.txt primary
Flash Memory Write (8192 bytes per dot) .....
DOWNLOADING MANIFEST FILE Done.

Manifest upgrade in progress...
Load to buffer (8192 bytes per dot)
.....
Processing the bundle image...
Flashing application image to Primary partition...
SYNCING IMAGE TO FLASH. DO NOT SWITCH OVER OR POWER DOWN THE UNIT(8192 bytes per dot)
.....
Flashing bootrom image to Primary partition...
SYNCING IMAGE TO FLASH. DO NOT SWITCH OVER OR POWER DOWN THE UNIT(8192 bytes per dot)...
.....
Post processing bundle image...
Bundle image processed successfully

Copy ICX7450 from TFTP to Flash Done
Manifest image download is complete, please reload the system

NOTE:In case of a SPX system, use manifest file download here to copy the correct images to all
CB and PE units.
```

- Download the 08.0.90 UFI directly using the **copy tftp flash** command.

```
ICX 7450-48P Router# copy tftp flash 10.176.132.11 eng_temp/user/SPR08090_B19ufi.bin secondary
Load to buffer (8192 bytes per dot)
.....
.....
.....
Processing the bundle image...
Flashing application image to Secondary partition...
SYNCING IMAGE TO FLASH. DO NOT SWITCH OVER OR POWER DOWN THE UNIT(8192 bytes per dot)
.....
.....
.....
Flashing bootrom image to Secondary partition...
SYNCING IMAGE TO FLASH. DO NOT SWITCH OVER OR POWER DOWN THE UNIT(8192 bytes per dot)...
.....
.....
.....
Post processing bundle image...
Bundle image processed successfully
```

b. Reboot the device with the 08.0.90 UFI image using the **boot system flash primary** or **boot system flash secondary** command to avoid cross boot combination of FI and uboot images.

```
ICX7450-48P Router# boot system flash primary
```

c. Enter the **show version** command to display the flash image running on the device.

```
ICX7450-48P Router# show version
Copyright (c) Ruckus Networks, Inc. All rights reserved.
UNIT 3: compiled on Feb 10 2019 at 08:52:46 labeled as SPR08090
(32454468 bytes) from Primary SPR08090.bin (UFI) <--Note UFI label.
SW: Version 08.0.90T213
Compressed Primary Boot Code size = 786944, Version:10.1.15T215 (spz10115)
Compiled on Sun May 17 19:50:23 1936

HW: Stackable ICX7450-48
Internal USB: Serial #: 9900314061200173
Vendor: ATP Electronics, Total size = 1919 MB
```

Loading the Flash Code Using SCP

The new flash code must be placed on an SCP-enabled host to which the Ruckus ICX device has access.

NOTE

Copying the manifest file using SCP is not supported.

1. a. Copy the flash code from the SCP-enabled host into the flash memory.

```
ICX7450-48 Router# copy scp flash 10.176.132.13 SPR08090.bin primary
User name:root
Password:
Connecting to remote host.....

Receiving data (8192 bytes per dot)
.
Automatic copy to member units: 1 4
SYNCING IMAGE TO FLASH. DO NOT SWITCH OVER OR POWER DOWN THE UNIT(8192 bytes per dot)...
Image copy completed
Primary Image file downloaded successfully.
SCP transfer to device completed
Outbound Connection Closed
```

- b. Copy the flash code to bootrom.

```
ICX7450-48 Router# copy scp fl 10.176.132.13 spz10115.bin bootrom
User name:root
Password:
Connecting to remote host.....

Receiving data (8192 bytes per dot)
.
Automatic copy to member units: 1 4
.....
.....
SYNCING IMAGE TO FLASH. DO NOT SWITCH OVER OR POWER DOWN THE UNIT(8192 bytes per dot)...

Image copy completed
.....

Done.

SCP transfer to device completed

Connection Closed
```

2. Reload the device and then immediately upgrade to the UFI image.

```
ICX7450-48 Router# ICX7450-48 Router# boot system flash primary
!
!
ICX7450-48 Router# copy scp flash 10.176.132.13 SPR08090ufi.bin pri
User name:root
Password:
Connecting to remote host.....

Receiving data (8192 bytes per dot)
Image copy completed
```

Loading the Flash Code Using HTTPS

The HTTPS method for loading flash code is available for FastIron release 08.0.80 and later releases.

The direct UFI command used in the procedure works only if the current image loaded is FastIron 08.0.80 or later and you are upgrading to FastIron release 08.0.90 or a later release.

1. Copy the HTTPS UFI image to flash.

```
ICX7450-48 Router# copy https flash 10.176.132.132 SPR08090ufi.bin primary
```

2. Reload the ICX device.

```
ICX7450-48 Router# boot system flash primary
```

Loading the Flash Code Using USB

1. Copy the application image and the boot image to the flash from the USB.

```
ICX7450-48 Router# copy disk0 flash SPR08090.bin primary
ICX7450-48 Router# copy disk0 flash spz10115.bin bootrom
```

2. Reload the device.

```
ICX7450-48 Router# boot system flash primary
```

3. Immediately perform a UFI upgrade.

```
ICX7450-48 Router# copy disk0 flash SPR08090ufi.bin primary
```

4. Enter the **show version** command to verify that the UFI image has loaded successfully.

```
ICX7450-48 Router# show version
Copyright (c) Ruckus Networks, Inc. All rights reserved.
UNIT 3: compiled on Feb 10 2019 at 08:52:46 labeled as SPR08090
(32454468 bytes) from Primary SPR08090.bin (UFI)
SW: Version 08.0.90T213
Compressed Primary Boot Code size = 786944, Version:10.1.15T215 (spz10115)
Compiled on Sun May 17 19:50:23 1936

HW: Stackable ICX7450-48
Internal USB: Serial #: 9900314061200173
Vendor: ATP Electronics, Total size = 1919 MB
```

Software Downgrade from a UFI to a Non-UFI Version

Ruckus recommends downgrading to earlier releases using a manifest download.

NOTE

Ruckus does not recommend using the application image download.

NOTE

Reboot the device using the **boot system** command only. When you try to reboot the device, the following warning message is displayed on the console.

```
Warning! the startup-config is 8.0.90 or later, but you are reloading to a pre-8090 image. There is
no pre-8090-startup-backup file. Reloading to pre-8090 image may lose some stack-port/trunk
configurations due to 8090 format changes.
```

The following sections provide examples of manifest downloads using TFTP and SCP.

Downgrade from a UFI to a Non-UFI Version Using TFTP

The following example uses TFTP to downgrade from FastIron release 08.0.90 to FastIron release 08.0.70e.

1. Enter the **show version** command to confirm the active image version.

```
ICX7650-48P Router# show version
Copyright (c) Ruckus Networks, Inc. All rights reserved.
UNIT 1: compiled on Feb  7 2019 at 17:14:15 labeled as TNR08090
(61202340 bytes) from Primary TNR08090.bin (UFI)
  SW: Version 08.0.90T233
  Compressed Primary Boot Code size = 1573376, Version:10.1.15T235 (tnu10115)
  Compiled on Thu Jan 31 07:09:04 2019

HW: Stackable ICX7650-48-HPOE
=====
UNIT 1: SL 1: ICX7650-48P-L3-PREM POE 48-port Management Module
  Serial #:EZD3324N03R
  Software Package: ICX7650_BASE_L3_SOFT_PACKAGE (LID: gbfIIHJpFit)
  Current License: l3-base
  P-ASIC 0: type B567, rev 11 Chip BCM56567_B0
=====
UNIT 1: SL 2: ICX7600-2X40GQ 2-port 80G Module
  Serial #:EZG3320N0AX
=====
UNIT 1: SL 3: ICX7650-2X100G 2-port 200G Module
=====
  2000 MHz ARM processor ARMv8 88 MHz bus
  8192 KB boot flash memory
  2048 MB code flash memory
  3910 MB DRAM
STACKID 1 system uptime is 4 day(s) 3 hour(s) 57 minute(s) 39 second(s)
The system started at 18:24:43 GMT+00 Mon Jan 17 2000

The system : started=warm start  reloaded=by "reload"
```

2. Copy the FastIron 08.0.70 images to flash using the manifest file.

```
ICX7650-48P Router# copy tftp system-manifest FI08070_Manifest.txt primary
ICX7650-48P Router#Flash Memory Write (8192 bytes per dot)
DOWNLOADING MANIFEST FILE Done.

