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# **FastIron Ethernet Switch**

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## **Software Licensing Guide**

Supporting FastIron Software Release 08.0.10

**BROCADE**

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# Preface

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## Document conventions

The document conventions describe text formatting conventions, command syntax conventions, and important notice formats used in Brocade technical documentation.

### Text formatting conventions

Text formatting conventions such as boldface, italic, or Courier font may be used in the flow of the text to highlight specific words or phrases.

Format	Description
<b>bold text</b>	Identifies command names Identifies keywords and operands Identifies the names of user-manipulated GUI elements Identifies text to enter at the GUI
<i>italic text</i>	Identifies emphasis Identifies variables and modifiers Identifies paths and Internet addresses Identifies document titles
<code>Courier font</code>	Identifies CLI output Identifies command syntax examples

### Command syntax conventions

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

Convention	Description
<b>bold text</b>	Identifies command names, keywords, and command options.
<i>italic text</i>	Identifies a variable.

Convention	Description
value	In Fibre Channel products, a fixed value provided as input to a command option is printed in plain text, for example, <b>--show WWN</b> .
[ ]	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. In Fibre Channel products, square brackets may be used instead for this purpose.
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.

## 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.

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### NOTE

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

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### ATTENTION

An Attention statement indicates potential damage to hardware or data.

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### CAUTION

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

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### 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.

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## Brocade resources

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

You can download additional publications supporting your product at [www.brocade.com](http://www.brocade.com).

- Adapter documentation is available on the [Downloads and Documentation for Brocade Adapters](#) page. Select your platform and scroll down to the Documentation section.
- For all other products, select the Brocade Products tab to locate your product, then click the Brocade product name or image to open the individual product page. The user manuals are available in the resources module at the bottom of the page under the Documentation category.

To get up-to-the-minute information on Brocade products and resources, go to [MyBrocade](#). You can register at no cost to obtain a user ID and password.

Release notes are available on [MyBrocade](#) under Product Downloads.

White papers, online demonstrations, and data sheets are available through the [Brocade website](#).

## Getting technical help

You can contact Brocade Support 24x7 online, by telephone, or by e-mail.

For product support information and the latest information on contacting the Technical Assistance Center, go to <http://www.brocade.com/services-support/index.html>.

Use one of the following methods to contact the Brocade Technical Assistance Center.

Online	Telephone	E-mail
<p>Preferred method of contact for non-urgent issues:</p> <ul style="list-style-type: none"> <li>• <a href="#">My Cases</a> through MyBrocade</li> <li>• <a href="#">Software downloads</a> and licensing tools</li> <li>• <a href="#">Knowledge Base</a></li> </ul>	<p>Required for Sev 1-Critical and Sev 2-High issues:</p> <ul style="list-style-type: none"> <li>• Continental US: 1-800-752-8061</li> <li>• Europe, Middle East, Africa, and Asia Pacific: +800-AT FIBREE (+800 28 34 27 33)</li> <li>• For areas unable to access toll free number: +1-408-333-6061</li> <li>• <a href="#">Toll-free numbers</a> are available in many countries.</li> </ul>	<p><a href="mailto:support@brocade.com">support@brocade.com</a></p> <p>Please include:</p> <ul style="list-style-type: none"> <li>• Problem summary</li> <li>• Serial number</li> <li>• Installation details</li> <li>• Environment description</li> </ul>

## Document feedback

To send feedback and report errors in the documentation you can use the feedback form posted with the document or you can e-mail the documentation team.

Quality is our first concern at Brocade and we have made every effort to ensure the accuracy and completeness of this document. However, if you find an error or an omission, or you think that a topic needs further development, we want to hear from you. You can provide feedback in two ways:

- Through the online feedback form in the HTML documents posted on [www.brocade.com](http://www.brocade.com).
- By sending your feedback to [documentation@brocade.com](mailto:documentation@brocade.com).

Provide the publication title, part number, and as much detail as possible, including the topic heading and page number if applicable, as well as your suggestions for improvement.



# Software Licensing Overview

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## Software licensing overview

Prior to the introduction of software licensing, Brocade supported hardware-based licensing, where an EEPROM was used to upgrade a Layer 2 or base Layer 3 switch to a premium or advanced Layer 3 switch. With the introduction of software licensing, one or more valid software licenses are required to run licensed features on the device.

Software licensing is designed to work together with hardware-based licensing. The first release of software licensing employed a combination of hardware-based and software licensing. A Brocade device can use hardware-based licensing, software licensing, or both. Current releases that support software licensing use software licensing only, eliminating the need for a customer- or factory-installed EEPROM on the management module or switch backplane.

Software licensing provides increased scalability and rapid deployment of hardware and software features on the supported Brocade family of switches. For example, for premium upgrades, it is no longer necessary to physically open the chassis and install an EEPROM to upgrade the system. Instead, the Web is used to generate, download, and install a software license that enables premium features on the device.

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### NOTE

An ICX device only supports software licensing. Hardware-based licensing is not supported on ICX devices.

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## How software licensing works

A permanent license (for select features on specific units) can be ordered pre-installed in a Brocade device when first shipped from the factory, or later ordered and installed by the customer. In either case, additional licenses can be ordered as needed.

When a license is ordered separately (not pre-installed), an entitlement certificate or e-mail message, along with a transaction key, are issued to the customer by Brocade as proof of purchase. The transaction key and license ID (LID) of the Brocade device are used to generate a license key from the Brocade software portal. The license key is contained within a license file, which is downloaded to the

customer's PC, where the file can then be transferred to a TFTP or SCP server, and then uploaded to the Brocade device.

Once a license is installed on the Brocade device, it has the following effects:

- For FCX and ICX devices, the license unlocks the licensed feature and it becomes available immediately. There is no need to reload the software.
- For FSX devices, the license unlocks the ability to upload the software image (for example, Premium Layer 3) onto the device. Once the software image is installed and the software is reloaded, the license unlocks the licensed feature.

When a trial license expires, the commands and CLI related to the feature are disabled, but the feature itself cannot be disabled until the system reloads.

## Seamless transition for legacy devices

The term "legacy device" refers to a Brocade device that was shipped prior to the introduction of software-based licensing, has an EEPROM installed, and is running a FastIron release prior to 07.1.00.

The transition to software licensing is seamless for legacy devices. When upgraded to a release that supports software-based licensing, these devices will continue to operate as previously configured.

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### NOTE

There are special considerations and instructions for FastIron legacy devices in need of replacement (by way of a Return Merchandise Agreement [RMA]). For details, refer to [Special replacement instructions for legacy devices](#) on page 21.

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## License types

The following license types are supported on FastIron devices:

- Application-related - Enables premium or advanced features on the device, for example advanced Layer 3 for the FCX, premium and advanced Layer 3 for the ICX 6610, premium Layer 3 for the ICX 6450, and full Layer 3 for the FSX 800 and FSX 1600.
- Trial license - Also called a temporary license, this license enables a license-controlled feature to run on the device on a temporary basis. A trial license enables demonstration and evaluation of a licensed feature and can be valid for a period of 45 days. For more information about a trial license, refer to [Using a trial license](#) on page 20.
- Normal license - Also called a permanent license, this license enables a license-controlled feature to run on the device indefinitely.

## Software licensing terminology

The following terms are used in this document:

- Entitlement certificate - The proof-of-purchase certificate (*paperpack*) issued by Brocade when a license is purchased. The certificate contains a unique transaction key that is used in conjunction

with the license ID (LID) of the Brocade device to generate and download a software license from the Brocade software portal.

- License file - The file produced by the Brocade software portal when the license is generated. The file is uploaded to the Brocade device and controls access to a licensed feature or feature set.
- License ID (LID) - The identification number that uniquely identifies the Brocade device. The LID is used in conjunction with a transaction key to generate and download a software license from the Brocade software portal. The software license is tied to the LID of the Brocade device for which the license was ordered and generated.
- Licensed feature - Any hardware or software feature or set of features that require a valid software license in order to operate on the device.
- Transaction key - A unique key, along with the LID, used to generate a software license from the Brocade software portal. The transaction key is issued by Brocade when a license is purchased. The transaction key is delivered according to the method specified when the order is placed:
  - Paperpack - The transaction key is recorded on an entitlement certificate, which is mailed to the customer.
  - Electronic - The transaction key is contained in an e-mail message, which is sent instantly to the customer after the order is placed. The customer receives the e-mail message within a few minutes after the order is placed, though the timing will vary depending on the network, Internet connection, and so on.

If a delivery method is not specified at the time of the order, the key will be delivered by the way of paperpack.

## Licensing rules

This section lists the software licensing rules and caveats related to the Brocade devices that support software licensing.

### General notes about licensing

The following licensing rules apply to all FastIron devices that support software licensing:

- A license is tied to the unique LID of the management module or fixed configuration switch for which the license was ordered. Therefore, a license can be used on one device only. It cannot be used on any other device.
- More than one license can be installed per device. For example, an FSX 800 with IPv6 hardware can have the SX-FIL3U-6-IPV4 license and the SX-FIL3U-6-IPV6 license, and both can be in effect.
- Only one normal or trial license at a time can be in effect for a licensed feature.
- More than one trial license can be in effect at the same time, as long as each trial license applies to a unique licensed feature.
- A trial license cannot replace or supersede a normal license.

### Licensing rules for FCX and ICX 6610 devices

The following licensing rule applies to FCX and ICX 6610 devices for software-based licensing. To describe the behavior for running software-based licensing in an FCX traditional stack, the FCX-ADV-LIC-SW license is used as an example.

**NOTE**

For FCX and ICX 6610 devices, the behavior for running software licensing with different licenses (Premium, Advance, or Upgrade licenses) is the same. One license allows multiple protocols to run in a stack. All units must have a separate license to run the same licensed feature in a stack. If all units do not have the same license, the Active controller cannot enable the licensed feature on the stack. If a member unit without a license joins a stack, the Active controller must make sure that no protocols are enabled in a stack before putting a member unit into full operational state.

- Each stack unit in an FCX traditional stack must have a separate software license for the same licensed feature. For example, if there are eight units in a traditional stack, eight separate licenses must be purchased to run the licensed features in the stack. If there is any unit in a stack without the FCX-ADV-LIC-SW license, the Active controller cannot run the licensed features on the stack.

For example, to run BGP on the stack, the **router bgp** command must be enabled through the CLI on the Active controller. If the Active controller does not have the FCX-ADV-LIC-SW license, the user cannot configure the **router bgp** command at the CLI level. If the Active controller has the FCX-ADV-LIC-SW license, and the **router bgp** command is enabled at the CLI level, the system checks all operational units to verify that each unit has the FCX-ADV-LIC-SW license. Only if all the operational units have the FCX-ADV-LIC-SW license will the licensed feature run in the stack. If any unit does not have the FCX-ADV-LIC-SW license, the **router bgp** command is rejected and the licensed feature cannot run in the stack. For example, the following error message is displayed on the console.

```
device(config)#router bgp
Error! cannot run BGP because unit 2 has no FCX-ADV license
```

If the Active controller is running BGP (and all other licensed features if enabled), and a unit without the FCX-ADV-LIC-SW license joins the stack, the unit is put into a non-operational state. If a user copies the FCX-ADV-LIC-SW license to a non-operational unit, it takes effect immediately and the unit becomes operational. If the operational unit has a higher priority than the current Standby controller, the unit replaces the existing Standby controller and becomes the new Standby controller. This behavior applies to all cases in which a non-operational unit becomes operational. If a user disables BGP from the stack, the Active controller puts all non-operational units in the operational state. The Active controller and the Standby controller must have the same non-operational units.

When the Standby controller receives the runtime configuration from the Active controller, the Standby controller must update the state of every unit (operational or non-operational state). If a user deletes the FCX-ADV-LIC-SW license in any stack unit, the Active controller does not change the unit to the non-operational state regardless of running BGP or not. Even if a new election algorithm change occurs, an operational unit is not changed to a non-operational unit. The stack continues its BGP running state. The stack cannot run BGP again after the user disables BGP, or after a reload. If BGP is not enabled on the Active controller, a stack unit is operational whether or not the Active controller or the stack units have the FCX-ADV-LIC-SW license. This implies that in a stack where all units (Active controller, Standby controller, and member units) have the FCX-ADV-LIC-SW license, a stack can be formed whether or not BGP is enabled. However, if there is a license mismatch between any of the units in a stack, a stack can still be formed provided that the **router bgp** command is not enabled on the Active controller. The FCX-ADV-LIC-SW license is not considered when selecting a unit to be the Standby controller.

