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Fabric OS

Software Licensing Guide

Supporting Fabric OS 7.3.0

BROCADE

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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
bold text	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
bold text	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, --show WWN .
[]	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.

NOTE

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

ATTENTION

An Attention statement indicates a stronger note, for example, to alert you when traffic might be interrupted or the device might reboot.



CAUTION

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



DANGER

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

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. 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](#).

Contacting Brocade Technical Support

As a Brocade customer, you can contact Brocade Technical Support 24x7 online, by telephone, or by e-mail. Brocade OEM customers contact their OEM/Solutions provider.

Brocade customers

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

If you have purchased Brocade product support directly from Brocade, use one of the following methods to contact the Brocade Technical Assistance Center 24x7.

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

Brocade OEM customers

If you have purchased Brocade product support from a Brocade OEM/Solution Provider, contact your OEM/Solution Provider for all of your product support needs.

- OEM/Solution Providers are trained and certified by Brocade to support Brocade® products.
- Brocade provides backline support for issues that cannot be resolved by the OEM/Solution Provider.
- Brocade Supplemental Support augments your existing OEM support contract, providing direct access to Brocade expertise. For more information, contact Brocade or your OEM.
- For questions regarding service levels and response times, contact your OEM/Solution Provider.

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.
- By sending your feedback to 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.

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Supported hardware and software

In those instances in which procedures or parts of procedures documented here apply to some switches but not to others, this guide identifies exactly which switches are supported and which are not.

Although many different software and hardware configurations are tested and supported by Brocade Communications Systems, Inc. for Fabric OS v7.3.0, documenting all possible configurations and scenarios is beyond the scope of this document.

The following hardware platforms are supported by this release of Fabric OS:

- Brocade 300 switch
- Brocade 5100 switch
- Brocade 5300 switch
- Brocade 5410 embedded switch
- Brocade M5424 embedded switch
- Brocade 5430 embedded switch
- Brocade 5431 embedded switch
- Brocade 5432 embedded switch
- Brocade 5450 embedded switch
- Brocade 5460 embedded switch
- Brocade 5470 embedded switch
- Brocade 5480 embedded switch
- Brocade M6505 embedded switch
- Brocade 6505 switch
- Brocade 6510 switch
- Brocade 6520 switch
- Brocade 6547 embedded switch
- Brocade 6548 embedded switch
- Brocade 7800 extension switch
- Brocade 7840 extension switch
- Brocade VA-40FC
- Brocade Encryption Switch
- Brocade DCX Backbone and Brocade DCX-4S Backbone
 - FC8-16 port blade
 - FC8-32 port blade
 - FC8-48 port blade
 - FC8-64 port blade
 - FCOE10-24 blade
 - FS8-18 Encryption Blade
 - FX8-24 DCX Extension Blade
- Brocade DCX 8510-4 Backbone and Brocade DCX 8510-8 Backbone

What's new in this document

- FC8-32E port blade
- FC8-48E port blade
- FC8-64 port blade
- FC16-32 port blade
- FC16-48 port blade
- FC16-64 port blade
- FCOE10-24 blade (not supported on Brocade DCX 8510-4)
- FS8-18 Encryption Blade
- FX8-24 DCX Extension Blade

What's new in this document

This document supports Fabric OS 7.3.0; and the new licenses in this release include:

- WAN Rate Upgrade 1
- WAN Rate Upgrade 2

For complete information, refer to the Release Notes.

Software Licensing Overview

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Licensing overview

Feature licenses are often part of the licensed paper pack supplied with your switch software; if not, they can be purchased separately from your switch vendor, who provides the transaction keys to activate the associated feature or features. Each product, each feature, and each individual switch within a fabric requires its own license key.

Licenses may be associated with a feature version. If a feature has a version-based license, that license is valid only for a particular version of the feature. If you want a newer version of the feature, you must purchase a new license. If a license is not version-based, then it is valid for all versions of the feature. Likewise, if you downgrade Fabric OS to an earlier version, some licenses associated with specific features of the version you are downgrading may not work.

Fabric OS includes basic switch and fabric support software, and support for optionally licensed software that is enabled using license keys.

Refer to [Available Fabric OS licenses](#) on page 15 for the list of the optionally licensed features that are available in Fabric OS.

How software licensing works

A permanent license (for select features on specific units) can be ordered pre-installed in a Brocade switch when first shipped from the factory, or later ordered and installed. 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 you by Brocade as proof of purchase. The transaction key and license ID (LID) of the Brocade switch are used to generate a license key from the Brocade software licensing portal. The license key is contained within the license file, which is downloaded to your PC. You can add the license key to a switch using the **licenseAdd** command.