Manifest upgrade in progress...
ICX7650-48P Router#Flash Memory Write (8192 bytes per dot)

COPY ICX7650 SIGNATURE TFTP to Flash Done
ICX7650-48P Router#Load to buffer (8192 bytes per dot)
.....
.....
SYNCING IMAGE TO FLASH. DO NOT SWITCH OVER OR POWER DOWN THE UNIT(8192 bytes per dot)...
.....
..... Copy
ICX7650 from TFTP to Flash Done.
ICX7650-48P Router#Flash Memory Write (8192 bytes per dot)
.....
DOWNLOAD OF ICX7650 BOOT SIGNATURE Done.
ICX7650-48P Router#
!!! Downloading this boot image can result in application-boot image mismatch. Please use UFI
image.
Load to buffer (8192 bytes per dot)
.....
SYNCING IMAGE TO FLASH. DO NOT SWITCH OVER OR POWER DOWN THE UNIT(8192 bytes per dot)...
.....
.....
ICX7650 Boot IMAGE COPY IS DONE

Manifest image download is complete, please reload the system
Copying the downloaded/created manifest file from ramfs to flash...
Copy Done.
```

3. Enter the **show flash** command to confirm the loaded version.

```
ICX7650-48P Router# show flash
Stack unit 1:
  Compressed Pri Code size = 56630696, Version:08.0.70eT233 (TNR08070e.bin)
  Compressed Sec Code size = 61191868, Version:08.0.90T233 (TNR08090.bin)
  Compressed Pri Boot Code size = 1573376, Version:10.1.14T235 (tnu10114)
  Compressed Sec Boot Code size = 1573376, Version:10.1.15T235 (tnu10115b5)
  Code Flash Free Space = 2725548032
```

4. Reload the device.

```
ICX7650-48P Router# boot system flash primary
```

5. Enter the **show version** command to confirm the loaded version.

```
ICX7650-48P Router# show version
Copyright (c) 2017 Ruckus Wireless, Inc. All rights reserved.
UNIT 1: compiled on Jan 22 2019 at 04:42:38 labeled as TNR08070e
(56630696 bytes) from Primary TNR08070e.bin
SW: Version 08.0.70eT233
Compressed Boot-Monitor Image size = 1573376, Version:10.1.14T235 (tnu10114)
Compiled on Thu Nov 15 07:40:46 2018

HW: Stackable ICX7650-48-HPOE
=====
UNIT 1: SL 1: ICX7650-48P-L3-BASE POE 48-port Management Module
Serial #:EZD3324N03R
License: ICX7650_BASE_L3_SOFT_PACKAGE (LID: gbfIIHJpFit)
P-ASIC 0: type B567, rev 11 Chip BCM56567_B0
=====
UNIT 1: SL 2: ICX7600-2X40GQ 2-port 80G Module
Serial #:EZG3320N0AX
=====
UNIT 1: SL 3: ICX7650-2X100G 2-port 200G Module
=====
2000 MHz ARM processor ARMv8 88 MHz bus
8192 KB boot flash memory
2048 MB code flash memory
3911 MB DRAM
STACKID 1 system uptime is 1 minute(s) 59 second(s)
The system started at 22:09:22 GMT+00 Fri Jan 21 2000

The system : started=warm start reloaded=by "reload"
```

Downgrade from a UFI to a Non-UFI Version Using SCP

When TFTP is not available or a secure download is required, you can download FastIron images using SCP.

NOTE

If you downgrade from FastIron release 08.0.90 to a previous release using SCP, boot image download using SCP is not possible. Once the ICX device has booted from the previous image, you must download the boot image again separately.

The following example downgrades from FastIron 08.0.90 images to 08.0.70e images using SCP.

1. Copy the application image to flash using SCP.

```
ICX7650-48F Router# copy scp flash 10.176.132.13 TNR08070e.bin primary
User name:root
Password:
Connecting to remote host.....

Receiving data (8192 bytes per dot)
.....
.....
.....
SYNCING IMAGE TO FLASH. DO NOT SWITCH OVER OR POWER DOWN THE UNIT(8192 bytes per dot)...
.....
.....
.....
Primary Image file downloaded successfully.

SCP transfer to device completed

Outbound Connection Closed
```

2. Enter the **show flash** command to check for the installed image.

```
ICX7650-48F Router# show flash
Stack unit 1:
  Compressed Pri Code size = 56630696, Version:08.0.70eT233 (TNR08070e.bin)
  Compressed Sec Code size = 56623412, Version:08.0.70eT233 (TNR08070e.bin)
  Compressed Pri Boot Code size = 1573376, Version:10.1.15T235 (tnu10115)
  Compressed Sec Boot Code size = 1573376, Version:10.1.15T235 (tnu10115b5)
  Code Flash Free Space = 2728226816
```

3. Reload the ICX device.

```
ICX7650-48 Router# boot system flash primary
```

4. Copy the boot image to flash using SCP.

```
ICX7650-48F Router# copy scp flash 10.176.132.13 tnu10114.bin bootrom
User name:root
Password:
Connecting to remote host.....
```

```
Receiving data (8192 bytes per dot)
```

```
.....
.....
.....
```

```
SYNCING IMAGE TO FLASH. DO NOT SWITCH OVER OR POWER DOWN THE UNIT(8192 bytes per dot)...
```

```
.....
.....
.....
```

```
Done.
```

```
SCP transfer to device completed
```

```
Outbound Connection Closed
```

5. Reload the ICX device.

```
ICX7650-48 Router# boot system flash primary
```

Reverting to the Old Image

Once the upgrade is completed, the primary partition has the new image, and the secondary partition has the older image. You can use the following steps to move the stack back to the older image.

1. Move the older image from the secondary partition to the primary partition.

- For a traditional stack, use the following command.

```
device# copy flash flash primary
```

- For an SPX system, use the following command for CB units.

```
device# copy flash flash primary
```

- For an SPX system, use the following command for PE units.

```
device# copy tftp flash server-ip file-name primary
```

2. Confirm that the proper image has been reloaded on all units.

3. Reboot the system from the primary flash image.

```
device# boot system flash primary
```

Software Recovery

If the software upgrade or downgrade fails, the device may reboot continuously as shown in the following CLI output.

```
bootdelay: ===  
Booting image from Primary  
Bad Magic Number  
could not boot from primary, no valid image; trying to boot from secondary  
Booting image from Secondary  
Bad Magic Number  
## Booting image at 01ffffc0 ...  
Bad Magic Number  
## Booting image at 01ffffc0 ...  
Bad Magic Number  
could not boot from secondary, no valid image; trying to boot from primary  
Booting image from Primary  
Bad Magic Number  
## Booting image at 01ffffc0 ...  
Bad Magic Number
```

Recovering Software

This section explains how to recover devices from image installation failure or deleted or corrupted flash images.

NOTE

Software recovery should be performed under the supervision of a Ruckus support engineer.

1. Connect a console cable from the console port to the terminal server.
2. Connect an Ethernet cable from the management port (the port located under the console port on the device) to the TFTP server.

The device will be in boot mode for recovery.

3. Set the existing variables from the boot prompt.

```
device> printenv  
baudrate=9600  
uboot=ruckus/ICX7450/bootcode/spz10115  
Version:10.1.06T215 (May 15 2015 - 11:28:23)
```

The path is to the boot image on the TFTP server.

4. Set the TFTP server that hosts a valid ICX software image using the **setenv serverip** command.

```
ICX 7450-48> setenv serverip 10.10.10.21
```


5. Set the IP address, gateway IP address, and netmask for the device management port, and save the configuration using the **setenv ipaddr**, **setenv gatewayip**, **setenv netmask**, and **saveenv** commands.

```
ICX 7450-48> setenv ipaddr 10.10.10.22
ICX 7450-48> setenv gatewayip 10.10.10.1
ICX 7450-48> setenv netmask 255.255.255.0
ICX 7450-48> saveenv
```

NOTE

The IP address and the gateway IP address set for the device management port should be for the same subnet as the TFTP server NIC.

6. Enter the **printenv** command to verify the IP addresses that you configured for the device and the TFTP server.

```
ICX 7450-48> printenv
baudrate=9600
ipaddr=10.10.10.22
gatewayip=10.10.10.1
netmask=255.255.255.0
serverip=10.10.10.1
uboot=brocade/ICX7450/bootcode/spz10115
Version:10.1.06T215 (May 15 2015 - 11:28:23)
```

7. Test the connectivity to the TFTP server from the device using the **ping** command to ensure a working connection.

```
ICX 7450-48> ping 10.10.10.21
ethPortNo = 0
Using egiga0 device
host 10.10.10.21 is alive
```

8. Provide the file name of the image that you want to copy from the TFTP server using the **setenv image_name** command.

```
ICX 7450-48> setenv image_name images/ICX/SPR08090.bin
```

9. Update the flash using the **update_primary** or **update_secondary** command as appropriate.