## Licensing rules for FSX 800 and FSX 1600 devices

FSX 800 and FSX 1600 devices with redundant management modules must have two separate licenses to run the same licensed feature on both management modules. The license file in the active management module is never copied to or updated on the standby management module.

Upon bootup, the active management module compares its license with the standby management module. If the license differs, the active management module immediately shuts down the standby

management module. To enable the standby management module, you must install a separate license. For example, if the active management module has the SX-FIL3U-SW license, the standby management module must also have this license.

## Viewing software license information from the Brocade software portal

This section describes other software licensing tasks supported from the Brocade software portal. You can use the **License Query** option to view software license information for a particular unit, transaction key, or both. You can export the report to Excel for sharing or archiving purposes.

Depending on the status of the license (for example, whether or not the license was generated), the report will include the following information:

- Hardware part number, serial number, and description
- Software part number, serial number, and description
- Date the license was installed
- Transaction key
- LID
- Feature name
- Product line

To view the license information, from **License Management** menu, select **Brocade IP/ADP > License Query**

The **IP/ADP Unit License Query** window appears.

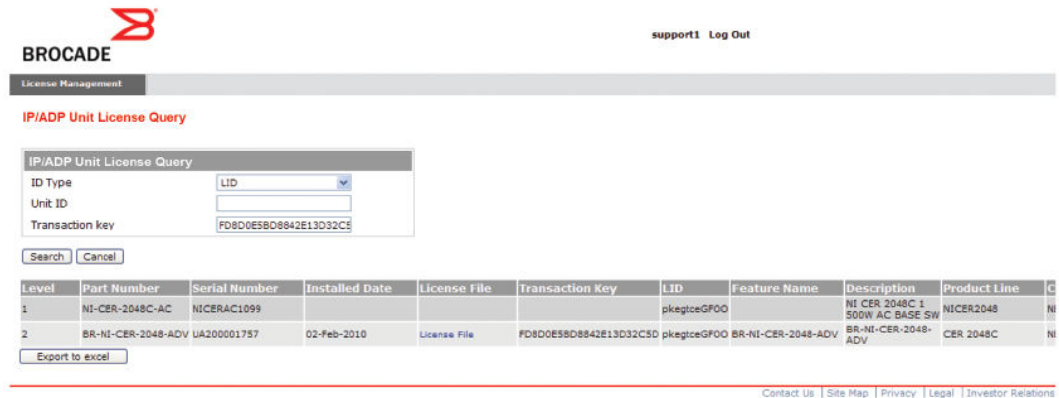
**FIGURE 1** IP/ADP Unit License Query window

The screenshot shows the Brocade IP/ADP Unit License Query window. The window has a title bar that says "IP/ADP Unit License Query". Inside the window, there are three input fields: "ID Type" with a dropdown menu currently showing "LID", "Unit ID", and "Transaction key". Below these fields are two buttons: "Search" and "Cancel". The background of the window shows the Brocade logo and the text "support1 Log Out".

- To view software license information for a particular unit, enter the LID in the **Unit ID** field and click **Search**.
- To view software license information for a particular transaction key, enter the unique number in the **Transaction key** field and click **Search**.

The following License Query Results window appears.

**FIGURE 2** License Query Results window



In this example, the line items for Level 1 display hardware-related information and the line items for Level 2 display software-related information. If the query was performed before the transaction key was generated, the first row (Level 1) would not appear as part of the search results. Similarly, if the query was performed before the license was generated, some of the information in the second row would not be displayed.

## Obtaining a license

The procedures in this section show how to generate and obtain a software license.

1. Order a license for the desired licensed feature. Refer to [Appendix A: FastIron Licensed Features and Part Numbers](#) on page 47 for a list of valid part numbers and licensed features.

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### NOTE

To request and obtain a trial license, contact your Brocade representative.

2. When you receive the paperpack or electronic transaction key, retrieve the LID of your Brocade device by entering the **show version** command on the device. Example command output is shown in [Viewing the license ID](#) on page 23."If you received a paperpack transaction key, write the LID in the space provided on the entitlement certificate.

---

### NOTE

Do not discard the entitlement certificate or e-mail with the electronic key. Keep it in a safe place in case it is needed for technical support or product replacement (RMAs).

3. Log in to the Brocade software portal at <http://swportal.brocade.com> and complete the software license request. If you do not have a login ID and password, request access by following the instructions on the screen.

The following figure shows the **Brocade Software Portal Login** window.

**FIGURE 3** Brocade Software Portal Login window

International

**BROCADE**

Products Solutions & Technology Services & Support Education Partnerships Company

**Welcome to MyBrocade**  
MyBrocade lets you customize your web experience. You can select your most frequently used applications and resources, and place them on your homepage for quick access. [Take the Tour](#) and learn more about MyBrocade.

**Join MyBrocade and Join the Online Community**  
Register for MyBrocade and get access to our online community of Brocade users. Participate in forum discussions or join online events like the Ask the Expert series. Read technology and executive blogs. Engage with Brocade subject matter experts, Brocade partners and your peers on networking topics that are relevant to your business.

Not a Member? [register now](#)

**Log in Now**

USER ID:  
  
(E.G. John.Doe@abc.com)

PASSWORD:

[Forgot Your User ID or Password](#) | [Help](#)

[login](#)

Not a member? [Register Now](#)

If you did not receive your registration activation email, [Click Here](#)

Brocade Support Customers: If you have not activated your support contract, [activate your contract now](#).

Foundry Support Customers: [Log in to the Foundry Knowledge Portal](#)

**MyBrocade For All Partners**  
[Learn More >](#)

Important Note on Firmware  
Firmware Brocade Classic and M-Class software release downloads, are available to Brocade Customers with an active support contract, and to all Brocade Partners.

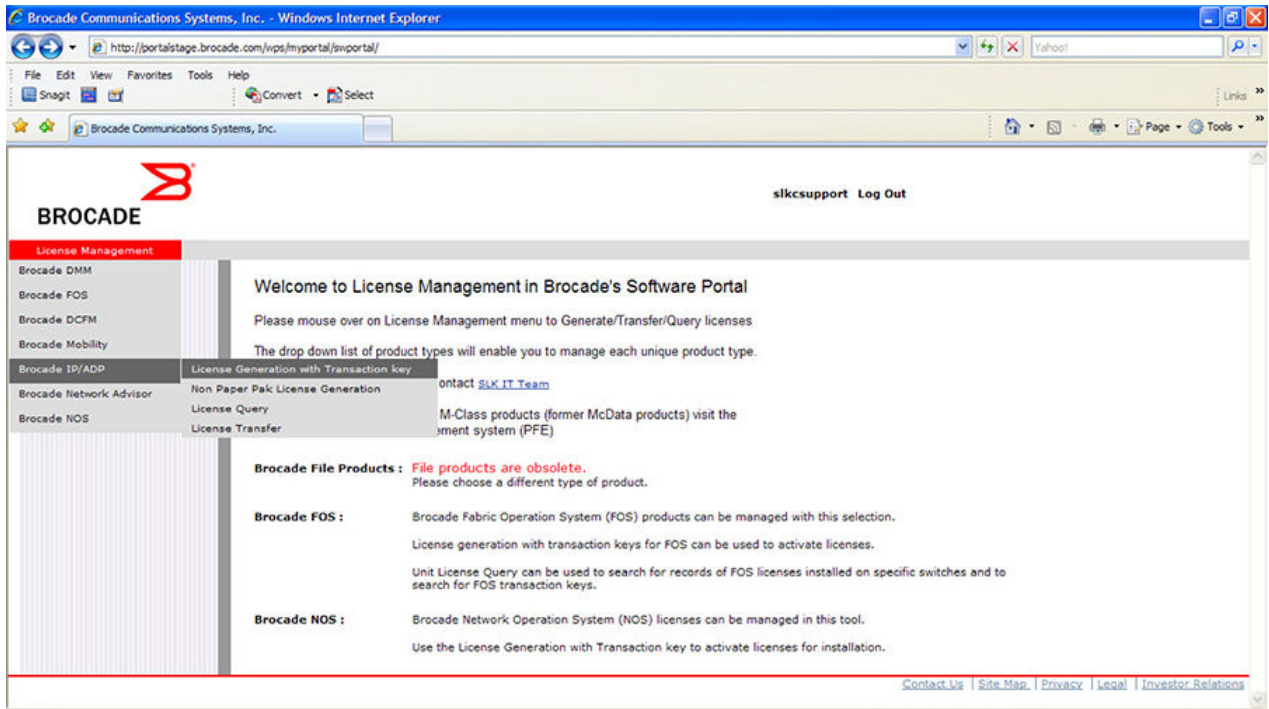
Foundry support customers can access firmware through the [Foundry Knowledge Portal](#).

Browser Settings: MyBrocade is optimized for Internet Explorer v8.0. Javascripts and cookies must be enabled to log in.

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4. From the **License Management** menu, select **Brocade IP/ADP > License Generation with Transaction key**. The **IP/ADP License Generation** dialog window displays.

FIGURE 4 License Management Welcome window





The following figure shows the **IP/ADP License Generation** window for generating a license using a transaction key and LID.

**FIGURE 5** IP/ADP License Generation window

**BROCADE** support1 Log Out

License Management

**IP/ADP Licence Generation**  
*Please check the Unique ID to make sure it is correct! License install failure may result!*

**Customer Information**

\* Indicates required field

Customer email ID\*

Site Name

Technical Contact

Company Name

City

State/Province

Zip/Postal Code

Country

Phone

**E-mail Notification Information**

Self

Other e-mail address(es)

**Unit Information**

Unique ID Type\*

Unit's Unique ID\*

Transaction Key\*

I have read and accept the [Brocade End User License Agreement](#)

[Contact Us](#) | [Site Map](#) | [Privacy](#) | [Legal](#) | [Investor Relations](#)

5. Enter the requested information in the required fields. An asterisk (\*) next to a field indicates that the information is required.

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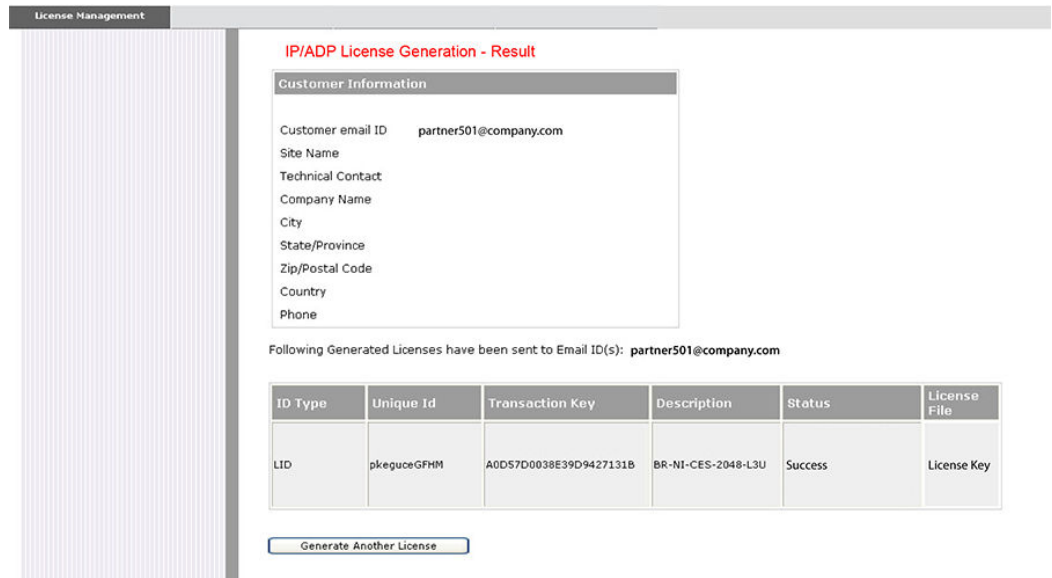
**NOTE**

You can generate more than one license at a time. For each license request, enter the **Unit's Unique ID** and **Transaction Key**, and click **Add**.

6. When you have finished entering the required information, read the Brocade End User License Agreement, and select the **I have read and accept** check box.

7. Click the **Generate** button to generate the license. The following figure shows the results window, which displays an order summary and the results of the license request.
  - If the license request is successful, the **Status** field shows "**Success**" and the **License File** field contains a hyperlink to the generated license file. The license file is automatically sent by e-mail to the specified customer e-mail address.
  - If the license request fails, the **Status** field indicates the reason it failed and the action to be taken.