Once a license is installed on the Brocade Fabric OS switch, the licensed feature is generally available immediately without requiring to reboot the switch. However, some licenses may require that you reboot the switch to activate the license; the **licenseAdd** command will prompt you to reboot the switch. For the port-related licenses, use the **portEnable** command to enable a port, or disable and re-enable the switch to make all newly added ports available simultaneously.

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

License types

The following license types are supported in Fabric OS:

- Permanent license - A permanent license enables a license-controlled feature to run on the switch indefinitely.
- Temporary license - A temporary license enables a license-controlled feature to run on the switch on a temporary basis. A temporary license enables demonstration and evaluation of a licensed feature and can be valid for a period of 45 days.
- Universal temporary license - A universal temporary license can only be installed once on a switch, but can be applied to as many switches as required. Temporary use duration (the length of time the feature will be enabled on a switch) is provided with the license keys.
- Slot-based licensing - A slot-based license allows you to select the slots that the license will enable up to the capacity purchased and to increase the capacity without disrupting slots that already have licensed features running. Each licensed feature supported on the blade has a separate slot-based license key. Refer to [Slot-based licensing](#) on page 24 for more information.

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.

Obtaining a license

Use the following procedure to generate and obtain a software license.

1. Order a license for the desired licensed feature.

NOTE

To obtain a trial license, contact your Brocade representative.

2. When you receive the paperpack or electronic transaction key, retrieve the LID of your Brocade switch by entering the **licenseIdShow** command on the switch. If you received a paperpack transaction key, write the LID in the space provided on the entitlement certificate.

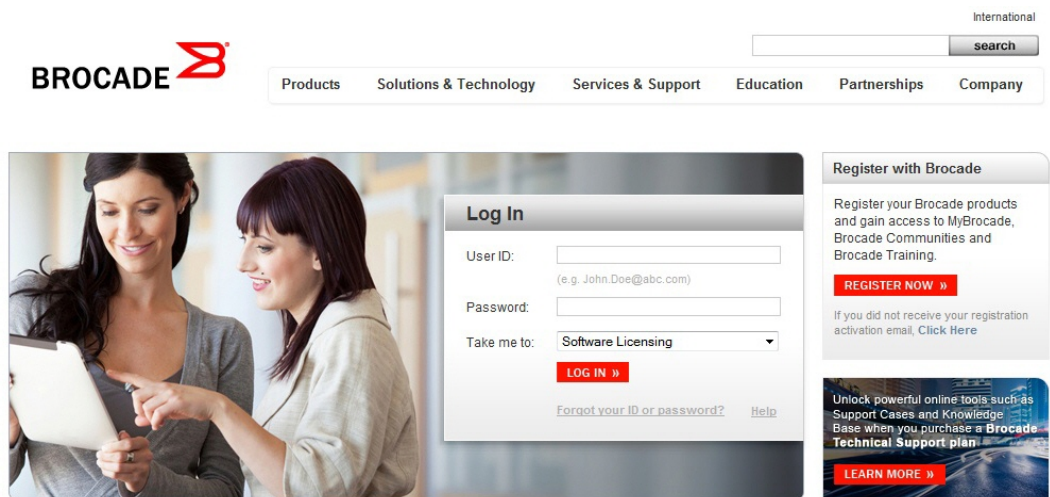
NOTE

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 licensing 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 software licensing portal login window.

FIGURE 1 Brocade software licensing portal login window



4. From the **License Management** menu, select **Brocade FOS > License Generation With Transaction Key**.

The **Brocade FOS License Generation** window displays as shown below.

FIGURE 2 Brocade FOS License Generation window

5. Enter the requested information in the required fields. An asterisk (*) next to a field indicates that the information is required.
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 results window 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.
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. Install the license on the Fabric OS switch by following the procedure in [Adding a licensed feature](#) on page 28.

Viewing software license information from the Brocade licensing portal

This section describes other software licensing tasks supported from the Brocade software licensing portal. You can use the Unit 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, select **License Management > Brocade FOS > Unit License Query**.

The **FOS Unit License Query** window appears as shown below.

FIGURE 3 License Query window

FOS Unit License Query

The screenshot shows a window titled "FOS Unit License Query". It contains three input fields: "ID Type" with a dropdown menu set to "License ID(LID)", "Unit ID", and "Transaction key". Below these fields are two buttons: "Search" and "Cancel".

- 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**.

In the **FOS Unit License Query** results window, 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.

Viewing software license information from the Brocade licensing portal

Fabric OS Licenses

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Available Fabric OS licenses

The following table lists the optionally licensed features that are available in Fabric OS.