```
ICX 7450-48> update_primary
```

10. Provide the file name of the boot image to be copied from the tftp server.

```
> setenv uboot
```

11. Update the uboot file.

```
ICX 7450-48> update_uboot
```

12. Load the image from the primary or secondary flash using the **boot_primary** or **boot_secondary** command as appropriate.

```
ICX 7450-48> boot_primary
```

Deprecated or Removed Features and Commands

The following upgrade and downgrade commands and features have been deprecated.

- SNTP is no longer supported. NTPv4 replaces SNTP.

- The **stack persistent-mac-timer** command is deprecated in FastIron 08.0.20.
- The **show cpu-utilization** command replaces the **show process cpu** command.
- The **stack secure-setup** command is deprecated beginning in release 08.0.90.
- The **default-port** command is deprecated beginning in release 08.0.90.
- The **copy tftp | scp flash tftp server-ip file-name bootrom** command is deprecated beginning in release 08.0.90.
- The **copy tftp | scp flash tftp server-ip file-name fips-bootrom-sig** command is deprecated beginning in release 08.0.90.
- The **copy tftp | scp flash tftp server-ip file-name fips-primary-sig** command is deprecated in ICX 7850 devices.
- The **copy tftp | scp flash tftp server-ip file-name fips-secondary-sig** command is deprecated in ICX 7850 devices.
- The **copy disk0 flash file-name bootrom** command is deprecated beginning in release 08.0.90.
- The **copy disk0 flash file-name fips-bootrom-sig** command is deprecated beginning in release 08.0.90.
- The **copy disk0 flash file-name fips-primary-sig** command is deprecated in ICX 7850 devices.
- The **copy disk0 flash file-name fips-secondary-sig** command is deprecated in ICX 7850 devices.
- The **copy tftp system-manifest server-ip-address manifest-file-name all-images-primary | all-images-secondary** command is deprecated beginning in release 08.0.90.

Upgrade and Downgrade Limitations

The following table lists known issues related to FastIron 08.0.90 image upgrade and downgrade.

TABLE 3 Known Issues Related to FastIron 08.0.90 Upgrade or Downgrade

Issue	Protocol Affected	Platforms Affected	FastIron Releases Affected	Issue Fixed	Issue Details
1. Image upgrade of UFI image using TFTP from FastIron release 08.0.80 onward does not work on ICX 7650 devices.	TFTP	ICX7650	08.0.80, 08.0.80a, 08.0.80b, 08.0.80c, 08.0.80d	08.0.80e (TFTP will be supported when it is released.)	Due to an increase in UFI image size, image upgrade from the FastIron 08.0.80 release to the FastIron 08.0.90 release does not work for ICX 7650 devices. There are two possible workarounds: (a) Use SCP to download the UFI image. (b) Download application and boot images separately using TFTP.
2. The show version command does not show correct image name on standby or stack members after image upgrade.	USB image download	All ICX platforms	08.0.30, 08.0.40, 08.0.50, 08.0.60, 08.0.61, 08.0.70	--	The show version command shows "eusb1" as the image name for standby units when the FastIron image is downloaded from USB. The image is downloaded correctly, and there is no functional impact. The workaround is to download the images using the TFTP or SCP protocol.

TABLE 3 Known Issues Related to FastIron 08.0.90 Upgrade or Downgrade (continued)

Issue	Protocol Affected	Platforms Affected	FastIron Releases Affected	Issue Fixed	Issue Details
3. Image download using USB of boot image does not work on standby or member units.	USB image download	All ICX platforms	08.0.30, 08.0.40, 08.0.50, 08.0.60, 08.0.61, 08.0.70	--	The boot image is not flashed to the standby controller unit when USB is used to upgrade or downgrade a stack. The workaround is to download the images using the TFTP or SCP protocol.
4. Warning messages are displayed on standalone units during copy of UFI images using SCP.	SCP	All ICX platforms	08.0.80, 08.0.80a, 08.0.80b, 08.0.80c, 08.0.80d, 08.0.80e	--	The following warning message is displayed on standalone units while copying UFI images using SCP. The image is downloaded correctly, and there is no functional impact. WARNING: Possible failure on one of the member units while downloading the image. Images may not be in sync after reloading. The workaround is to download the images using TFTP.
5. USB image upgrade is not supported for stacking in FastIron release 08.0.80.	USB image download	All ICX platforms	All ICX platforms	--	Image upgrade using USB is not supported for stacking in FastIron release 08.0.80 and 08.0.80 patches. The workaround is to upgrade using the TFTP or SCP protocol.

Campus Fabric Limitations for Image Downgrade from FastIron Release 08.0.90 to Previous Releases

Consider the following information when downgrading from FastIron release 08.0.90 in a Campus Fabric (SPX) network.

ICX Device Support in SPX Systems

The following table lists Ruckus ICX devices and the release when they were introduced for use in a Control Bridge (CB) or as a Port Extender (PE) unit.

TABLE 4 SPX Support for ICX Devices

ICX device	First FastIron release to support SPX on device	SPX role
ICX 7450	08.0.40	PE
ICX 7250	08.0.50	PE
ICX 7150	08.0.70	PE
ICX 7650	08.0.80	CB

SPX System with ICX 7650 CB Units

- Downgrade from FastIron release 08.0.90 to 08.0.70 or prior releases is not supported. If this downgrade is attempted in an SPX system with ICX 7650 CB units, the PE units are not recognized, and the SPX system is dismantled.
- Downgrade from FastIron release 08.0.90 to 08.0.80 should be fine.

General Upgrade and Downgrade Considerations for Stacks

Read the following section before upgrading a stack from a pre-08.0.90 release to FastIron 08.0.90 or later and before downgrading from FastIron 08.0.90 or a later release to a pre-08.0.90 release. Certain stack configuration behaviors have changed in FastIron release 08.0.90, and new commands have been introduced to assist with upgrades and downgrades. For additional information on stacking changes, refer to the *Ruckus FastIron Stacking Configuration Guide*.

Changes to Upgrade and Downgrade for Stacking from FastIron Release 08.0.90

The stacking port format is different beginning with FastIron 08.0.90. The change in format creates upgrade and downgrade issues.

Upgrading to FastIron Release 08.0.90 from Earlier Releases

Upgrades from earlier releases to FastIron 08.0.90 are seamless. FastIron 08.0.90 recognizes the old format and parses startup-config flash to convert the configuration to the new format. After upgrade, if you enter the **write memory** command to save the configuration, the new format is stored to startup-config flash.

In the following example, an ICX 7450 stack is upgraded to FastIron 08.0.90 from FastIron 08.0.80 startup-config flash. The user has not yet used the **write memory** command. Output for the **show configuration** command shows that the FastIron 08.0.80 startup-config flash remains in the old format. The command output for the **show running-config** command displays the runtime configuration in the new format.

```
ICX7450-48P Router# show configuration
!
Startup-config data location is flash memory
!
Startup configuration:
!
ver 08.0.80T213 <-- old 08.0.80 release startup-config flash
!
stack unit 1
module 1 icx7450-48p-poe-management-module
module 2 icx7400-xgf-4port-40g-module
module 3 icx7400-qsfp-1port-40g-module
module 4 icx7400-qsfp-1port-40g-module
priority 128
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
stack-port 1/2/1 1/2/3
stack unit 2
module 1 icx7450-48p-poe-management-module
module 2 icx7400-xgf-4port-40g-module
module 3 icx7400-qsfp-1port-40g-module
module 4 icx7400-qsfp-1port-40g-module
priority 128
```

```
default-ports 2/2/1 2/2/3
stack-trunk 2/2/1 to 2/2/2
stack-port 2/2/1 2/2/3
stack enable
stack mac 609c.9f2a.97e0