**FIGURE 6** IP/ADP License Generation Results window



8. Download the license file to your PC by either clicking the hyperlink in the **License File** field or saving the license file from the e-mail attachment.
9. Upload the license file to the Brocade device as instructed in [Installing a license file](#) on page 18.

# Software Licensing Tasks

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## Software licensing configuration tasks

This section describes the configuration tasks for generating and obtaining a software license, and then installing it on the Brocade device. Perform the tasks in the order as given the following table.

**TABLE 1** Configuration tasks for software licensing

Configuration task	Reference
1 Order the desired license.	For a list of available licenses and associated part numbers, refer to <a href="#">Appendix A: FastIron Licensed Features and Part Numbers</a> on page 47.
2 When you receive the transaction key, retrieve the LID of the Brocade device.  If you received the transaction key by way of paperpack, record the LID on the entitlement certificate in the space provided.	<a href="#">Viewing the license ID</a> on page 23
3 Log in to the Brocade software portal to generate and obtain the license file.	<a href="#">Obtaining a license</a> on page 12
4 Upload the license file to the Brocade device.	<a href="#">Installing a license file</a> on page 18
5 Verify that the license is installed.	<a href="#">Using a trial license</a> on page 20
6 For FSX 800, FSX 1600, FCX, ICX 6610, ICX 6450, and ICX 6650 devices, upload the software image to the device.	Refer to the release notes.

## Installing a license file

Once you obtain a license file, place it on a TFTP or SCP server to which the Brocade device has access, and then use TFTP or SCP to copy the file to the license database of the Brocade device.

### Using TFTP to copy a license file on FSX 800 and FSX 1600 devices

To copy a license file from a TFTP server to the license database of the Brocade device, enter a command such as the following at the privileged EXEC level of the CLI.

```
device# copy tftp license 10.1.1.1 lic.xml
```

**Syntax:** `copy tftp license [IP_address|ipv6_address]license_filename_on_host`

The `IP_address` variable is the address of the IPv4 TFTP server.

The `ipv6_address` variable is the address of the IPv6 TFTP server.

The `license_filename_on_host` variable is the file name of the license file.

If you attempt to download the same license twice on the device, the following error message is displayed on the console.

```
Can't add the license string - 93 (DUPLICATE_LICENSE)
```

### Using TFTP to copy a license file on FCX and ICX devices

You can copy a license file from the active unit to all other member units without having to physically disable the stack to install a license for each unit. To copy a license file from the active unit to all other member units in the system, enter a command such as the following at the privileged EXEC level of the CLI.

```
device# copy tftp license 10.120.54.185 FCX_ADV_LIC_PERP.xml unit 2
```

**Syntax:** `copy tftp license [IP_address|ipv6_address]license_filename_on_host unit unit_id`

The `IP_address` variable is the address of the IPv4 TFTP server.

The `ipv6_address` variable is the address of the IPv6 TFTP server.

The `license_filename_on_host` variable is the file name of the license file.

The `unit unit_id` parameter specifies a unit for which you want to add a software license file. The `unit_id` variable can be from 1 through 8.

If you attempt to download the same license twice on the device, the following error message is displayed on the console.

```
Can't add the license string - 93 (DUPLICATE_LICENSE)
```

### Using Secure Copy to install a license

SSH and Secure Copy (SCP) must be enabled on the Brocade device before the procedures in this section can be performed. For details, refer to the "SSH2 and SCP" chapter in the *FastIron Ethernet Switch Security Configuration Guide*.

The `scp license_file_on_host user @ IP_address :license` command is supported on FSX 800 and FSX 1600 devices.

To copy a license file from an SCP-enabled client to the license database of the Brocade device, enter a command such as the following on the SCP-enabled client.

```
scp c:\license\license101 terry@10.1.1.1:license
```

**Syntax:** `scp license_file_on_hostuser@ IP_address:license`

On FCX and ICX devices, to copy a license file from an SCP-enabled client to the license database of a specific unit, enter a command such as the following on the SCP-enabled client.

```
scp license.xml terry@10.20.91.39:license:3
```

In the example the license is copied to unit 3.

**Syntax:** `scp license_file_on_hostuser@ IP_address:license:unit_id`

The `unit_id` variable specifies a unit for which you want to add a software license file. The `unit_id` variable can be from 1 through 8.

## Verifying the license file installation

Use the `show license` command to verify that the license is installed on the device. Details about this command are in [Viewing information about software licenses](#) on page 23.

## Deleting a license file

A license remains in the license database until it is deleted. If you want to delete a license, Brocade recommends that you first disable the licensed feature before deleting the associated license.

---

### NOTE

If a trial license and a normal license for the same licensed feature are added to the system (in either order), the normal license cannot be deleted first. The trial license should be deleted first, and then the normal license can be deleted. If necessary, the same trial license can be reinstalled and used as long as it has not expired.

---

## Deleting a license on FSX 800 and FSX 1600 devices

To delete a license, enter a command such as the following at the privileged EXEC level of the CLI.

```
device# license delete 7
```

The `license delete` command immediately removes the license from the license database. The CLI commands related to the licensed feature will no longer be available from the CLI. The licensed feature will continue to run as configured until the software is reloaded, at which time the feature will be disabled and removed from the system. Syslog and trap messages are generated when the license is deleted.

**Syntax:** `license delete index_number`

The *index\_number* variable is a valid license index number. The license index number can be retrieved from the **show license** command output. For more information, refer to [Viewing information about software licenses](#) on page 23.

---

**NOTE**

When removing a license on an FSX device running a release 08.0.01 image, Brocade recommends an immediate reboot.

---

## Deleting a license on FCX and ICX devices

To delete all license files for a specific unit, enter the following command at the privileged EXEC level of the CLI.

```
device# license delete unit 3 all
```

To delete a specific license file from a unit, enter the following command at the privileged EXEC level of the CLI.

```
device# license delete unit 3 index 3
```

**Syntax:** **license delete unit** *unit\_id* [ **all** | **index** *license\_index*]

The *unit\_id* variable specifies the unit ID number.

The **all** option allows you to delete all license files for a specific unit.

The **index license\_index** parameter specifies the software license file, and is generated by the member unit. The license index number is the license file you want to delete from a unit. The license index number is not unique across stack units, and the user must specify both the unit number and the index number to delete a license from a specific unit. For example, the FCX-ADV-LIC-SW license is installed on both stack unit 3, index 1, and stack unit 5, index 1. Because the index numbers are the same, the user must specify both the unit number and the index number to delete a license from a specific unit.

In the ICX 6650, deleting a 10 GbE or 40 GbE license requires a system reload for the command to take effect.

## Using a trial license

---

**NOTE**

A trial license must be requested and installed by a Brocade representative.

---

A trial license enables demonstration and evaluation of a licensed feature. The trial license is valid for a period of up to 45 days, and is renewable for an additional 45 days. A licensed feature operating under a trial license has the same functionality (CLI and **show** commands) as does a licensed feature operating under a normal license. You cannot install more than one trial license of the same license ID on the device. Only one trial license of the same license ID is operational.

## What happens when a trial license expires

A trial license expires when it exceeds the specified expiration time or date. The countdown starts when the trial license is generated. When the license expires, the CLI commands related to the

licensed feature will no longer be available from the CLI. The licensed feature will continue to run as configured until the system is reloaded, at which time the feature will be disabled and removed from the system.

---

**NOTE**

Trial licenses are not cumulative. The new license replaces the current license. To extend the license, you must contact your Brocade representative.

---

## Console, syslog, and trap messages for trial license expiration

Three days prior to the date that a trial license is set to expire, the following warning message will appear daily on the console. On the day that the license will expire, the warning message will appear every two hours. Syslog and trap messages will also be generated.

```
SYSLOG: <12>Jan 1 00:00:00 624-top License: Package FSX624-L3U-IPV6 with LID NFLXXXX
expires in 3 days
```

When the license has expired, the following message will appear on the console. Syslog and trap messages will also be generated.

```
SYSLOG: <13>Jan 1 00:00:00 624-top License: Package FSX624-L3U-IPV6 with LID NFLXXXX
has expired
```

## Renewing or extending a trial license

A trial license can be extended once by another trial license of the same type, or by a normal license of the same type. To avoid any interruptions to the network, obtain and install the second trial license before the first license expires. When extended by another trial license, the duration is not cumulative. The countdown starts when the trial license is generated.

To extend the license, you must contact your Brocade representative.

## Transferring a license

---

**NOTE**

Only the Technical Assistance Center (TAC) can perform a license transfer. If you need to transfer a license from one Brocade device to another, contact your Brocade representative for more information.

---

A license can be transferred between Brocade devices only if both the following conditions are true:

- The device is under an active support contract.
- The license is being transferred between two similar models (for example, from a 24-port model to another 24-port model or from a 48-port model to another 48-port model).

## Special replacement instructions for legacy devices

A legacy device refers to a Brocade device that was shipped prior to the introduction of software licensing, has an EEPROM installed, and is running a FastIron release prior to 07.1.00.

For Brocade legacy devices in need of replacement (by way of a Return Merchandise Agreement [RMA]), the following actions must be taken:

- If the replacement device will be upgraded to a software release that supports software licensing, registration of the replacement device is required after the software is upgraded.
- If the replacement device will be using a software release that does not support software licensing, follow these instructions:

---

**NOTE**

This procedure is not supported on FCX and ICX platforms.

---

1. Prior to shipping the device in need of replacement back to the factory, remove the EEPROM from the device. To remove the EEPROM, follow the instructions in the appropriate hardware installation guide or in the instructions that shipped with the EEPROM.
2. After removing the EEPROM, store it in a safe place.
3. When the replacement device is received from the factory, install the previously removed EEPROM in the device. To do so, follow the instructions that shipped with the EEPROM.

## Syslog messages and trap information

The following table lists the syslog messages and traps that are supported for software licensing.

**TABLE 2** Syslog messages

Message level	Message	Explanation
Informational	License: Package <i>package_name</i> with LID <i>LID_number</i> is added	The license package has been added.
Informational	License: Package <i>package_name</i> with LID <i>LID_number</i> is removed	The license package has been deleted.
Warning	License: Package <i>package_name</i> with LID <i>LID_number</i> expires in <i>number</i> days	The trial license is about to expire. This message will begin to display three days before the expiration date, and every two hours on the last day that the license will expire.
Notification	License: Package <i>package_name</i> with LID <i>LID_number</i> has expired	The trial license has expired.

## Syslog messages

**Message** License: Package *package\_name* with LID *LID\_number* is added



<b>Explanation</b>	The license package has been added.
<b>Message Level</b>	Informational
<b>Message</b>	License: Package package_name with LID LID_number is removed
<b>Explanation</b>	The license package has been deleted.
<b>Message Level</b>	Informational
<b>Message</b>	License: Package package_name with LID LID_number expires in number days
<b>Explanation</b>	The trial license is about to expire. This message will begin to display three days before the expiration date, and every two hours on the last day that the license will expire.
<b>Message Level</b>	Warning
<b>Message</b>	License: Package package_name with LID LID_number has expired
<b>Explanation</b>	The trial license has expired.
<b>Message Level</b>	Notification

## Viewing information about software licenses

The **show** commands associated with software licensing are issued on the Brocade device, at any level of the CLI.

---

### NOTE

You can also view information about software licenses from the Brocade software portal. Refer to [Viewing software license information from the Brocade software portal](#) on page 11.

---

## Viewing the license ID

Brocade devices that ship during and after the release of software licensing have the license ID (LID) imprinted on the label affixed to the device. You can use the **show version** command as well to view the LID on these devices, and on devices that shipped before the release of software licensing.