TABLE 1 Available Brocade licenses

License	Description
10 Gigabit FCIP/ Fibre Channel (10G license)	<ul style="list-style-type: none"> • Allows 10 Gbps operation of FC ports on the Brocade 6510 or 6520 switches or the FC ports of FC16-32 or FC16-48 port blades installed on a Brocade DCX 8510 Backbone. • Enables the two 10-GbE ports on the FX8-24 extension blade when installed on the Brocade DCX, DCX-4S, DCX 8510-4, or DCX 8510-8 Backbone. • Allows selection of the following operational modes on the FX8-24 blade: <ul style="list-style-type: none"> - 10 1-GbE ports and 1 10-GbE port, or - 2 10-GbE ports • License is slot-based when applied to a Brocade Backbone. It is chassis-based when applied to a Brocade 6510 or 6520 switch.
7800 Upgrade	<ul style="list-style-type: none"> • Enables full hardware capabilities on the Brocade 7800 base switch, increasing the number of Fibre Channel ports from four to sixteen and the number of GbE ports from two to six. • Supports up to eight FCIP tunnels instead of two. • Supports advanced capabilities such as tape read/write pipelining.
<p>NOTE The Brocade 7800 switch must have the 7800 Upgrade license to add FICON Management Server (CUP) or Advanced FICON Acceleration licenses. Refer to Brocade 7800 Upgrade license on page 20 for details.</p>	

TABLE 1 Available Brocade licenses (Continued)

License	Description
Adaptive Networking with QoS	Provides a rich framework of capability, allowing a user to ensure that high-priority connections obtain the bandwidth necessary for optimum performance, even in congested environments. The QoS SID/DID Prioritization and Ingress Rate Limiting features are included in this license, and are fully available on all 8-Gb and 16-Gb platforms.
	<p>NOTE</p> <p>The Brocade 6520 does not require an Adaptive Networking with QoS license to enable the capabilities associated with this license. These capabilities are included by default on the Brocade 6520.</p>
	<p>NOTE</p> <p>This license is automatically enabled for new switches that operate with only Fabric OS 7.2.0 or later and for existing switches that are upgraded to Fabric OS 7.2.0 or later.</p>
Advanced Extension	<ul style="list-style-type: none"> • Enables two advanced extension features: FCIP Trunking and Adaptive Rate Limiting. • FCIP Trunking feature allows all of the following: <ul style="list-style-type: none"> - Multiple (up to 4) IP source and destination address pairs (defined as FCIP Circuits) using multiple (up to 4) 1-GbE or 10-GbE interfaces to provide a high bandwidth FCIP tunnel and failover resiliency. - Support for up to 4 of the following QoS classes: Class-F, high, medium and low priority, each as a TCP connection. • The Adaptive Rate Limiting feature provides a minimum bandwidth guarantee for each tunnel with full usage of available network bandwidth without any negative impact to throughput performance under high traffic load. • Available on the Brocade 7800 switch, Brocade 7840, and the Brocade DCX and DCX-4S and the Brocade DCX 8510 family for the FX8-24 on an individual slot basis, .
Advanced FICON Acceleration	<ul style="list-style-type: none"> • Allows use of specialized data management techniques and automated intelligence to accelerate FICON tape read and write and IBM Global Mirror data replication operations over distance, while maintaining the integrity of command and acknowledgment sequences. • Available on the Brocade 7800 switch, Brocade 7840, and the Brocade DCX and DCX-4S and the Brocade DCX 8510 family for the FX8-24 on an individual slot basis.
Brocade Advanced Performance Monitoring	<ul style="list-style-type: none"> • Enables performance monitoring of networked storage resources. • Includes the Top Talkers feature.
Brocade Extended Fabrics	Provides greater than 10 km of switched fabric connectivity at full bandwidth over long distances (depending on the platform, this can be up to 3000 km).
	<p>NOTE</p> <p>This license is not required for long distance connectivity using licensed 10G ports.</p>
Brocade Fabric Watch	<ul style="list-style-type: none"> • Monitors mission-critical switch operations. • Includes Port Fencing capabilities.

TABLE 1 Available Brocade licenses (Continued)

License	Description
Brocade ISL Trunking	<ul style="list-style-type: none"> Provides the ability to aggregate multiple physical links into one logical link for enhanced network performance and fault tolerance. Includes Access Gateway ISL Trunking on those products that support Access Gateway deployment.
Brocade Ports on Demand	Allows you to instantly scale the fabric by provisioning additional ports using license key upgrades.
	<p>NOTE Applies to the Brocade 300, 5100, 5300, M6505, 6505, 6510, 6520, 6547, and VA-40FC switches.</p>
DataFort Compatibility	<p>Provides ability to read, write, decrypt, and encrypt the NetApp DataFort-encrypted Disk LUNs and Tapes to all of the following:</p> <ul style="list-style-type: none"> Brocade Encryption Switch Brocade enterprise platforms with FS8-18 blade <p>Includes metadata, encryption and compression algorithms.</p>
	<p>NOTE Availability is limited. Contact your vendor for details.</p>
Encryption Performance Upgrade	Provides additional encryption bandwidth on encryption platforms. For the Brocade Encryption Switch, two Encryption Performance Upgrade licenses can be installed to enable the full available bandwidth. On a Brocade enterprise platform, a single Performance License can be installed to enable full bandwidth on all FS8-18 blades installed in the chassis.
Enhanced Group Management	Enables full management of the device in a data center fabric with deeper element management functionality and greater management task aggregation throughout the environment. This license is used in conjunction with Brocade Network Advisor application software. This license is applicable to all of the Brocade 8G and 16G FC platforms.
	<p>NOTE This license is enabled by default on all 16G FC platforms, and on DCX and DCX-4S platforms that are running Fabric OS v7.0.0 or later. This license is not included by default on 8G FC fixed port switches (300, 5100, 5300, VA-40FC, and 8G FC embedded switches).</p>