ICX7450-48P Router# show running-config
Current configuration:
!
ver 08.0.90
!
stack unit 1
module 1 icx7450-48p-poe-management-module
module 2 icx7400-xgf-4port-40g-module
module 3 icx7400-qsfp-1port-40g-module
module 4 icx7400-qsfp-1port-40g-module
priority 128
stack-trunk 1/2/1 to 1/2/2
stack-trunk 1/2/3 to 1/2/4
stack unit 2
module 1 icx7450-48p-poe-management-module
module 2 icx7400-xgf-4port-40g-module
module 3 icx7400-qsfp-1port-40g-module
module 4 icx7400-qsfp-1port-40g-module
priority 128
stack-trunk 2/2/1 to 2/2/2
stack-port 2/2/3
stack enable
stack mac 609c.9f2a.97e0
```

Downgrading from FastIron 08.0.90 to Earlier Releases

A standalone or active controller parses the startup-config flash to read the stacking ports for the entire stack. A release prior to FastIron 08.0.90 does not understand startup-config flash content generated by FastIron 08.0.90 or later releases. As a result, if you try to downgrade from FastIron 08.0.90 or later to a pre-08.0.90 release, the stack may break. FastIron 08.0.90 attempts to overcome the need to downgrade by saving and recovering the original startup-config flash.

In FastIron 08.0.90, when the **write memory** command is used, the system renames the startup-config flash "pre-8090-startup-backup" if it has been generated from a pre-08.0.90 release. You can view the contents of the saved file using the **show pre-8090-startup-backup** command.

NOTE

When a stack downgrades to a pre-08.0.90 release from recovered pre-08.0.90 startup-config flash, it loses all configuration changes made under FastIron 08.0.90.

Every unit, including a stack member, has a startup-config file, and every unit renames the startup-config as the backup file when the **write memory** command is used.

If you no longer need the pre-8090-startup-backup file, you can delete it using the **erase pre-8090-startup-backup** command. This command erases the pre-8090-startup-backup file in every unit in the stacking system. You may no longer need the older backup file if you are certain you will not have to downgrade the system or if you have made many configuration changes with the FastIron 08.0.90 or later release installed, making the backup file obsolete.

When a system running FastIron 08.0.90 detects that it is about to reload to a pre-08.0.90 release, the system tries to recover the backup file. A message is displayed asking for confirmation before recovering the file with a warning that all changes made with the current release will be lost.

```
ICX7450-48P Router# boot system flash secondary
Are you sure? (enter 'y' or 'n'): y
Warning! the startup-config is 8.0.90 or later, but you are reloading to a pre-8090 image.
The system will use the pre-8090-startup-backup file to reload and lose all 8.0.90 changes.
(You can type "show pre-8090-startup-backup" to see its content.)
```

Software Upgrade and Downgrade

General Upgrade and Downgrade Considerations for Stacks

```
Do you want to reload ? (enter 'y' or 'n'): y
Reload using pre-8090-startup-backup file.
```

NOTE

In contrast, the **reload yes** and **boot system flash secondary yes** commands do not require confirmation. The following example shows the system response when the **boot system flash secondary yes** command is entered.

```
ICX7450-48P Router# boot system flash secondary yes
Reload using pre-8090-startup-backup file.
T=8m11.3: Halt and reboot
```

When a system is upgraded to FastIron 08.0.90 or later and then downgraded to a pre-08.0.90 release, the results of the downgrade differ, depending on the situation. The following cases describe specific situations and the expected results. The scenarios in the following tables apply to a standalone unit or a stack.

TABLE 5 Downgrade Scenarios

Situation	Result
The user never uses a write memory command when running FastIron 08.0.90.	The downgrade is seamless.
The user does not change any configuration but uses the write memory command when running FastIron 08.0.90.	The downgrade is fine. The system recovers the backup file before reloading to a pre-08.0.90 release.
The user makes configuration changes while running FastIron 08.0.90 and uses the write memory command.	The downgrade loses all configuration changes made under FastIron 08.0.90. The system recovers the backup file that does not contain the changes.

Switchover or failover does not affect these downgrade scenarios. For example, you may perform a switch-over to change the active controller and then reload. The recovery result is the same as a reload without changing the active controller.

There are a few cases where recovery does not work.

TABLE 6 Scenarios where Downgrades Cannot Be Performed

Situation	Result
The user reloads the system by powering down.	The system cannot recover the backup file before reloading.
The standalone or active controller does not have a startup-config flash file generated by any pre-08.0.90 release.	Downgrade is not possible.

NOTE

It is recommended that you copy the running configuration to a file before downgrading. You can do this using the **copy running-config** command to copy the configuration to different locations such as a USB disk file or a tftp server, or you can simply enter the **show running-config** command and then copy the output and paste it into a computer file.

NOTE

If you don't have a pre-08090-startup-backup file (which can be checked with the **show pre-8090-startup-backup** command), or you have many configuration changes to the 08.0.90 release or a later release and you need to downgrade to a pre-08.0.90 release, you must manually edit the 08.0.90 configuration to create a pre-08.0.90 format.

In-service Software Upgrade

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What Is an In-service Software Upgrade?

An in-service software upgrade (ISSU) allows stack units or units in a Campus Fabric (SPX) system to be upgraded with minimal interruptions to multi-unit topologies.

ISSU provides an incremental method to upgrade traditional stacks and Campus Fabric (SPX) systems. A successful ISSU does not affect uplink or downlink connectivity in a topology with multi-unit LAGs. Only the node that is undergoing the upgrade requires a hardware reset that includes the reset of the packet processor. As a result, traffic transiting only that node is disrupted.

NOTE

Traffic through PE nodes is affected by ISSU because PE ports cannot be part of a traditional LAG.

ISSU Limitations and Considerations

When using ISSU, consider the following capabilities and restrictions:

- ISSU is supported on FastIron ICX 7150, ICX 7250, ICX 7450, ICX 7650, and ICX 7850 stackable hardware.
- ISSU is supported in a traditional ring stack topology and an SPX topology where control bridges are connected in a ring. PE units can be connected in either linear or ring topologies.
- ISSU works for stacks of two units to the maximum supported twelve units.
- ISSU is supported in SPX configurations with the maximum number of PE units.
- ISSU is supported for upgrades between minor releases only. For example, you can use ISSU to upgrade between FastIron 08.0.90 and FastIron 08.0.90a or between FastIron 08.0.90a and subsequent patch releases but not between FastIron 08.0.80 and FastIron 08.0.90.
- For ISSU to occur with minimal disruption, the customer network connected to the stack and CB units in an SPX system must have redundant uplink and downlink configurations across multiple units.
- If the secondary partition is upgraded, this partition is set as the default boot partition for the stack.
- Most CLI commands, SNMP, and web operations are blocked while ISSU is in progress.
- To make the upgrade seamless, the following administrative operations are blocked while ISSU is in progress:
 - Configuration
 - Image download to flash memory
 - Stack commands or SPX commands that may result in topology change or discovery

- Initiation of another ISSU
- New PE join activity

The following additional items are blocked during ISSU in a Campus Fabric system:

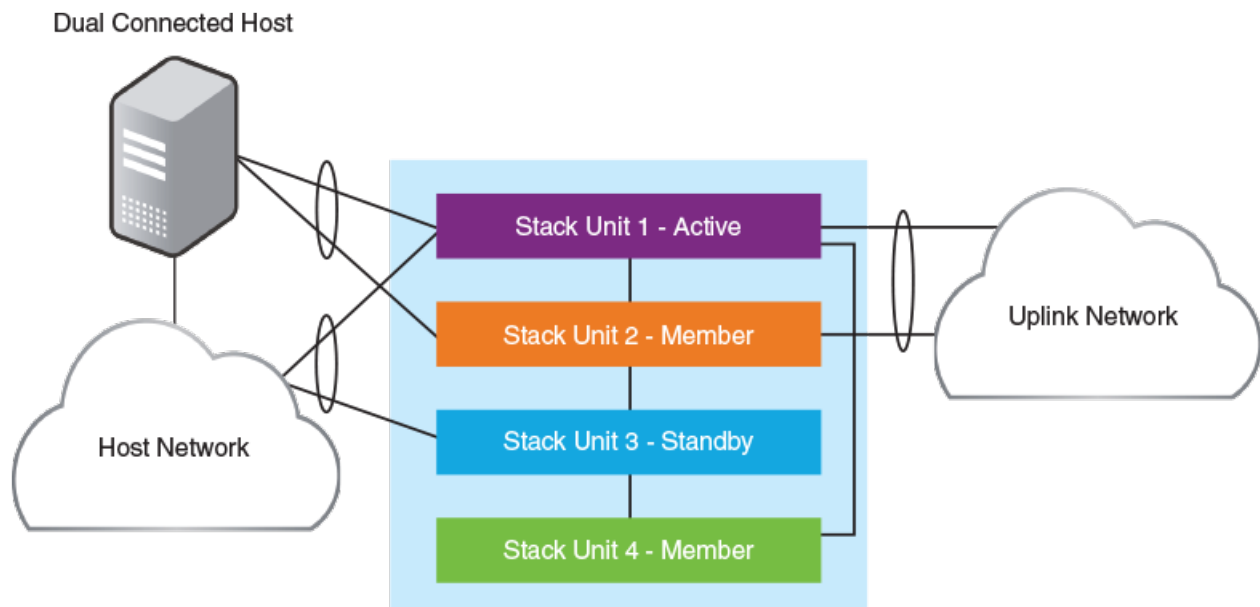
- The web interface
- SPX DDM commands
- SPX interactive-setup
- SPX zero-touch provisioning
- Clear commands

Recommended Stack Topology for ISSU

ISSU provides an ability to upgrade traditional stacks without affecting the network.

ISSU reduces its network impact only if redundant uplink and downlink connections are available from multiple stack units. A typical topology where ISSU can be used effectively is shown in the following figure.

FIGURE 1 Recommended Stack Topology for ISSU



In the figure, redundant links are going to both the uplink network and the downlink network from different units of the stack. At any point during the upgrade, the uplink and downlink connectivity is maintained. The following software features are used to provide link redundancy:

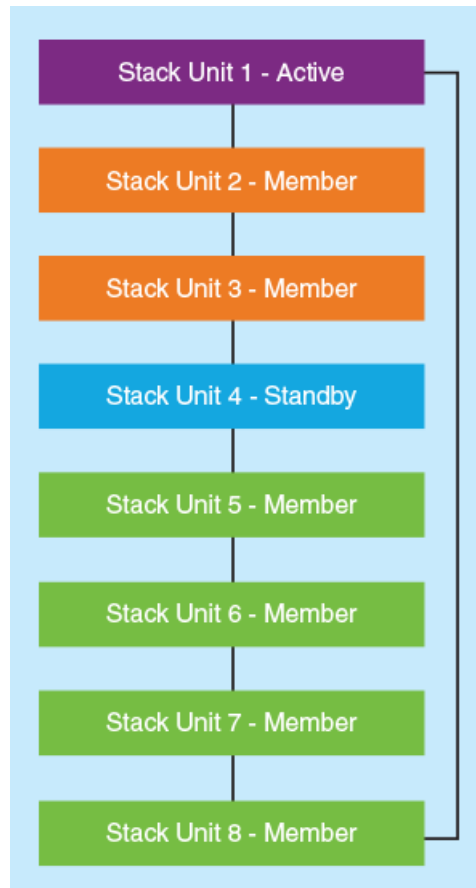
- Link aggregation (or dual connectivity to two different PEs in a chain or ring to provide PE redundancy)
- VRRP and VRRP-E
- Graceful restart for IP routing features

The node that is being upgraded goes through a hardware reset. This resets the packet processor, and traffic flowing through that specific node is disrupted.

How ISSU Works When Upgrading Stack Units

The following section describes the checks and the upgrade sequence for the typical 8-unit stack shown in the [Figure 2](#). For a step-by-step procedure on performing an ISSU, refer to [Upgrading a Stack with ISSU](#) on page 35.

FIGURE 2 Stack Units To Be Upgraded



After you have downloaded release software as described in [Initial Steps](#) on page 11 and [The Upgrade Process](#) on page 13, you can check the sequence in which stack units will be upgraded using the **show issu sequence** command. The following example displays the ISSU upgrade sequence for the stack shown in [Figure 2](#).