Use the **show version** command to display the serial number, software and hardware license package name, and LID of all units in the device. The following example is sample output from an FCX unit with the FCX\_ADV\_ROUTER\_SOFT\_PACKAGE package installed on units 1, 3, and 5.

```

device#show version
Copyright (c) 1996-2011 Brocade Communications Systems, Inc.
  UNIT 5: compiled on Jun 24 2011 at 14:20:38 labeled as FCXR07203a
    (6674957 bytes) from Primary FCXR07203a.bin
UNIT 1: compiled on Jun 24 2011 at 14:20:38 labeled as FCXR07203a
    (6674957 bytes) from Primary FCXR07203a.bin
UNIT 2: compiled on Jun 24 2011 at 14:20:38 labeled as FCXR07203a
    (6674957 bytes) from Primary FCXR07203a.bin
UNIT 3: compiled on Jun 24 2011 at 14:20:38 labeled as FCXR07203a
    (6674957 bytes) from Primary FCXR07203a.bin
UNIT 4: compiled on Jun 24 2011 at 14:20:38 labeled as FCXR07203a
    (6674957 bytes) from Primary FCXR07203a.bin
Boot-Monitor Image size = 369286, Version:07.0.01T7f5 (grz07001)
HW: Stackable FCX648S
=====
UNIT 1: SL 1: FCX-48GS POE 48-port Management Module
  Serial #: BCYxxxxxxxx
  License: FCX_ADV_ROUTER_SOFT_PACKAGE (LID: deaHHKIgFro)
  P-ENGINE 0: type DB90, rev 01
  P-ENGINE 1: type DB90, rev 01
  PROM-TYPE: FCX-ADV-U
=====
UNIT 1: SL 2: FCX-2XGC 2-port 16G Module (2-CX4)
=====
UNIT 1: SL 3: FCX-2XG 2-port 10G Module (2-XFP)
=====
UNIT 2: SL 1: FCX-48GS POE 48-port Management Module
  Serial #: upgrade7072
  License: FCX_FULL_ROUTER_SOFT_PACKAGE (LID: ZU0W478MFMH)
  P-ENGINE 0: type DB90, rev 01
  P-ENGINE 1: type DB90, rev 01
=====
UNIT 2: SL 2: FCX-2XGC 2-port 16G Module (2-CX4)
=====
UNIT 3: SL 1: FCX-48GS POE 48-port Management Module
  Serial #: BCYxxxxxxxx
  License: FCX_ADV_ROUTER_SOFT_PACKAGE (LID: deaHHKIgFrN)
  P-ENGINE 0: type DB90, rev 01
  P-ENGINE 1: type DB90, rev 01
=====
UNIT 3: SL 2: FCX-2XGC 2-port 16G Module (2-CX4)
=====
UNIT 4: SL 1: FCX-24GS 24-port Management Module
  Serial #: BCVxxxxxxxx
  License: FCX_FULL_ROUTER_SOFT_PACKAGE (LID: dexHHIIgFFd)
  P-ENGINE 0: type DB90, rev 01
=====
UNIT 4: SL 2: FCX-2XGC 2-port 16G Module (2-CX4)
=====
UNIT 5: SL 1: FCX-48GS 48-port Management Module
  Serial #: UPGRADE7072
  License: FCX_ADV_ROUTER_SOFT_PACKAGE (LID: writcfgMFMH)
  P-ENGINE 0: type DB90, rev 01
  P-ENGINE 1: type DB90, rev 01
=====

```

In the **show license** command output, only unit 3 and unit 5 are shown with the software license, FCX-ADV-LIC-SW. Unit 1 is not displayed in the **show license** command output because it has a hardware license installed on the device as indicated by the PROM-TYPE: FCX-ADV-U. For more information about the **show license** command, refer to [Viewing the license database](#) on page 25.

```

device#show license
Index      License Name          Lid          License Type  Status  License
-----
Period License Capacity
Stack unit 3:
1          FCX-ADV-LIC-SW       deaHHKIgFrN Normal        Active

```

```

Unlimited                               1
Stack unit 4:
1 FCX-ADV-LIC-SW                       dexHHIIGFFd Normal      Active
Unlimited                               1
Stack unit 5:
1 FCX-ADV-LIC-SW                       writcfgMFMH Normal      Active
Unlimited                               1

```

## Viewing the license database

### NOTE

The **show license** command can be used to display software license information for the FSX 800 and FSX 1600, FCX, ICX 6610, ICX 6450, and ICX 6650 devices.

To display general information about all software licenses for all units in a device, use the **show license** command. The **show license** command only displays software license information for a unit, not hardware license information, as shown in the following example.

```

device#show license
Index      License Name Lid
Status License Period License Capacity
Stack unit 3:
1 FCX-ADV-LIC-SW deaHHKIGFrN
Normal
Unlimited                               1
Stack unit 5:
1 FCX-ADV-LIC-SW writcfgMFMH
Normal
Unlimited                               1

```

To display software license information on an ICX 6610 device (for example, the ICX 6610) enter the following command.

```

device#show license
Index      License Name Lid License Type Status License
Period License Capacity
Stack unit 1:
1 ICX6610-PREM-LIC-SW FJdnjFJFGiF Normal Active
Unlimited                               1
2 ICX6610-10G-LIC-POD FJdnjFJFGiF Normal Active
Unlimited                               8
Stack unit 2:
1 ICX6610-ADV-LIC-SW FJdnmFJFGiF Normal Active
Unlimited                               1
2 ICX6610-10G-LIC-POD FJdnjFJFGiF Normal Invalid
Unlimited                               8
Stack unit 3:
1 ICX6610-ADV-LIC-SW FJdnlFJFGiF Normal Active
Unlimited                               1
4 ICX6610-10G-LIC-POD FJdnlFJFGiF Normal Active
Unlimited                               8

```

To display software license information on an ICX 6430 device, enter the following command. In the following example, the premium and PoD licenses are installed on stack unit 1, and on stack unit 2 only the premium license is installed.

```

device#show license
Index      License Name Lid License Type Status License
Period License Capacity
Stack unit 1:
1 ICX6450-PREM-LIC-SW dbtFJIKiFFI Normal Active
Unlimited                               2
2 ICX6450-10G-LIC-POD dbtFJIKiFFI Normal Active
Unlimited                               2
Stack unit 2:
1 ICX6450-PREM-LIC-SW dbtFJIKiFFI Normal Active
Unlimited                               2

```

The output from the **show license** command is the same for an FSX 800 or FSX 1600 device.

```
device#show license
Index      Package Name      Lid      License Type      Status      License
Period
1          FCX624-EL3U      cpFNJHFFGO  normal          active      unlimited
```

To display specific software license information installed on a FSX 800 or FSX 1600 device, enter the following command.

```
device#show license 1
License information for license <1>:
+package name:      FCX624-EL3U
+lid:               cpFNJHFFGO
+license type:      normal
+status:            active
+license period:    unlimited
```

**Syntax: show license *index\_number***

The *index\_number* variable specifies the specific license file installed on the device.

To display software license information for a specific stack unit on an ICX 6610, ICX 6450, or an FCX device, enter the following command. In the following output example, the ICX 6610 premium license, and the PoD license are installed on unit 3.

```
device#show license unit 3
Index      License Name      Lid      License Type      Status      License
Period    License Capacity
Stack unit 3:
1          ICX6610-PREM-LIC-SW  FJdnjFJFGiF  Normal          Active
Unlimited  1
2          ICX6610-10G-LIC-POD  FJdnjFJFGiF  Normal          Active
Unlimited  8
```

**Syntax: show license [ unit *unit\_id*]**

The *unit unit\_id* parameter specifies the unit ID number. The unit ID number is available only on FCX, ICX 6610, and ICX 6450 devices.

The following table describes the information displayed by the **show license unit** command

**TABLE 3** Output from the show license unit command

Field	Description
Index	The index number specifies the software license file for a specific stack. The index number is generated by the member unit.
License Name	The name of the license installed for the license index number on the stack unit.
Lid	The license ID. This number is embedded in the Brocade device.
License Type	Indicates whether the license is normal (permanent) or trial (temporary).

**TABLE 3** Output from the show license unit command (Continued)

Field	Description
Status	<p>Indicates the status of the license:</p> <ul style="list-style-type: none"> <li>Valid - A license is valid if the LID matches the license ID of the device for which the license was purchased, and the package name is recognized by the system.</li> <li><b>Invalid</b> - The LID does not match the license ID of the device for which the license was purchased.</li> <li>Active - The license is valid and in effect on the device.</li> <li>Not used - The license is not in effect on the device.</li> <li>Expired - For trial licenses only, this indicates that the trial license has expired.</li> </ul>
License Period	<p>If the license type is trial (temporary), this field displays the number of days the license is valid. If the license type is normal (permanent), this field displays Unlimited.</p>
License capacity	<p>The port capacity of the PoD license. For ICX 6610 devices, the PoD license can be a 4-port capacity license, or an 8-port capacity license depending on the number of licenses purchased. For the ICX 6450, and ICX 6650 devices, the field displays license capacity 2 when the PoD license is purchased for two ports (ports 2 and 4). The license capacity field is displayed in the <b>show license</b> command outputs for ICX 6610, ICX 6450, ICX 6650, and FCX devices only.</p> <p>For ICX 6650 devices, the capacity can be 8, 16, or 24 for a 10Gbps PoD license, and 2, 4, or 6 for a 40Gbps PoD license.</p>

To display detailed information about a license for a specific unit, use the **show license unit** command. The following example shows sample output.

```
device#show license unit 3 index 1
License information for unit 3 license <1>:
+license name:      FCX-ADV-LIC-SW
+lid:               deaHHKIgFrN
+license type:      Normal
+status:            Active
+license period:    Unlimited
Trial license information:
+days used:        10
+hours used:        21
+days left:        30
+hours left:        18
```

**Syntax:** **show license unit** *unit\_id* [**index** *index\_number*]

The index *index\_number* parameter specifies the software license file for which you want to display information. The **index** *index\_number* option is available only on FCX, ICX 6610, and ICX 6450 devices.

The following table describes the information displayed by the **show license unit** command.

**TABLE 4** Output from the show license unit command

Field	Description
+license name	The name of the license installed on the unit.
+lid	The license ID. This number is embedded in the Brocade device.
+license type	Indicates whether the license is normal (permanent) or trial (temporary).

**TABLE 4** Output from the show license unit command (Continued)

Field	Description
+status	Indicates the status of the license: <ul style="list-style-type: none"> <li>Valid - A license is valid if the LID embedded in the license matches the license ID of the device for which the license was purchased, and the package name is recognized by the system.</li> <li>Invalid - The LID does not match the license ID of the device for which the license was purchased.</li> <li>Active - The license is valid and in effect on the device.</li> <li>Not used - The license is not in effect on the device.</li> <li>Expired - For trial licenses only, this indicates that the trial license has expired.</li> </ul>
+license period	If the license type is trial (temporary), this field displays the number of days the license is valid. If the license type is normal (permanent), this field displays Unlimited.
+ days used	The number of days the trial license has been in effect.
+ hours used	The number of hours the trial license has been in effect.
+ days left	The number of days left before the trial license expires.
+ hours left	The number of hours left before the trial license expires.

## Viewing software packages installed in the device

Use the **show version** command to view the software packages that are currently running in the device. The following example is sample output from an FCX unit with the FCX\_ADV\_ROUTER\_SOFT\_PACKAGE package installed on units 1, 3, and 5.

### NOTE

The software package name is not the same as the license name.

```

device#show version
Copyright (c) 1996-2011 Brocade Communications Systems, Inc.
  UNIT 5: compiled on Jun 24 2011 at 14:20:38 labeled as FCXR07203a
          (6674957 bytes) from Primary FCXR07203a.bin
UNIT 1: compiled on Jun 24 2011 at 14:20:38 labeled as FCXR07203a
          (6674957 bytes) from Primary FCXR07203a.bin
UNIT 2: compiled on Jun 24 2011 at 14:20:38 labeled as FCXR07203a
          (6674957 bytes) from Primary FCXR07203a.bin
UNIT 3: compiled on Jun 24 2011 at 14:20:38 labeled as FCXR07203a
          (6674957 bytes) from Primary FCXR07203a.bin
UNIT 4: compiled on Jun 24 2011 at 14:20:38 labeled as FCXR07203a
          (6674957 bytes) from Primary FCXR07203a.bin
Boot-Monitor Image size = 369286, Version:07.0.01T7f5 (grz07001)
HW: Stackable FCX648S
=====
UNIT 1: SL 1: FCX-48GS POE 48-port Management Module
        Serial #: BCYxxxxxxxx
        License: FCX_ADV_ROUTER_SOFT_PACKAGE (LID: deaHHKIgFro)
        P-ENGINE 0: type DB90, rev 01
        P-ENGINE 1: type DB90, rev 01
        PROM-TYPE: FCX-ADV-U
=====
UNIT 1: SL 2: FCX-2XGC 2-port 16G Module (2-CX4)
=====

```

```

=====
UNIT 1: SL 3: FCX-2XG 2-port 10G Module (2-XFP)
=====
UNIT 2: SL 1: FCX-48GS POE 48-port Management Module
      Serial #: upgrade7072
      License: FCX_FULL_ROUTER_SOFT_PACKAGE (LID: ZU0W478MFMH)
      P-ENGINE 0: type DB90, rev 01
      P-ENGINE 1: type DB90, rev 01
=====
UNIT 2: SL 2: FCX-2XGC 2-port 16G Module (2-CX4)
=====
UNIT 3: SL 1: FCX-48GS POE 48-port Management Module
      Serial #: BCYxxxxxxxx
      License: FCX_ADV_ROUTER_SOFT_PACKAGE (LID: deaHHKIgFrN)
      P-ENGINE 0: type DB90, rev 01
      P-ENGINE 1: type DB90, rev 01
=====
UNIT 3: SL 2: FCX-2XGC 2-port 16G Module (2-CX4)
=====
UNIT 4: SL 1: FCX-24GS 24-port Management Module
      Serial #: BCVxxxxxxxx
      License: FCX_FULL_ROUTER_SOFT_PACKAGE (LID: dexHHIIgFFd)
      P-ENGINE 0: type DB90, rev 01
=====
UNIT 4: SL 2: FCX-2XGC 2-port 16G Module (2-CX4)
=====
UNIT 5: SL 1: FCX-48GS 48-port Management Module
      Serial #: UPGRADE7072
      License: FCX_ADV_ROUTER_SOFT_PACKAGE (LID: writcfgMFMH)
      P-ENGINE 0: type DB90, rev 01
      P-ENGINE 1: type DB90, rev 01
=====

```

For a list of supported software packages installed on the device, refer to [Appendix A: FastIron Licensed Features and Part Numbers](#) on page 47.