```
device# show issu sequence
Stack units will be upgraded in the following order
ID Type Role
4 ICX7450-32ZP standby
3 ICX7450-32ZP member
2 ICX7450-32ZP member
5 ICX7450-32ZP member
6 ICX7450-32ZP member
7 ICX7450-32ZP member
8 ICX7450-32ZP member
1 ICX7450-32ZP active
```

All stack ISSU processes follow the same pattern. As reflected in the sample output, the stack in our example responds to the **issu** command in the following ways:

- Unit 4, the standby controller, is reloaded with the new image.

- Once the standby controller joins the stack, all member units from the standby controller to the active controller units (3 and 2 in the following example) reload the new image.
- All members from the standby controller to the active controller in the other direction (5,6,7, and 8 in the following example) reload the new image.
- Once all member units and the standby controller are reloaded with the new image, the active controller unit triggers a switchover, in which the old standby controller (4) becomes the new active controller unit, and the old active controller (unit 1) becomes the new standby controller.
- The new active controller (unit 4) reloads the old active controller (unit 1) with the new image.
- Once the old active controller (unit 1) comes up as a member unit and rejoins the stack, standby controller election occurs, and the stack becomes fully functional with the upgraded image.

NOTE

If the stack unit configurations have priority settings, a final switchover is done to ensure that the unit with the highest priority becomes the active controller unit.

Pre-ISSU Compatibility Checks for a Traditional Stack

After ISSU is triggered, but before ISSU processing begins, a pre-ISSU compatibility check is executed.

The compatibility check determines whether the stack is ready for an upgrade. A successful compatibility check for a stack displays the passing results shown in the following table.

TABLE 7 Pre-ISSU Checks for a Traditional Stack

Check	Passing Result
Stacking Topology is Ring	Yes
Standby Present	Yes
Standby ready for upgrade	Yes
Flash use in progress	No
Stack interactive-setup in progress	No
Stack ZTP is configured	No
ISSU in progress or aborted	No
Election pending	No
Election in progress	No
Reload pending	No
CPU utilization high	No
All units in ready state	Yes
Primary Image is upgrade compatible	Yes
Secondary Image is upgrade compatible	Yes
Startup config and Running Config Same	Yes
Boot option present in running config	No
User in Config mode	No
POE-Firmware Download is in Progress	No
System ready for issu	If this flag is present, you can proceed with ISSU. Otherwise, check the conditions flagged by three asterisks (***) and make prescribed corrections to the device before performing an ISSU.

TABLE 7 Pre-ISSU Checks for a Traditional Stack (continued)

Check	Passing Result
ISSU not in progress	

Upgrading a Stack with ISSU

The following examples for copying images represent typical use. Other options such as manifest-based image copy can also be used. Refer to [Initial Steps](#) on page 11 and [The Upgrade Process](#) on page 13 for more information before performing the upgrade.

Complete the following steps to upgrade a stack using ISSU.

NOTE

By default, switches are booted from the primary partition.

1. Copy the images.

- a) Back up the running image to the secondary partition.

```
device# copy flash flash secondary
```

- b) Copy the new image from its server location to the primary partition.

```
device# copy tftp flash 10.10.10.10 SWR08090aufi.bin primary
```

The IP address in the example is for the TFTP server. The address can be an IPv4 or IPv6 address. The .bin file is the name of the image file.

2. Check the sequence of the upgrade.

```
device# show issu sequence
Stack units will be upgraded in the following order
ID Type Role
1 ICX7450-32ZP standby
3 ICX7450-32ZP member
4 ICX7450-32ZP active
```

The example shows the sequence for a three-unit stack.

3. Initiate the upgrade.

Use the **issu primary** command, preferably with an error recovery option, if you downloaded the image to the primary partition of the flash.

Or use the **issu secondary** command, preferably with an error recovery option, if you downloaded the image to the secondary partition.

NOTE

Ruckus recommends using an error recovery option when upgrading.

NOTE

The **issu** command option **on-error reload-primary** shown in the following example specifies an automatic reload from the primary partition if there is an upgrade error. You can also specify the option **on-error reload-secondary** to reload from the secondary partition to bring the stack back up with the original image.

- Initiating the upgrade with error recovery.

```
device# issu primary on-error reload-primary
Stacking Topology is Ring           Yes
Standby Present                     Yes
Standby ready for upgrade           Yes
Flash use in progress               No
Stack interactive-setup in progress No
Stack ZTP is configured             No
ISSU in progress or aborted         No
Election pending                    No
Election in progress                No
Reload pending                      No
CPU utilization high                No
All units in ready state            Yes
Primary Image is upgrade compatible Yes
Secondary Image is upgrade compatible Yes
Startup config and Running Config Same Yes
Boot option present in running config No
User in Config mode                 No
POE-Firmware Download is in Progress No
Proceed with upgrade? (enter 'y' or 'n'):
```

- Initiating the upgrade without error recovery (not recommended)

```
device# issu secondary
Stacking Topology is Ring           Yes
Standby Present                     Yes
Standby ready for upgrade           Yes
Flash use in progress               No
Stack interactive-setup in progress No
Stack ZTP is configured             No
ISSU in progress or aborted         No
Election pending                    No
Election in progress                No
Reload pending                      No
CPU utilization high                No
All units in ready state            Yes
Primary Image is upgrade compatible Yes
Secondary Image is upgrade compatible Yes
Startup config and Running Config Same Yes
Boot option present in running config No
User in Config mode                 No
POE-Firmware Download is in Progress No
Proceed with upgrade? (enter 'y' or 'n'):
```

If an error occurs when the upgrade was initiated without error recovery, the error condition is marked by three asterisks.