Viewing software packages installed in the device



# Licensing for Ports on Demand

---

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The following table lists the individual BrocadeFastIron switches and the software licensing features they support.

**TABLE 5** Supported software PoD licensing features

Feature	FSX 800 FSX 1600	FCX	ICX 6610	ICX 6450	ICX 6650	ICX 7750
PoD licensing	No	No	Yes	Yes	Yes	No
License generation	No	No	Yes	Yes	Yes	No
License query	No	No	Yes	Yes	Yes	No
Deleting a license	No	No	Yes	Yes	Yes	No

## Overview of licensing for Ports on Demand

---

### NOTE

Licensing for Ports on Demand is applicable to ICX 6610 , ICX 6450, and ICX 6650 devices.

You can use the Ports on Demand (PoD) feature to enable 1 Gbps ports to 40 Gbps port speed.

By default, regardless of what SFP+ media optic is used, the ICX 6610 device has eight active 1 Gbps uplink ports. To increase the uplink capacity of four ports from 1 Gbps to 10 Gbps port speed, purchase a single ICX6610-10G-LIC-POD license. To increase the uplink capacity of all eight ports from 1 Gbps to 10 Gbps port speed, purchase a second ICX6610-10G-LIC-POD license.

---

### NOTE

For 10Gbps PoD licenses, the ICX 6610 device does not support a trial license along with a permanent license at the same time even for different ports. The permanent license causes the trial license to be marked as obsolete.

The ICX 6450 device has four active uplink and stacking ports on slot 2. By default, regardless of what SFP+ media optic is used, ports 1 and 3 are 10 Gbps ports. By default, without a license at bootup, ports 2 and 4 come up in 10 Gbps port speed in an error disabled state. To enable ports 2 and 4 to 10 Gbps port speed, purchase the ICX6450-2X10G-LIC-POD license. For more information about enabling

ports 2 and 4 to 10 Gbps port speed, refer to [Configuration considerations when configuring PoD for ICX 6450 devices only](#) on page 38.

The PoD feature is not applicable to ICX 6430 devices because there are no 10 Gbps ports on the device.

The PoD feature for ICX 6650 is explained in detail in the *Ports on Demand Licensing on the ICX 6650* section.

## Configuring PoD on an interface

To upgrade the ICX 6610 and ICX 6450 ports from 1 Gbps to 10 Gbps port speed, perform the following steps.

1. Download the PoD license to the device. For more information about copying the license file on ICX devices, refer to [Using TFTP to copy a license file on FCX and ICX devices](#) on page 18.
2. Insert the 10 Gbps optic transceiver.
3. Enter the **speed-duplex 10g-full** command on a single, multiple, or interface range on ICX 6610 devices only, as shown in the following example.

```
device(config)# interface ethernet 1/3/1
device(config-if-e10000-1/3/1)# speed-duplex 10g-full
```

---

### NOTE

You do not need to enter the **speed-duplex 10g-full** command on ICX 6450 devices when configuring PoD on an interface.

---

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

**Syntax: no speed-duplex [ 10g-full | 1000-full-master ]**

The **10g-full** parameter allows you to enable the port speed to 10 Gbps speed.

The **1000-full-master** parameter allows you to enable the port speed to 1 Gbps speed.

If you enable the port to 10 Gbps port speed, and then issue the **no speed-duplex** command, the port continues to run at 10 Gbps speed. Upon bootup, the port reverts to 1 Gbps speed. In a stacking environment, if you issue the **no speed-duplex 10g-full** command on a 10 Gbps port interface, or a range of interfaces, the 10 Gbps port interface defaults back to 1 Gbps port speed in five to ten seconds.

## Configuring the upper PoD ports in a stack for ICX 6610 devices only

By default, when a single ICX6610-10G-LIC-POD license is downloaded onto the device, all four lower PoD ports in the stack (1/3/1 to 1/3/4) are eligible for an upgrade to 10 Gbps port speed. If you have a single ICX6610-10G-LIC-POD license, and you want to enable the upper four PoD ports (1/3/5 to 1/3/8) to 10 Gbps port speed, instead of the lower four PoD ports (1/3/1 to 1/3/4), complete the following steps. If the lower four PoD ports are already configured for 10 Gbps speed, you must first issue the **no speed-duplex 10g-full** command on the lower four PoD ports before configuring the upper four PoD ports to 10 Gbps port speed.

The following procedure assumes that you have already downloaded the license.

**NOTE**

If you purchased a second ICX6610-10G-LIC-POD license, you do not need to perform the following steps. The **flexible-10g-ports upper** command is used to configure the upper four PoD ports to 10 Gbps port speed using a single ICX6610-10G-LIC-POD license. The command can only be used on the upper four PoD ports.

1. Enter the **flexible-10g-ports upper** command at the stack unit configuration level.

```
device(config)# stack unit 2
device(config-unit-2)#flexible-10g-ports upper
device(config-unit-2)#exit
```

2. Specify the upper four PoD ports in a group with a single ICX6610-10G-LIC-POD license at the interface configuration level.

```
device(config)#interface ethernet 2/3/5 to 2/3/8
```

3. Enable the 10 Gbps port speed for the upper four PoD ports by entering the following command.

```
device(config-mif-2/3/5-2/3/8)#speed-duplex 10g-full
Port 2/3/5 mode changed from 1G to 10G
Port 2/3/6 mode changed from 1G to 10G
Port 2/3/7 mode changed from 1G to 10G
Port 2/3/8 mode changed from 1G to 10G
device(config-mif-2/3/5-2/3/8)#end
```

**Syntax: [no] flexible-10g-ports upper**

Use the **no** form of the **flexible-10g-ports upper** command when you want to enable the lower four PoD ports, instead of the upper four PoD ports, to 10 Gbps port speed. Before you issue the **no flexible-10g-ports upper** command, you must first issue the **no speed-duplex 10g-full** command on the upper four PoD ports.

To display the configuration for the **flexible-10g-ports upper** command on a stack unit, use the **show stack** command with the appropriate parameters.

```
device#show stack 1
alone: standalone, D: dynamic config, S: static config
ID   Type      Role      Mac Address   Pri State  Comment
1   S ICX6610-48  standby 748e.f834.32cc 180 remote Ready
```

**Syntax: show stack stack-unit**

## Displaying license configuration for PoD ports after a license upgrade

**NOTE**

The **show pod** command cannot be used to display the configuration for 1 Gbps or 40 Gbps ports on ICX 6610 and ICX 6450 devices.

The **show pod** command is used to display a license configuration for PoD ports in a stack after a license upgrade on ICX 6610, ICX 6450, and ICX 6650 devices. To display general license information about the PoD license in a stack unit, use the **show license** command. For more information about the **show license** command, refer to [Viewing the license database](#) on page 25.

## Displaying license configuration for PoD ports for ICX 6610 devices

To display a license configuration for all PoD ports for all units in a stack, enter the following command at the CLI level.

```
device#show pod
Unit-Id: 1
PoD license capacity: 8
PoD license capacity used: 8
PoD-ports    Lic-Available Lic-Used
1/3/1       Yes             Yes
1/3/2       Yes             Yes
1/3/3       Yes             Yes
```

**Syntax:** `show pod [ unit id]`

The *unit id* parameter specifies the unit ID number of the PoD you want to display.

The following table describes the information displayed in the output of the **show pod unit** command.

**TABLE 6** Output from the show pod unit command

Field	Description
Unit-Id	The unit ID number of the PoD.
PoD license capacity	The port capacity of the PoD license that is purchased. For ICX 6610 devices, the port capacity can be four or eight 10 Gbps ports. UPPER is displayed in parentheses when the upper four PoD ports are selected using the <b>flexible-10g-ports upper</b> command. LOWER is displayed in parentheses when the four lower PoD ports are selected for an upgrade to 10 Gbps port speed.
PoD license capacity used	The number of PoD ports that are upgraded to 10 Gbps port speed.
PoD-ports	The list of PoD ports in the PoD unit.
Lic-Available	Whether the license is available for the port.
Lic-Used	Whether the license is used by the port.

## Displaying license configuration for PoD ports for ICX 6450 devices

By default at bootup, the license state for ports 2 and 4 are in the acquired state. The following output from the **show pod** command displays port 2 and 4 as acquired. Upon installing the ICX6450-2X10G-LIC-POD license, ports 2 and 4 can be enabled to run in 10 Gbps port speed. The license state for ports 2 and 4 remains in the acquired state.

```
Brocade#show pod
Unit-Id: 1
PoD-ports    Lic-Available Lic-Used
1/2/2       Yes             Yes
1/2/4       Yes             Yes
Unit-Id: 2
PoD-ports    Lic-Available Lic-Used
2/2/2       Yes             Yes
2/2/4       Yes             Yes
```

If ports 2 and 4 are configured to 1 Gbps port speed, the license state changes to the default. The following output from the **show pod** command displays port 2 and 4 in the default state.

```
Brocade#show pod
Unit-Id: 1
PoD-ports  Lic-Available Lic-Used
1/2/2      No                    No
1/2/4      No                    No
```

**Syntax: show pod [unit id]**

The *unit id* parameter specifies the unit ID number of the PoD you want to display.

For a description of the fields in the **show pod** command output, refer to [Displaying license configuration for PoD ports for ICX 6610 devices](#) on page 34.

## Displaying license configuration for PoD ports for ICX 6650 devices

To display the license configuration for PoD ports in the system, enter the **show pod** command at the CLI level. In the following output, the 16-port capacity license is used for the 10 GbE PoD license, and the 6-port capacity license is used for the 40 GbE PoD license.

```
Brocade#show pod
Unit-Id: 1
PoD 10G license capacity: 16
PoD 10G license capacity used: 16
PoD 40G license capacity: 6
PoD 40G license capacity used: 6
PoD-ports Lic-Available Lic-Used
1/1/33      Yes                    Yes
1/1/34      Yes                    Yes
1/1/35      Yes                    Yes
1/1/36      Yes                    Yes
1/1/37      Yes                    Yes
1/1/38      Yes                    Yes
1/1/39      Yes                    Yes
1/1/40      Yes                    Yes
1/1/41      Yes                    Yes
1/1/42      Yes                    Yes
1/1/43      Yes                    Yes
1/1/44      Yes                    Yes
1/1/45      Yes                    Yes
1/1/46      Yes                    Yes
1/1/47      Yes                    Yes
1/1/48      Yes                    Yes
1/1/49      No                     No
1/1/50      No                     No
1/1/51      No                     No
1/1/52      No                     No
1/1/53      No                     No
1/1/54      No                     No
1/1/55      No                     No
1/1/56      No                     No
1/2/1       Yes                    Yes
1/2/2       Yes                    Yes
1/2/3       Yes                    Yes
1/2/4       Yes                    Yes
1/3/1       Yes                    Yes
1/3/2       Yes                    Yes
1/3/3       Yes                    Yes
1/3/4       Yes                    Yes
1/3/5       Yes                    Yes
1/3/6       Yes                    Yes
1/3/7       Yes                    Yes
1/3/8       Yes                    Yes
```

**Syntax: show pod**

The following table describes the information displayed in the output of the **show pod** command.

**TABLE 7** Output from the show pod command

Field	Description
Unit-Id	The unit ID number of the PoD.
PoD license capacity	The port capacity of the PoD license (10 GbE or 40 GbE license) that is purchased. The PoD 10 GbE license consists of an 8-, 16-, or 24-port capacity license. The PoD 40 GbE license consists of a 2-, 4-, or 6-port capacity license.
PoD license capacity used	The port capacity of the PoD license (10 GbE or 40 GbE license) that is in use by the port. The PoD 10 GbE license consists of an 8-, 16-, or 24-port capacity license. The PoD 40 GbE license consists of a 2-, 4-, or 6-port capacity license.
PoD-ports	The list of PoD ports in the PoD unit.
Lic-Available	Whether the license is available for the port.
Lic-Used	Whether the license is used by the port.

## Upgrading or downgrading configuration considerations for PoD

Consider the following when upgrading or downgrading PoD ports for ICX 6610 or ICX 6450 devices:

- When a single ICX6610-10G-LIC-POD license is downloaded onto the device, you can upgrade the first four or the last four PoD ports to 10 Gbps port speed. However, if you upgrade the fifth port to 10 Gbps port speed, the following syslog message and error message displays.

```
SYSLOG: <14>Jul 31 00:33:46 10.20.147.22 PoD: No license present for port 1/3/3".
        POD:No license present for port 3.
```

The error message is displayed because the port you are attempting to upgrade to 10 Gbps port speed has exceeded the license capacity that is downloaded onto the device. To upgrade all eight ICX 6610 ports to 10 Gbps port speed, purchase a second ICX6610-10G-LIC-POD license.

- There is no trial license available for the PoD feature for ICX 6610 and ICX 6450 devices.

### Configuration considerations for stacking or trunking PoD ports

Consider the following when stacking or trunking PoD ports for ICX 6610 or ICX 6450 devices:

- In an ICX traditional stack, a stack member unit without a PoD license can join a stack even when the active or master stack unit has a PoD license.
- All trunk ports must operate at 1 Gbps or 10 Gbps speed in a stack. You cannot mix and match trunk ports with different port speeds.
- In a trunk formation, if there is no license installed in a stack upon bootup or hot swap of a stack unit, a port is disabled. This does not affect the trunk formation.

## Configuration considerations when configuring PoD on an interface

Consider the following when configuring PoD on an interface or a range of interfaces on ICX 6610 or ICX 6450 devices:

- The **speed-duplex 10g-full** command is rejected when there is no license or an insufficient license in the unit. For example, an insufficient license implies that you are attempting to upgrade all eight ports to 10 Gbps port speed, and you have downloaded a single ICX6610-10G-LIC-POD license. The following syslog message and error message is generated.

```

SYSLOG: <14>Jul 31 00:33:46 10.20.147.22 PoD: No license present for port 1/3/3".
POD:No license present for port 2

```

- When the **speed-duplex 10g-full** command is configured for a port or multiple ports on an interface, and there is no license or an insufficient license in the stack upon bootup or hot swap of a stack unit, the port is configured to 10 Gbps port speed. However, the port is in ERROR\_DISABLED state until you install the correct license in the stack. A syslog message is generated every 30 seconds stating that the license is not present on the port. The error disable recovery timer checks every 30 seconds to see if the correct license is installed in the stack. Once the correct license is installed, the port is automatically enabled to operate at 10 Gbps port speed on the next cycle of the timer. You can also enable the port manually to operate at 10 Gbps port speed once the correct license is installed.
- In a stack, the **speed-duplex 10g-full** command is rejected on the primary port if all ports in a trunk do not have the correct license installed to upgrade to 10 Gbps port speed. The following error message is displayed.

```

Error:Not enough 10Gig License present for all the ports in trunk

```

- If you delete the license from the stack, the port runs in 10 Gbps mode until the switch is reloaded. If the **speed-duplex 10g-full** command is entered, the following syslog message is displayed.

```

SYSLOG: <14>Jul 31 00:33:46 10.20.147.22 PoD: No license present for port 1/3/3".

```

- The **show interface ethernet** command can be used to display the configuration for a disabled 10 Gbps interface port, or a range of port interfaces after bootup for both ICX 6610 and ICX 6450 devices. The **show interface ethernet** command displays the port in the ERROR\_DISABLED state. The following example output is from an ICX 6450 device.

```

device#show interface ethernet 3/2/2
10GigabitEthernet3/2/2 is ERR-DISABLED (invalid license), line protocol is
down
  Hardware is 10GigabitEthernet, address is 0000.0083.01fa (bia
0000.0083.01fa)
  Configured speed 10Gbit, actual unknown, configured duplex fdx, actual
unknown
  Stacking Port, port state is DISABLED
  BPDU guard is Disabled, ROOT protect is Disabled
  Link Error Dampening is Disabled
  STP configured to ON, priority is level0, mac-learning is enabled
  Flow Control is enabled
  Mirror disabled, Monitor disabled
  Not member of any active trunks
  Not member of any configured trunks
  No port name

```

Once the correct license is installed, the port displays the state as up as shown in the following example output.

```

device#show interface ethernet 3/2/2
10GigabitEthernet6/2/2 is up, line protocol is up
  Hardware is 10GigabitEthernet, address is 0000.0082.f872 (bia 0000.0082.f872)
  Configured speed 10Gbit, actual 10Gbit, configured duplex fdx, actual fdx
  Stacking Port, port state is FORWARDING
  BPDU guard is Disabled, ROOT protect is Disabled
  Link Error Dampening is Disabled

```

```
STP configured to ON, priority is level0, mac-learning is enabled
Flow Control is enabled
Mirror disabled, Monitor disabled
Not member of any active trunks
Not member of any configured trunks
No port name
```

## Configuration considerations when configuring PoD for ICX 6450 devices only

Consider the following when configuring PoD for ICX 6450 devices only:

- By default, without a license at bootup, ports 2 and 4 come up in 10 Gbps port speed in an error disabled state. The **show interface ethernet** command displays the port in the `ERROR_DISABLED` state at bootup. Refer to section, [Configuration considerations when configuring PoD on an interface](#) on page 37 for output examples from the **show interface ethernet** command.
- From the default state, ports 2 and 4 can be configured to 1 Gbps port speed using the **speed-duplex 1000-full-master** command without a license. You do not need to reboot the switch for the links to come up in 1 Gbps port speed.
- If you download the ICX6450-2X10G-LIC-POD license to the device, insert the correct 10 Gbps optic transceiver, and enter the **speed-duplex 10g-full** command on the interface, you can immediately begin using ports 2 and 4 in 10 Gbps port speed. You do not need to reboot the switch for the links to come up.
- For any of the four uplink ports on slot 2, if you reconfigure any port from 1 Gbps to 10 Gbps port speed, you must reload the switch to begin using the ports in 10 Gbps port speed. Until you reload the switch, the ports will remain in an error-disabled state. The following example output displays Ethernet port 4 in an error-disabled state.

```
device#show interface ethernet 1/2/4
10GigabitEthernet1/2/4 is ERR-DISABLED (Reload the switch or stack to enable
this port in 10G speed), line protocol is down
  Hardware is 10GigabitEthernet, address is 0000.0082.e39c (bia 0000.0082.e39c)
  Configured speed 10Gbit, actual unknown, configured duplex fdx, actual
unknown
  Member of L2 VLAN ID 1, port is untagged, port state is DISABLED
  BPDU guard is Disabled, ROOT protect is Disabled
  Link Error Dampening is Disabled
  STP configured to ON, priority is level0, mac-learning is enabled
  Flow Control is enabled
  Mirror disabled, Monitor disabled
  Not member of any active trunks
  Not member of any configured trunks
  No port name
  MTU 1500 bytes
  300 second input rate: 0 bits/sec, 0 packets/sec, 0.00% utilization
  300 second output rate: 0 bits/sec, 0 packets/sec, 0.00% utilization
  0 packets input, 0 bytes, 0 no buffer
  Received 0 broadcasts, 0 multicasts, 0 unicasts
  0 input errors, 0 CRC, 0 frame, 0 ignored
  0 runts, 0 giants
  0 packets output, 0 bytes, 0 underruns
  Transmitted 0 broadcasts, 0 multicasts, 0 unicasts
  0 output errors, 0 collisions
  Relay Agent Information option: Disabled
```

## Configuration considerations when configuring PoD for ICX 6650 devices only

Consider the following when configuring PoD for ICX 6650 devices:



- You can add an ICX6650-2P40G-POD license to any configuration. For example, you can add an ICX6650-2P40G-POD license to a base 32-port configuration.
- In a trunk formation, if there is no license upon bootup or hot swap of a unit, a port is disabled. This does not affect the trunk formation.
- A 10 GbE or 40 GbE port can be in one of the following port states:
  - Error-disabled (invalid license)
  - Down
  - Up

A port is in an error-disabled (invalid license) state when there is no license installed in the device. An invalid license implies that you have incorrectly installed a license that is not tied to the device. When a physical link is established between two devices, but a license is not installed in the device, the port remains in an error-disabled state. A port is operational only when you install the correct license in the device. The **show interface ethernet** command displays the port in the ERROR\_DISABLED state because there is no license installed, and there is no physical link between two devices. The following example output is from a Brocade ICX 6650 device.

```
device#show interface ethernet 1/1/33
10GigabitEthernet1/1/33 is ERR-DISABLED (invalid license), line protocol is
down
Hardware is 10GigabitEthernet, address is 748e.f80c.5f40(bia 748e.f80c.5f40)
Interface type is unknown
Configured speed 10Gbit, actual unknown, configured duplex fdx, actual
unknown
Member of L2 VLAN ID 1, port is untagged, port state is DISABLED
BPDU guard is Disabled, ROOT protect is Disabled
Link Error Dampening is Disabled
STP configured to ON, priority is level0, mac-learning is enabled
Flow Control is enabled
Mirror disabled, Monitor disabled
Not member of any active trunks
Not member of any configured trunks
No port name
```

A port is in a down state when there is no physical link between two devices, and a license is installed in the device. The **show interface ethernet** command displays the port in the down state. The following example output is from a Brocade ICX 6650 device.

```
device#show interface ethernet 1/1/33
10GigabitEthernet1/1/33 is down, line protocol is down
Hardware is 10GigabitEthernet, address is 748e.f80c.5f40(bia 748e.f80c.5f40)
Interface type is unknown
Configured speed 10Gbit, actual unknown, configured duplex fdx, actual
unknown
Member of L2 VLAN ID 1, port is untagged, port state is BLOCKING
BPDU guard is Disabled, ROOT protect is Disabled
Link Error Dampening is Disabled
STP configured to ON, priority is level0, mac-learning is enabled
Flow Control is enabled
Mirror disabled, Monitor disabled
Not member of any active trunks
Not member of any configured trunks
No port name
```

A port is in an up state when a physical link is established between two devices, and a license is installed in the device. The **show interface ethernet** command displays the port in the up state. The following example output is from a Brocade ICX 6650 device.

```
device#show interface ethernet 1/2/1
40GigabitEthernet1/2/1 is up, line protocol is up
Hardware is 40GigabitEthernet, address is 748e.f80c.5f40(bia 748e.f80c.5f40)
Interface type is 40Gig Copper
Configured speed 40Gbit, actual 40Gbit, configured duplex fdx, actual fdx
Configured mdi mode AUTO, actual none
Member of 1 L2 VLANs, port is tagged, port state is FORWARDING
BPDU guard is Disabled, ROOT protect is Disabled
Link Error Dampening is Disabled
```

```
STP configured to ON, priority is level0, mac-learning is enabled
Flow Control is enabled
Mirror disabled, Monitor disabled
Member of active trunk ports 1/2/1,1/2/2,1/2/3,1/2/4, primary port
Member of configured trunk ports 1/2/1,1/2/2,1/2/3,1/2/4, primary port
No port name
```

## Ports on Demand licensing on the ICX 6650

The Brocade ICX 6650 device features Ports on Demand licensing. With Ports on Demand licensing, software features do not require licenses and you can add port licenses as needed. The Brocade ICX 6650 device supports:

- 56 front-panel, dual-speed 1/10 GbE SFP+ ports
- 4 rear-panel 40 GbE QSFP+ ports
- 2 rear-panel 4x10 GbE QSFP+ breakout ports

The details for obtaining a license is provided in the "Obtaining a license" section of the "Software Licensing Overview" chapter.

---

### NOTE

There is no trial license available for the PoD feature for the ICX 6650 device.