```
device# issu primary
Stacking Topology is Ring           Yes
```

```
Standby Present                No    ***
Standby ready for upgrade      No    ***
Flash use in progress          No
Stack interactive-setup in progress No
Stack ZTP is configured        No
ISSU in progress or aborted    No
Election pending               No
Election in progress           No
Reload pending                 No
CPU utilization high           No
All units in ready state       Yes
Primary Image is upgrade compatible Yes
Secondary Image is upgrade compatible Yes
Startup config and Running Config Same Yes
Boot option present in running config No
User in Config mode            No
POE-Firmware Download is in Progress No
System not ready for issu. Check error condition highlighted by "****" and rectify.
ISSU not in progress
```

4. Enter **y** when prompted to start the upgrade, or **n** to stop the process.

5. Wait for the upgrade to complete, and check the status. (You may check the status at any time.)

The following **show issu status** command output indicates the successful completion of an ISSU upgrade.

```
device# show issu status
Last upgrade time 00:02:19.367 GMT+00 Tue Mar 20 2019
The older image before-ISSU SPRO8090.bin
Stacking Topology is Ring          Yes
Standby Present                    Yes
Standby ready for upgrade          Yes
Flash use in progress              No
Stack interactive-setup in progress No
Stack ZTP is configured            No
ISSU in progress or aborted        No
Election pending                   No
Election in progress               No
Reload pending                     No
CPU utilization high                No
All units in ready state           Yes
Primary Image is upgrade compatible Yes
Secondary Image is upgrade compatible Yes
Startup config and Running Config Same Yes
Boot option present in running config No
User in Config mode                No
POE-Firmware Download is in Progress No
System ready for issu
ISSU not in progress
```

The following example shows a status display for an upgrade that is in progress.

```
device# show issu status
ISSU Status: In Progress
Upgrade State: UNIT JOIN
Upgrade Option: issu primary
ID   Type           Role      State
1    ICX7450-32ZP     member   UPGRADING
3    ICX7450-32ZP     member   UPGRADE PENDING
4    ICX7450-32ZP     active   UPGRADE PENDING
```

If the upgrade has not been initiated, the **show issu status** command displays information about whether the system is ready for the upgrade.

The following example shows a status display for an aborted upgrade.

```
device# show issu status
ISSU Status: Aborted
Upgrade State: UPGRADE ABORT
Upgrade Option: issu primary
Reason for Abort: UNABLE TO UPGRADE
ID   Type           Role      State
1    ICX7450-32ZP     member   UPGRADE ABORT
3    ICX7450-32ZP     standby  UPGRADE PENDING
4    ICX7450-32ZP     active   UPGRADE PENDING
```

The following example shows an unsuccessful ISSU that was aborted due to a hot swap error.

```
device# show issu status
Abort info before recovery upgrade:
Reason for abort          HOTSWAP ERROR
Hotswap error with Unit 1
Topology is Ring          Yes
Standby Present          Yes
Standby ready for upgrade Yes
Flash use in progress     No
Stack interactive-setup in progress No
ISSU in progress or aborted No
Election pending          No
Election in progress      No
Reload pending            No
CPU utilization high      No
```

```
All units in ready state           Yes
Primary Image is upgrade compatible  Yes
Secondary Image is upgrade compatible  Yes
Startup config and Running Config Same  Yes
Boot option present in running config  No
User in Config mode                No
POE-Firmware Download is in Progress  No
System ready for issu
ISSU not in progress
```

If the upgrade is aborted manually or if ISSU detects an abort condition (when the **issu** command is used without the **on-error** option), the stack is left as it is, and a manual recovery is required.

Summary ISSU Command Sequence for Upgrading a Stack

```
device# copy flash flash secondary
device# copy tftp flash 10.10.10.10 SWR0809a0ufi.bin primary
device# show issu sequence
device# issu primary on-error reload-primary
device# show issu status
```

Recommended Topology for Campus Fabric (SPX) ISSU

ISSU provides the ability to upgrade Campus Fabric (SPX) systems with minimal traffic loss.

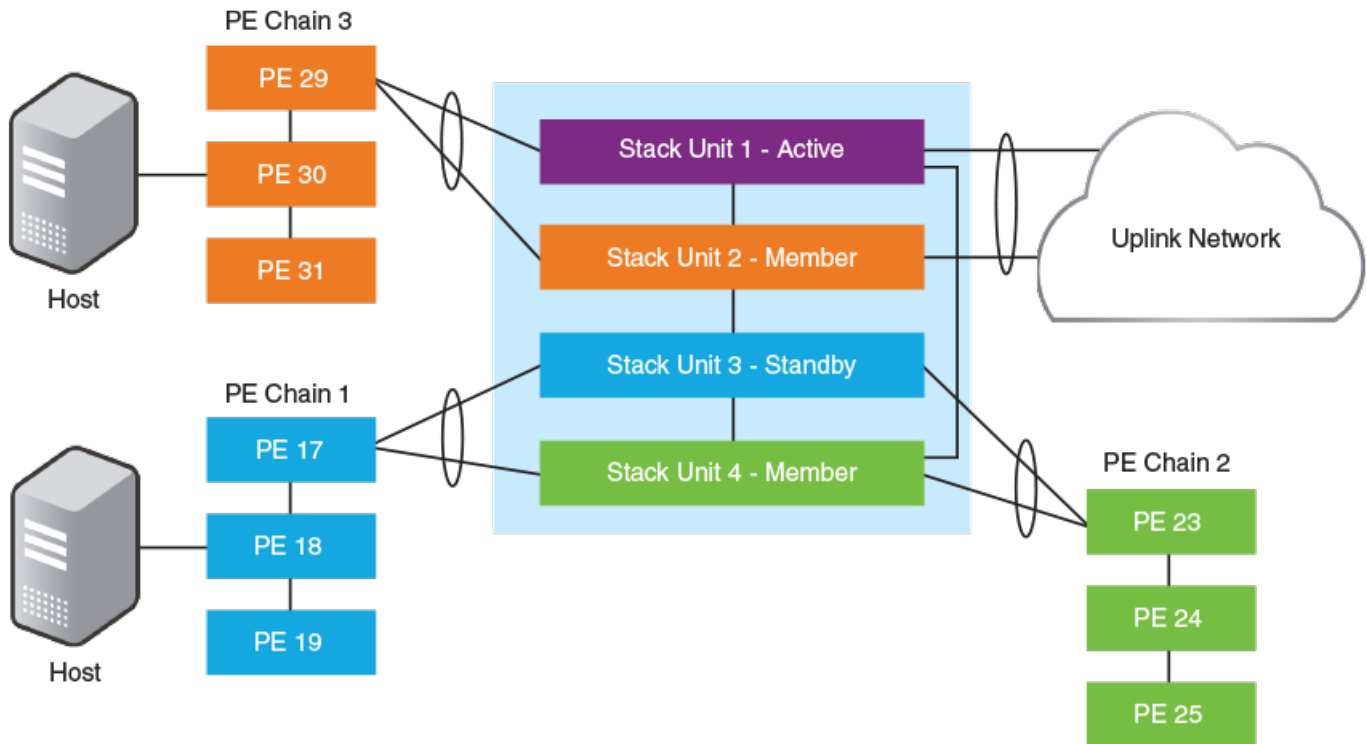
Multi-PE unit LAGs are not supported in an SPX system, which means that traffic through a PE being upgraded is affected by the upgrade. ISSU reduces the network impact of an upgrade only if redundant uplink and downlink connections are available from multiple CB stack units.

NOTE

Because traditional LAGs are not supported on Port Extender (PE) units in an SPX system, dual connectivity (through two different PE units) is recommended for every PE chain or ring.

The following figure illustrates a typical topology where ISSU can be used effectively to upgrade an SPX system.

FIGURE 3 Recommended Topology for SPX ISSU

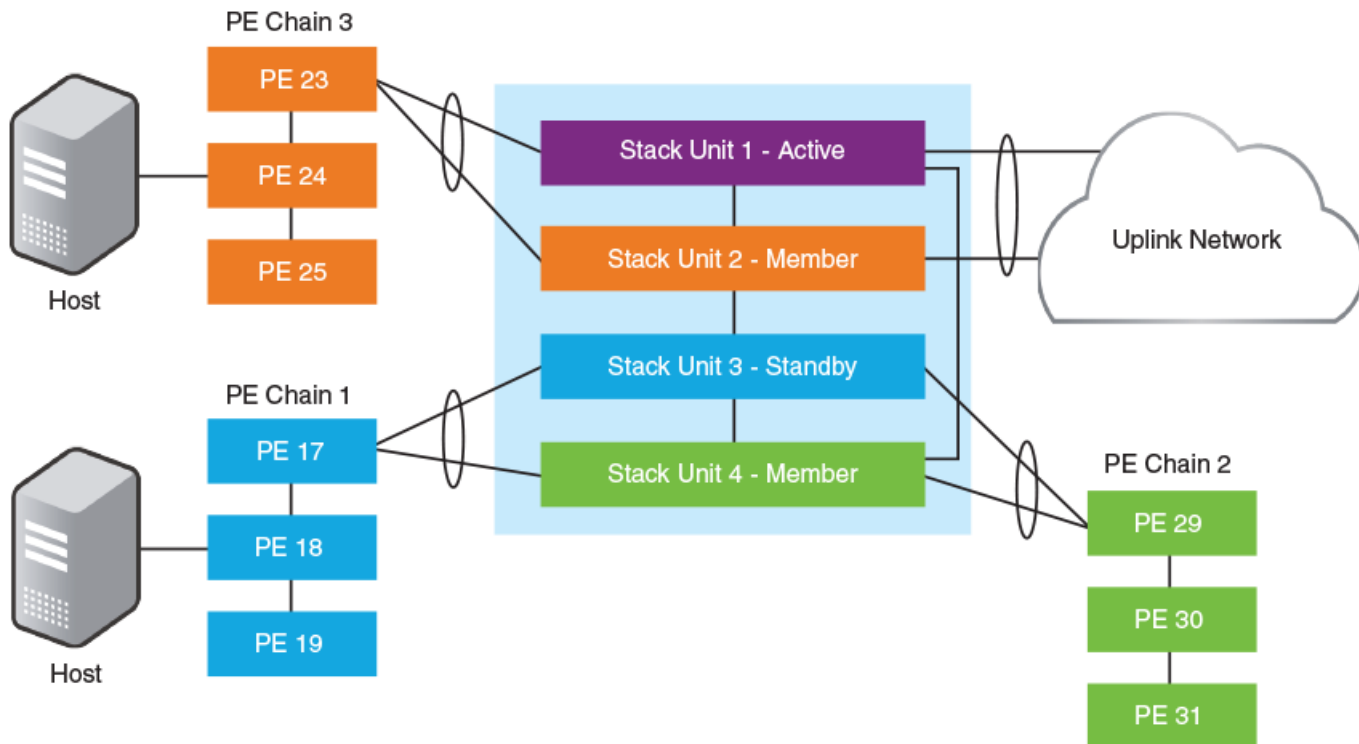


In the figure, redundant links connect different CB units in the SPX system to the uplink network. As each node is upgraded, it undergoes a hardware reset, which resets the packet processor and disrupts traffic flowing through the node. The redundant links allow traffic to flow through other units, minimizing the impact of each unit upgrade.

How ISSU Works When Upgrading a Campus Fabric (SPX) System

The following section describes the checks and the upgrade sequence for an SPX system in the typical topology shown below. For a step-by-step procedure on performing an ISSU, refer to [Upgrading a Campus Fabric \(SPX\) System with ISSU](#) on page 43.

FIGURE 4 Typical SPX Topology



After you have downloaded release software as described in [Initial Steps](#) on page 11 and [The Upgrade Process](#) on page 13, you can check the sequence in which stack units will be upgraded using the **show issu sequence** command.

The following example displays **show issu sequence** command output for the Campus Fabric (SPX) topology shown above and indicates the sequence in which CB units and their associated PE units will be upgraded. PE units are upgraded along with their associated CB units. This association of PE units to CB units is computed automatically.