---

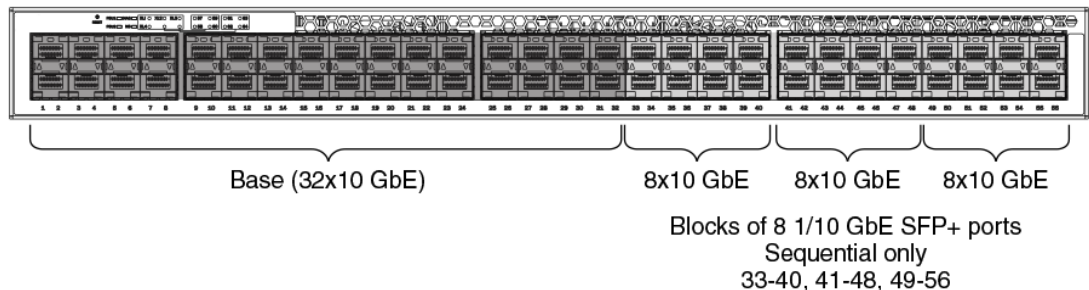
## Front Panel PoD

The front panel has the following fixed PoD ports:

- Ports 1/1/1 to 1/1/32 are enabled by default.
- Ports 1/1/33 to 1/1/56 are disabled by default and are in an error-disabled state.

For a detailed description of the port states (up, down, or error-disabled), refer to the *Configuration considerations when configuring PoD for Brocade ICX 6650 devices* section. The following is an illustration of the front panel ports.

**FIGURE 7** Brocade ICX 6650 front panel ports



## Rear Panel Flexible Ports on Demand

The rear panel has 6 QSFP+ ports:

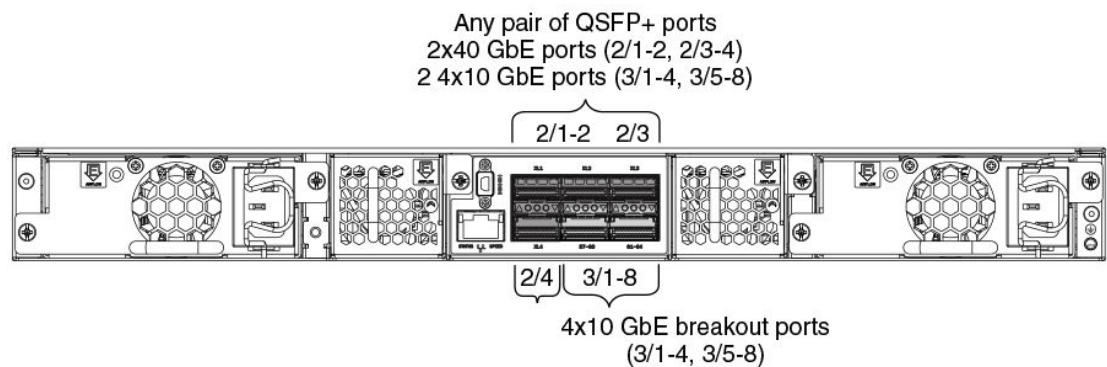
- 2 pairs of 40 ports that are error-disabled by default.
- 2 ports that can be converted to eight ports using a breakout cable. The ports are error disabled by default.

The ports on the rear panel are categorized into groups. Each group requires a Flexible PoD (FPoD) license to enable the ports. For more information about using the FPoD license with a group of ports, refer to *Disabling the FPoD ports on the rear panel* section.

- Group 1 = Ports 1/2/1 - 1/2/2. When enabled, these ports operate at 40 GbE.
- Group 2 = Ports 1/2/3 - 1/2/4. When enabled, these ports operate at 40 GbE.
- Group 3 = Ports 1/3/1-4, 1/3/5-8. When enabled, these breakout ports operate at 10 GbE.

The following is an illustration of the rear panel ports.

**FIGURE 8** Brocade ICX 6650 rear panel ports on demand



## Enabling ports on the front panel

By default, ports 1/1/33 to 1/1/56 are in an error-disabled state. Use the ICX6650-10G-LIC-POD license to enable these ports. Once enabled, the ports are up at 10 GbE port speed. One ICX6650-10G-LIC-POD license enables eight ports at a time in sequential order.

1. Download the ICX6650-10G-LIC-POD license from the Brocade software portal onto the Brocade device.
2. Place the license file on a TFTP or SCP server to which the Brocade device has access to.
3. Use TFTP or SCP to copy the file to the license database of the Brocade device. To use TFTP to copy the file to the license database of the Brocade device, enter the following command.

```
Brocade# copy tftp license 10.120.54.185 lic.xml unit 1
Brocade#Flash Memory Write (8192 bytes per dot)
Copy Software License from TFTP to Flash Done.
```

```
copy tftp license [IP_address] ipv6_address] license_filename_on_host unit unit_id
```

The *IP\_address* variable is the address of the IPv4 TFTP server.

The *ipv6\_address* variable is the address of the IPv6 TFTP server.

The *license\_filename\_on\_host* variable is the file name of the license file.

The *unit unit\_id* variable specifies a unit for which you want to add a software license file. The *unit\_id* variable is 1.

If you attempt to download the same license twice on the device, the following error message is displayed on the console.

```
Can't add the license string - 93 (DUPLICATE_LICENSE)
```

SSH and Secure Copy (SCP) must be enabled on the Brocade device before the procedures in this section can be performed. To copy the file from an SCP-enabled client to the license database of a specific unit, enter the following command. In the example, the license is copied to unit 1.

```
scp license.xml terry@10.20.91.39:license:1
```

**Syntax:** `scp license_filename_on_host@IP_address:license:unit_id`

The *unit\_id* variable specifies a unit for which you want to add a software license file. The *unit\_id* variable is 1.

4. Insert an SFP+ optical transceiver to enable ports to 10 GbE speed.
5. Insert an SFP+ or SFP optical transceiver to enable the ports to 1 GbE speed.
6. Repeat step 1 through step 3 above to enable ports 1/1/33 to 1/1/48.
7. Repeat step 1 through step 3 above to enable ports 1/1/33 to 1/1/56.

By default, once the license is installed, the ports are up in 10 GbE port speed. You do not need to use the **speed-duplex** command, or reload the system to enable the ports to 10 GbE port speed. As you upgrade from a lower port to a higher port capacity license, the new license replaces the previous license.

## Deleting an ICX6650-10G-LIC-POD license

When downgrading to a lower port capacity license using the ICX6650-10G-LIC-POD license, you must first delete the higher port capacity license and then re-install the lower port capacity license in your system. A reload is required for the license to take effect.

1. Delete the 16-port ICX6650-10G-LIC-POD license file from the device.

```
Brocade#license delete unit 1 index 1
```

2. Use TFTP or SCP to copy the 8-port ICX6650-10G-LIC-POD license file to the license database of the device. To use TFTP to copy the file to the license database of the Brocade device, enter the following command.

```
Brocade# copy tftp license 10.120.54.185 lic.xml unit 1
Brocade#Flash Memory Write (8192 bytes per dot)
Copy Software License from TFTP to Flash Done.
```

```
copy tftp license [IP_address] ipv6_address] license_filename_on_host unit unit_id
```

The *IP\_address* variable is the address of the IPv4 TFTP server.

The *ipv6\_address* variable is the address of the IPv6 TFTP server.

The *license\_filename\_on\_host* variable is the file name of the license file.

The *unit\_id* variable specifies a unit for which you want to add a software license file. The *unit\_id* variable is 1.

If you attempt to download the same license twice on the device, the following error message is displayed on the console.

```
Can't add the license string - 93 (DUPLICATE_LICENSE)
```

SSH and Secure Copy (SCP) must be enabled on the Brocade device before the procedures in this section can be performed. To copy the file from an SCP-enabled client to the license database of a specific unit, enter the following command. In the example, the license is copied to unit 1.

```
scp license.xml terry@10.20.91.39:license:1
```

```
scp license_file_on_host user@IP_address:license:unit_id
```

The *unit\_id* variable specifies a unit for which you want to add a software license file. The *unit\_id* variable is 1.

3. Reload the device for the 8-port ICX6650-10G-LIC-POD license file to take effect.

```
Brocade#reload
```

4. Use the **show pod** command to display configuration information for the 8-port ICX6650-10G-LIC-POD license.

```
Brocade#show pod
Unit-Id: 1
PoD 10G license capacity: 8
PoD 10G license capacity used: 8
PoD 40G license capacity: 6
PoD 40G license capacity used: 6
PoD-ports Lic-Available Lic-Used
1/1/33 Yes Yes
1/1/34 Yes Yes
1/1/35 Yes Yes
1/1/36 Yes Yes
1/1/37 Yes Yes
1/1/38 Yes Yes
1/1/39 Yes Yes
1/1/40 Yes Yes
1/1/41 No No
1/1/42 No No
1/1/43 No No
1/1/44 No No
1/1/45 No No
1/1/46 No No
1/1/47 No No
1/1/48 No No
1/1/49 No No
1/1/50 No No
1/1/51 No No
1/1/52 No No
1/1/53 No No
1/1/54 No No
1/1/55 No No
1/1/56 No No
show pod
```

## Enabling ports on the rear panel

By default, ports on the rear panel are in an error-disabled state. Use the ICX6650-40G-LIC-POD license to enable these ports. Once enabled, ports 1/2/1 through 1/2/4 are at 40 GbE port speed, and ports 1/3/1 through 1/3/8 are at 10 GbE port speed.

1. Download the ICX6650-40G-LIC-POD license from the Brocade software portal.
2. Place the license file on a TFTP or SCP server to which the Brocade device has access to.
3. Use TFTP or SCP to copy the file to the license database of the Brocade device. To use TFTP to copy the file to the license database of the Brocade device, enter the following command.

```
Brocade# copy tftp license 10.120.54.185 lic.xml unit 1
Brocade#Flash Memory Write (8192 bytes per dot)
Copy Software License from TFTP to Flash Done.
copy tftp license [IP_address] ipv6_address] license_filename_on_host unit unit_id
```

The *IP\_address* variable is the address of the IPv4 TFTP server.

The *ipv6\_address* variable is the address of the IPv6 TFTP server.

The *license\_filename\_on\_host* variable is the file name of the license file.

The *unit unit\_id* variable specifies a unit for which you want to add a software license file. The *unit\_id* variable is 1.

If you attempt to download the same license twice on the device, the following error message is displayed on the console.

```
Can't add the license string - 93 (DUPLICATE_LICENSE)
```

SSH and Secure Copy (SCP) must be enabled on the Brocade device before the procedures in this section can be performed. To copy the file from an SCP-enabled client to the license database of a specific unit, enter the following command. In the example, the license is copied to unit 1.

```
scp license.xml terry@10.20.91.39:license:1
scp license_file_on_host user@IP_address:license:unit id
```

The *unit\_id* variable specifies a unit for which you want to add a software license file. The *unit\_id* variable is 1.

4. Insert the 40 GbE QSFP optical transceiver for ports 1/2/1 through 1/2/4.
5. Insert the QSFP to 4 SFP+ copper breakout cable or the breakout-capable QSFP+ optical transceiver for ports 1/3/1 through 1/3/8.
6. Enter the following command.

```
Brocade(config)# fpod-40g-enable group 1
Brocade(config)# fpod-40g-enable group 2
```

**Syntax: [no] fpod-40g-enable group groupID**

Enter one of the following values for *groupID*:

- 1 = Ports 1/2/1 - 1/2/2
- 2 = Ports 1/2/3 - 1/2/4
- 3 = Ports 1/3/1 - 1/3/8

The ports in the group are enabled without a system reload. The port status is up in 30 seconds. You can use the **no fpod-40g-enable group groupID** command to disable the port speed for the groups specified. The ports become non-operational and revert back to the default state, error-disabled. A system reload is not required.

7. Use the **show pod** and **show license** commands to display information on port licensing.

## Disabling the FPoD ports on the rear panel

Enter the following command to disable the ports in group 1.

```
Brocade(config)# no fpod-40g-enable group 1
```

Ports 1/2/1 and 1/2/2 in group 1 are disabled. With a 2-port capacity license, you can choose to enable any one group out of the three groups (group 1, group 2, or group 3). For example, if you want to disable the ports in group 1 and enable the ports in group 2, perform the following steps.

1. Disable ports for group 1.

```
Brocade(config)# no fpod-40g-enable group 1
```

2. Enable ports for group 2.

```
Brocade(config)# fpod-40g-enable group 2
```

Ports 1/2/3 and 1/2/4 are enabled. A system reload is not required.

With a 4-port capacity license, you can choose to enable any two groups out of the three groups. For example, if you want to enable the ports in group 3, but you have already enabled the ports in group 1 and group 2, you must first disable the ports in group 1 or group 2. If you do not disable the ports in group 1 or group 2, the following error message displays on the CLI.

```
Error: 40G PoD license capacity has been exceeded
```

The error message implies that you have exceeded the license capacity for this unit. To enable ports in group 3, perform the following steps.