```
device# show issu sequence
Stack units will be upgraded in the following order
ID      Type                Role
3       ICX7750-48XGC        standby
  17    ICX7450-32ZP         spx-pe
  18    ICX7150-48ZP         spx-pe
  19    ICX7150-48           spx-pe
2       ICX7750-20QXG        member
  23    ICX7450-32ZP         spx-pe
  24    ICX7150-48ZP         spx-pe
  25    ICX7150-48           spx-pe
4       ICX7750-48XGF        member
  29    ICX7450-32ZP         spx-pe
  30    ICX7150-48ZP         spx-pe
  31    ICX7150-48           spx-pe
1       ICX7750-48XGF        active

PEs 17, 18, 19 are associated with CB unit 3 for upgrade.
PEs 23, 24, 25 are associated with CB unit 2 for upgrade.
PEs 29, 30, 31 are associated with CB unit 4 for upgrade.
```

As reflected in **show issu sequence** output, the system responds to the **issu** command in the following ways:

- Unit 3, the standby controller, is reloaded with the new image, along with associated PEs 17, 18, and 19.

- Once the standby controller and associated PEs join the SPX system, member units from the standby controller to the active controller (unit 2 in the previous figure) reload from the new image. Along with CB unit 2, associated PEs 23, 24, and 25 are also upgraded.
- All members from the standby controller to the active controller in the other direction (unit 4) reload from the new image. Along with unit 4, associated PEs 29, 30, and 31 are also upgraded.
- Once all member units and the standby controller are reloaded with the new image, the active controller triggers a switchover, in which the old standby controller (unit 3) becomes the new active controller, and the old active controller (unit 1) becomes the new standby controller.
- The new active controller (unit 3) reloads the old active controller (unit 1) with the new image. If there are any PEs attached to unit 3 that are not yet upgraded (none in this example), they are upgraded next.
- Once the old active controller (unit 1) comes up as a member unit and rejoins the SPX system, standby controller election occurs, and the SPX system becomes fully functional with the upgraded image.

NOTE

If the stack unit configurations include priority settings, a final switchover occurs to ensure that the unit with the highest priority becomes the active controller.

Pre-ISSU Compatibility Checks for an SPX System

After you enter the **issu** command but before an ISSU is performed in an SPX system, a set of checks similar to the set of compatibility checks performed for a stack is executed to determine whether the SPX system is ready for an upgrade.

NOTE

In contrast to the standard stacking checklist, zero-touch provisioning (ZTP) cannot be in progress when an SPX ISSU is initiated.

A successful compatibility check for an SPX system displays the passing results shown in the following table. Any differences between an SPX system and a stacking system are noted.

TABLE 8 Pre-ISSU Checks for an SPX System

Check	Passing Result
Stacking Topology is Ring	Yes
Standby Present	Yes
Standby ready for upgrade	Yes
Flash use in progress	No
Stack interactive-setup in progress	No
Stack ZTP is configured	No
SPX interactive-setup in progress	No (unique to SPX ISSU)
ZTP is configured	No (unique to SPX ISSU)
ISSU in progress or aborted	No
Election pending	No
Election in progress	No
Reload pending	No
CPU utilization high	No
All units in ready state	Yes

TABLE 8 Pre-ISSU Checks for an SPX System (continued)

Check	Passing Result
Primary Image is upgrade compatible	Yes
Secondary Image is upgrade compatible	Yes
Startup config and Running Config Same	Yes
Boot option present in running config	No
User in Config mode	No
POE-Firmware Download is in Progress	No
System ready for issu	If this flag is present, you can proceed with ISSU. Otherwise, check the conditions flagged by three asterisks (***) and make prescribed corrections to the device before performing an ISSU.
ISSU not in progress	

Upgrading a Campus Fabric (SPX) System with ISSU

Complete the following steps to upgrade an SPX system using ISSU.

The following examples for copying images represent typical use. Other options such as manifest-based image copy can also be used. Refer to [Initial Steps](#) on page 11 and [The Upgrade Process](#) on page 13 for more information before performing the upgrade.

NOTE

By default, switches are booted from the primary partition.

The IP address used in the following code examples (10.10.10.10) is for the TFTP server. The address may be an IPv4 or an IPv6 address. The .bin file names used in the examples are image file names.

1. Copy the images.

- a) Back up the running image on the CB to the secondary partition.

```
device# copy flash flash secondary
```

- b) Back up the running image on the PE to the secondary partition.

```
device# copy tftp flash 10.10.10.10 SPR08090.bin secondary
```

- c) Copy the new image to the primary partition on the CB.

```
device# copy tftp flash 10.10.10.10 SWR08090aufi.bin primary
```

- d) Copy the new image to the primary partition on the PE.

```
device# copy tftp flash 10.10.10.10 SPR08090aufi.bin primary
```

2. Check the sequence of the upgrade.