- a) Disable ports in group 1 or 2.

```
Brocade(config)# no fpod-40g-enable group 2
```

- b) Enable ports in group 3.

```
Brocade(config)# fpod-40g-enable group 3
```

- c) Use the **show pod** command to display configuration information for the groups enabled as shown in the following example output.

```
Brocade(config)#show pod
Unit-Id: 1
PoD 10G license capacity: 24
PoD 10G license capacity used: 24
PoD 40G license capacity: 4
PoD 40G license capacity used: 4
PoD-ports Lic-Available Lic-Used
1/1/33 Yes Yes
1/1/34 Yes Yes
1/1/35 Yes Yes
1/1/36 Yes Yes
1/1/37 Yes Yes
1/1/38 Yes Yes
1/1/39 Yes Yes
1/1/40 Yes Yes
1/1/41 Yes Yes
1/1/42 Yes Yes
1/1/43 Yes Yes
1/1/44 Yes Yes
1/1/45 Yes Yes
1/1/46 Yes Yes
1/1/47 Yes Yes
1/1/48 Yes Yes
1/1/49 Yes Yes
1/1/50 Yes Yes
1/1/51 Yes Yes
1/1/52 Yes Yes
1/1/53 Yes Yes
1/1/54 Yes Yes
1/1/55 Yes Yes
1/1/56 Yes Yes
1/2/1 Yes Yes
1/2/2 Yes Yes
1/2/3 No No
1/2/4 No No
1/3/1 Yes Yes
1/3/2 Yes Yes
1/3/3 Yes Yes
1/3/4 Yes Yes
1/3/5 Yes Yes
1/3/6 Yes Yes
1/3/7 Yes Yes
1/3/8 Yes Yes
```

Disabling the FPoD ports on the rear panel



# Appendix A: FastIron Licensed Features and Part Numbers

This appendix lists the supported licensed features, associated image filenames, and related part numbers. There are no changes to the part numbers for products with pre-installed (factory-installed) licenses. These part numbers are listed for reference in the last column.

**TABLE 8** Licensed features and part numbers

Product	Licensed feature or feature set	Image filename	Part numbers for software license only	Part numbers for hardware with pre-installed software license
FCX	Advance Layer 3: <ul style="list-style-type: none"> <li>• BGP</li> <li>• BGP4+</li> <li>• GRE</li> <li>• IPv6 over IPv4 tunnels</li> </ul>	N/A <sup>1</sup>	FCX-ADV-LIC-SW	FCX624-E-ADV
				FCX-624-I-ADV
				FCX624S-ADV
				FCX624S-HPOE-ADV
				FCX624S-F-ADV
				FCX648-E-ADV
				FCX648-I-ADV
				FCX648S-ADV
				FCX648S-HPOE-ADV
				ICX 6610
Software licensing is only supported on ICX 6610 devices.	ICX 6610-24-PI			
	ICX 6610-24P-PE			
	ICX 6610-24P-PI			
	ICX 6610-24F-PE			
	ICX 6610-24F-PI			
	ICX 6610-48-PE			
	ICX 6610-48-PI			
	ICX 6610-48P-PE			
	ICX 6610-48P-PI			

**TABLE 8** Licensed features and part numbers (Continued)

Product	Licensed feature or feature set	Image filename	Part numbers for software license only	Part numbers for hardware with pre-installed software license
	Advance Layer 3: <ul style="list-style-type: none"> <li>• All features in the Premium license (see the cell above - Premium Layer 3).</li> <li>• BGP4</li> <li>• BGP4+</li> <li>• GRE</li> <li>• IPv6 over IPv4 tunnels</li> </ul>	N/A <sup>1</sup>	ICX6610-ADV-LIC-SW	Sold separately. To purchase the ICX 6610 Advance license, contact your Brocade representative.
	Upgrade from Premium to Advance license  This license is used to upgrade from Premium to Advance license. The license can only be installed on all hardware that has a Premium license installed.	N/A <sup>1</sup>	ICX6610-ADV-UPG-LIC-SW	Sold separately. To purchase the Upgrade license, contact your Brocade representative.
	ICX 6610 - Ports on Demand license  To upgrade the ICX 6610 1 Gbps ports to 10 Gbps port speed, use the ICX6610-10G-LIC-POD license. By default, the ICX 6610 device has eight active 1 Gbps uplink ports. To increase the uplink capacity of four ports from 1 Gbps to 10 Gbps port speed, purchase a single ICX6610-10G-LIC-POD license. To increase the uplink capacity of all eight ports from 1 Gbps to 10 Gbps port speed, purchase a second ICX6610-10G-LIC-POD license.	N/A <sup>1</sup>	ICX 6610-10G-LIC-POD	Sold separately. To purchase the Ports on Demand license, contact your Brocade representative.

**TABLE 8** Licensed features and part numbers (Continued)

Product	Licensed feature or feature set	Image filename	Part numbers for software license only	Part numbers for hardware with pre-installed software license
ICX 6450	Premium Layer 3:	N/A <sup>1</sup>	ICX6450-PREM-LIC	N/A
ICX 6450C	<ul style="list-style-type: none"> <li>• IPv4 OSPF v2</li> <li>• IPv4 OSPF v3</li> <li>• RIP v1, v2</li> <li>• RIPng</li> <li>• VRRP</li> <li>• VRRP-E</li> <li>• GRE</li> </ul>			
Software licensing is only supported on ICX 6450 devices.				
	<p>ICX 6450- Ports on Demand license</p> <p>The ICX 6450 device has four active uplink or stacking ports on slot 2. By default, ports 1 and 3 are 10 Gbps ports. By default, without a license at bootup, ports 2 and 4 come up in 10 Gbps port speed in an error-disabled state. To enable ports 2 and 4 to 10 Gbps port speed, purchase the ICX6450-2X10G-LIC-POD license.</p>	N/A <sup>1</sup>	ICX6450-2X10G-LIC-POD	Sold separately. To purchase the Ports on Demand license, contact your Brocade representative.

**TABLE 8** Licensed features and part numbers (Continued)

Product	Licensed feature or feature set	Image filename	Part numbers for software license only	Part numbers for hardware with pre-installed software license
ICX 6650	ICX 6650 - Ports on Demand license for 10Gbps	N/A <sup>1</sup>	ICX6650-10G-LIC-POD	<p>Enables ports 1/1/33-1/1/56 in blocks of eight in sequential order. You need three ICX6650-8P10G-POD licenses to enable all front panel ports. When you purchase a license, a new transaction key is generated as you upgrade to a higher port capacity. Purchase the following:</p> <ul style="list-style-type: none"> <li>• 8-port capacity = 1 ICX6650-8P10G-POD license. Enables ports 1/1/33 - 1/1/40.</li> <li>• 16-port capacity = 2 ICX6650-8P10G-POD licenses. Enables ports 1/1/33 - 1/1/48.</li> <li>• 24-port capacity = 3 ICX6650-8P10G-POD licenses. Enables ports 1/1/33- 1/1/56.</li> </ul>

**TABLE 8** Licensed features and part numbers (Continued)

Product	Licensed feature or feature set	Image filename	Part numbers for software license only	Part numbers for hardware with pre-installed software license
	ICX 6650 - Ports on Demand license for 40Gbps	N/A <sup>1</sup>	ICX6650-40G-LIC-POD	<p>Enables the rear panel ports by port groups. You need three ICX6650-2P40G-POD licenses to enable all rear panel ports. Purchase the following:</p> <ul style="list-style-type: none"> <li>• 2-port capacity = 1 ICX6650-2P40G-POD license. Enables one group out of the 3 groups (group 1, group 2, or group 3).</li> <li>• 4-port capacity = 2 ICX6650-2P40G-POD licenses. Enables two groups out of the three groups.</li> <li>• 6-port capacity = 3 ICX6650-2P40G-POD licenses. Enables all three groups.</li> </ul>

**TABLE 8** Licensed features and part numbers (Continued)

Product	Licensed feature or feature set	Image filename	Part numbers for software license only	Part numbers for hardware with pre-installed software license
FSX 800 and FSX 1600	IPv4 and IPv6 PREM Layer 3 for XL management modules: <ul style="list-style-type: none"> <li>• BGP4+</li> <li>• IPv6 Layer 3 forwarding</li> <li>• IPv6 over IPv4 tunnels in hardware</li> <li>• IPv6 redistribution</li> <li>• IPv6 static routes</li> <li>• RIPng</li> <li>• IPv6 VRRPv3</li> <li>• IPv6 over GRE</li> <li>• IPv6 PIM-DM<sup>2</sup></li> <li>• IPv6 PIM-SM<sup>2</sup></li> <li>• IPv6 PIM passive<sup>2</sup></li> <li>• IPv6 PIM SSM<sup>2</sup></li> <li>• IPv6 Policy-based routing<sup>2</sup></li> <li>• IPv6 over IPv4 tunnels</li> <li>• 6,000 active host routes</li> <li>• OSPF v2</li> <li>• OSPF v3</li> <li>• Anycast RP</li> <li>• BGP</li> <li>• DVMRP V2</li> <li>• IGMP V1, V2, and V3</li> <li>• ICMP redirect messages</li> <li>• IGMP V3 fast leave (for routing)</li> <li>• MSDP</li> <li>• PIM-DM</li> <li>• PIM-SM</li> <li>• PIM passive</li> <li>• PIM SSM</li> <li>• Policy-based routing</li> <li>• VRRP-E</li> <li>• GRE</li> <li>• Multicast over GRE</li> </ul>	SXLRxxxxx.bin (full Layer 3)	SX-FIL3U-6-IPV6-SW	SX-FI-ZMR-XL SX-FI-ZMR-XL-PREM6 SX-FIZMRXL6 SX-FI2XGMRXL6

**TABLE 8** Licensed features and part numbers (Continued)

Product	Licensed feature or feature set	Image filename	Part numbers for software license only	Part numbers for hardware with pre-installed software license
	<ul style="list-style-type: none"> <li>IPv4 over GRE</li> <li>Multi-VRF</li> </ul>			

1 Basic Layer 3 functionality is available in an FSX router image that does not require a license.

2 Third generation only

The following table lists the supported software packages.

**TABLE 9** Software packages

Product	Software package name	License needed?
FCX	BASE_SOFT_PACKAGE	No
	FCX_FULL_ROUTER_SOFT_PACKAGE	No
	FCX_ADV_ROUTER_SOFT_PACKAGE	Yes
ICX 6610	ICX6610_BASE_ROUTER_SOFT_PACKAGE	No
	ICX6610_PREM_ROUTER_SOFT_PACKAGE	Yes
	ICX6610_ADV_ROUTER_SOFT_PACKAGE	Yes
ICX 6450	ICX6450_BASE_ROUTER_SOFT_PACKAGE	No
	ICX6450_PREM_ROUTER_SOFT_PACKAGE	Yes
ICX 6650	ICX6650_L3_SOFT_PACKAGE	No
FSX 800, FSX 1600	BASE_SOFT_PACKAGE	No
	SX_V4_HW_BASE_L3_SOFT_PACKAGE	No <sup>1</sup>
	SX_V4_HW_ROUTER_SOFT_PACKAGE	Yes
	SX_V6_HW_BASE_L3_SOFT_PACKAGE	No <sup>1</sup>
	SX_V6_HW_ROUTER_IPV4_SOFT_PACKAGE	Yes
	SX_V6_HW_ROUTER_IPV6_SOFT_PACKAGE	Yes

1 Basic Layer 3 functionality is available in an FSX router image that does not require a license.





## Appendix B: FastIron Non-Licensed features

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This appendix lists the FastIron software images that do not require a license to run on the device.

**TABLE 10** Software image files that do not require a license

Product	Image filename
FSX 800	SXLRxxxxx.bin
FSX 1600	SXLSxxxxx.bin
FCX	FCXSxxxxx.bin (Layer 2) FCXRxxxxx.bin (Layer 3)
ICX 6610	
ICX 6430	ICX64Sxxxxx.bin (Layer 2)
ICX 6450	ICX64Rxxxxx.bin (Layer 3)
ICX 6650	ICXSxxxxx.bin ICXRxxxxx.bin

For a list of features supported with these images, refer to the release notes.

---

### NOTE

In FSX devices for software release 08.0.01, you can load an image (see table above) that does not require a license. The image contains some basic Layer 3 functionality: static route, RIP v1, RIP v2, VRRP, and VRRP-E.

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