```
device# show issu sequence

Stack units will be upgraded in the following order
ID      Type              Role
 2      ICX7750-20QXG      standby
 3      ICX7750-48XGF      member
20      ICX7150-48PF       spx-pe
21      ICX7150-48P        spx-pe
22      ICX7150-48P        spx-pe
18      ICX7450-24G        spx-pe
19      ICX7450-24G        spx-pe
 1      ICX7750-20QXG      active
17      ICX7450-24G        spx-pe
```

3. Initiate the upgrade.

Use the **issu primary** command, preferably with an error recovery option, if you downloaded the image to the primary partition of the flash.

Or use the **issu secondary** command, preferably with an error recovery option, if you downloaded the image to the secondary partition.

NOTE

Ruckus recommends using an error recovery option when upgrading.

NOTE

The **issu** command option **on-error reload-primary** shown in the following example specifies an automatic reload from the primary partition if there is an upgrade error. You can also specify the option **on-error reload-secondary** to reload from the secondary partition to bring the stack back up with the original image.

- Initiating the upgrade with error recovery

```
device# issu primary on-error reload-primary
Stacking Topology is Ring           Yes
Standby Present                     Yes
Standby ready for upgrade           Yes
Flash use in progress               No
Stack interactive-setup in progress No
Stack ZTP is configured             No
SpX interactive-setup in progress  No
ZTP is configured                  No
ISSU in progress or aborted         No
Election pending                   No
Election in progress               No
Reload pending                     No
CPU utilization high               No
All units in ready state           Yes
Primary Image is upgrade compatible Yes
Secondary Image is upgrade compatible Yes
Startup config and Running Config Same Yes
Boot option present in running config No
User in Config mode                No
POE-Firmware Download is in Progress
Proceed with upgrade? (enter 'y' or 'n'):
```

- Initiating the upgrade without error recovery (not recommended)

```
device# issu secondary
Stacking Topology is Ring           Yes
Standby Present                     Yes
Standby ready for upgrade           Yes
Flash use in progress               No
Stack interactive-setup in progress No
Stack ZTP is configured             No
SpX interactive-setup in progress  No
ZTP is configured                  No
ISSU in progress or aborted         No
Election pending                   No
Election in progress               No
Reload pending                     No
CPU utilization high               No
All units in ready state           Yes
Primary Image is upgrade compatible Yes
Secondary Image is upgrade compatible Yes
Startup config and Running Config Same Yes
Boot option present in running config No
User in Config mode                No
POE-Firmware Download is in Progress
Proceed with upgrade? (enter 'y' or 'n'):
```

NOTE

If you initiate an upgrade without error recovery and an error occurs, the error condition is marked by three asterisks.

```
device# issu primary
Stacking Topology is Ring      Yes      ***
Standby Present                Yes      ***
Standby ready for upgrade      Yes
Flash use in progress          No
Stack interactive-setup in progress No
Stack ZTP is configured        No
Spx interactive-setup in progress No
ZTP is configured              No
ISSU in progress or aborted    No
Election pending               No
Election in progress           No
Reload pending                 No
CPU utilization high           No
All units in ready state       Yes
Primary Image is upgrade compatible Yes
Secondary Image is upgrade compatible Yes
Startup config and Running Config Same Yes
Boot option present in running config No
User in Config mode            No
POE-Firmware Download is in Progress No
System not ready for issu. Check error condition highlighted by "****" and rectify.
```

4. Enter **y** when prompted to start the upgrade, or **n** to stop the process.

- Wait for the upgrade to complete, and check the status. (You may check the status at any time.)

The following example displays **show issu status** command output for an ISSU in progress for an SPX system.

```
device# show issu status
ISSU Status: In Progress
Upgrade State: UNIT TO BE UPGRADED
Upgrade Option: issu primary on-error reload-primary

ID   Type           Role      State
2    ICX7750-20QXG standby  UPGRADE PENDING
3    ICX7750-48XGF member   UPGRADE PENDING
20   ICX7150-48PF  spx-pe   UPGRADE PENDING
21   ICX7150-48P   spx-pe   UPGRADE PENDING
22   ICX7150-48P   spx-pe   UPGRADE PENDING
18   ICX7450-24G   spx-pe   UPGRADE PENDING
19   ICX7450-24G   spx-pe   UPGRADE PENDING
1    ICX7750-20QXG active   UPGRADE PENDING
17   ICX7450-24G   spx-pe   UPGRADE PENDING
```

If the upgrade has not been initiated, the command displays information on whether the system is ready for upgrade.

The following **show issu status** command example displays output for an aborted ISSU.

```
device# show issu status
ISSU Status: Aborted
Upgrade State: UPGRADE ABORT
Upgrade Option: issu primary
Reason for Abort: UNABLE TO UPGRADE

ID   Type           Role      State
2    ICX7750-20QXG standby  UPGRADE ABORT
3    ICX7750-48XGF member   UPGRADE PENDING
20   ICX7150-48PF  spx-pe   UPGRADE PENDING
21   ICX7150-48P   spx-pe   UPGRADE PENDING
22   ICX7150-48P   spx-pe   UPGRADE PENDING
18   ICX7450-24G   spx-pe   UPGRADE PENDING
19   ICX7450-24G   spx-pe   UPGRADE PENDING
1    ICX7750-20QXG active   UPGRADE PENDING
17   ICX7450-24G   spx-pe   UPGRADE PENDING
```

NOTE

If the upgrade is aborted manually, or if the ISSU process detects an abort condition (when the **issu** command is used without the **on-error** option), the stack is left as it is, and a manual recovery is required.

Summary ISSU Command Sequence for Upgrading an SPX System

```
device# copy flash flash secondary
device# copy tftp flash 10.10.10.10 SWR08090aufi.bin primary
device# show issu sequence
device# issu primary on-error reload-primary
device# show issu status
```

ISSU Errors

There are several sources of errors that may be encountered during an ISSU, and there are two means of error recovery.

TABLE 9 Common Errors

Check	Passing Result
Hot-swap timeout	Unit hot-swap does not complete within the expected time.

TABLE 9 Common Errors (continued)

Check	Passing Result
Version synchronization timeout	Version information synchronization does not complete within the expected time.
Standby assignment timeout	After upgrading the current standby unit, the standby assignment does not occur within the expected time.
Standby assignment error	After upgrading the current standby unit, the expected unit was not elected as the new standby unit.
Image/boot source mismatch	After a unit upgrade, the image version and boot source did not match the expected version or boot source.
Unit fails to rejoin	The unit fails to rejoin the stack or SPX system within the specified time after an upgrade.
Unit delete	The unit is detached from the stack or SPX system while the ISSU is in progress.
Ping fail	A unit fails to respond to keepalive messages.

TABLE 10 Crash and Manual Abort Errors

Error Message	Description
Unit crash	If the issu command on-error option is specified, the unit that crashes is reloaded from the partition specified in the command. The active controller detects this condition as a unit delete and reloads all the existing stack members from the partition specified in the issu command on-error option.
Active reload/crash	If the active controller reloads unexpectedly, or crashes while the ISSU is in progress, the stack units detect the loss of the active controller and abort the ISSU. If the issu command on-error option is specified, all units that were part of the stack at the time of the active controller crash are reloaded from the partition specified in the command. Any units that were being upgraded at the time of the active controller failover reload from the target partition given in the issu command. Once all units have booted and an active controller has been elected, if some units have a running image different from the active controller image, an image auto-copy is executed, and units are reloaded to ensure they are all running the same image.
Manual abort	If ISSU is aborted through the issu abort command, ISSU is stopped, and the stack is left in the current state for manual recovery. This behavior occurs whether ISSU is started with or without the issu command on-error option.

Error Recovery

There are two means for error recovery, one manual and one automatic:

- When ISSU is started with the **issu primary** or **issu secondary** command, the following results apply:
 - If an error occurs, the upgrade is aborted, and the stack is left for manual recovery. In this condition, it is likely that the running images on the stack units are different. After abort, **image auto-copy** is not executed.
 - Units continue with their current running image until the system is reloaded. As a result, a reload of the entire stack is required to bring it back to a functional state.
 - To ensure system stability, the stack is left in the aborted state. You must reload the system manually. If any of the stack units are reloaded individually, they cannot move to the Ready state. To execute a manual recovery, refer to [Manual Error Recovery](#) on page 49.

- The following points apply when ISSU is started with an **issu primary** or an **issu secondary** command that includes an **on-error reload primary** or an **on-error reload-secondary** option:
 - If an error occurs, the upgrade is aborted.
 - All the units in the stack are automatically reloaded to the partition specified by the **issu** command **on-error** option.
 - After the system reload, any units that were unreachable at the time of the ISSU abort may have an image that is different from the other units. When these units rejoin the stack, an **image auto-copy** is executed for any units with a mismatched image, and they are reloaded after the auto-copy completes.

Manual Error Recovery

Complete the following steps to manually recover from an ISSU error.

If an error is detected during the upgrade, ISSU is aborted. In this case, the recommended procedure is to reload the stack to the old or new image from the primary or secondary partition, and then use the **boot system flash** command to reload the stack.

1. Reload to the primary partition.

```
device# boot system flash primary
```

2. Reload to the secondary partition.

```
device# boot system flash secondary
```



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