TABLE 1 Available Brocade licenses (Continued)

License	Description
Enterprise ICL	<p>Allows you to connect four or more chassis to a Brocade DCX 8510 chassis using ICLs. For each Brocade DCX 8510 chassis, you can connect up to three Brocade DCX 8510 Backbones via ICLs without this license. This license is required only on the Brocade DCX 8510 chassis that is connected to four or more Brocade DCX 8510 chassis.</p> <p>Note that this license requirement does not depend upon the total number of DCX 8510 chassis that exist in a fabric, but only on the number of chassis connected directly to a Brocade DCX 8510 via ICLs.</p> <p>You must also have an ICL POD license on each Brocade DCX 8510 to activate the ICL ports. The Enterprise ICL license only allows connection of more than four chassis using ICLs; it does not enable the ICL ports on a chassis.</p>
<p>NOTE Applies to the Brocade DCX 8510 Backbone family only.</p>	
Fabric Vision (FV)	<p>Allows you to activate the following features:</p> <ul style="list-style-type: none"> Monitoring and Alerting Policy Suite (MAPS) Flow Vision Run D_Port tests between a switch and non-Brocade HBAs <p>This license replaces the Advanced Performance Monitor (APM) and Fabric Watch (FW) licenses. If you have the Fabric Vision license, you can use Advanced Performance Monitoring and Fabric Watch features without the APM and FW licenses.</p>
FCoE	Enables Fibre Channel over Ethernet (FCoE) functions.
FICON Management Server (Also known as Control Unit Port or "CUP")	Enables host-control of switches in mainframe environments.
Full Fabric	Enables a switch to connect to a multi-switch fabric via E_Ports, forming ISL connections.
<p>NOTE This license is only required on select embedded switch models and the Brocade 300, and does not apply to other fixed-port switches or chassis-based platforms.</p>	
High Performance Extension over FCIP/FC (formerly known as "FC-IP Services")	Includes the IPsec capabilities.
ICL 8-Link	<p>Activates all eight links on ICL ports on a Brocade DCX-4S or half of the ICL bandwidth for each ICL port on the Brocade DCX platform by enabling only eight links out of the sixteen links available. This allows you to purchase half the bandwidth of DCX ICL ports initially and upgrade with an additional ICL 8-Link license to utilize the full ICL bandwidth at a later time. This license is also useful for environments that want to create ICL connections between a DCX and a DCX-4S; the latter cannot support more than eight links on an ICL port.</p> <p>Available on the Brocade DCX and DCX-4S Backbones only.</p>

TABLE 1 Available Brocade licenses (Continued)

License	Description
ICL 16-Link	<p>Activates all 16 links on ICL ports on a Brocade DCX chassis. Each chassis must have the ICL 16-Link license installed in order to enable the full 16-link ICL connections.</p> <p>Available on the Brocade DCX only.</p>
Integrated Routing	<p>Allows any ports in Brocade 5100, 5300, 6510, 6520, 6547, 7840, and VA-40FC switches, the Brocade Encryption Switch, or the Brocade DCX, DCX-4S, and DCX 8510 family platforms to be configured as an EX_Port supporting FC-FC routing.</p>
Inter-Chassis Link (1st POD)	<p>Activates half of the ICL bandwidth on a DCX 8510-8, or all the ICL bandwidth on a DCX 8510-4, allowing you to enable only the bandwidth needed, and upgrade to additional bandwidth at a later time. This license is also useful for environments that wish to create ICL connections between a DCX 8510-8 and a DCX 8510-4; the latter platform supports only half the number of ICL links that the former platform supports.</p> <p>Available on the Brocade DCX 8510 Backbones only.</p>
Inter-Chassis Link (2nd POD)	<p>Activates the remaining ICL bandwidth on the Brocade DCX 8510-8 chassis. Each chassis must have this ICL license installed in order to enable all available ICL connections.</p> <p>Available on the Brocade DCX 8510-8 only.</p>
Server Application Optimization (SAO)	<p>When deployed with Brocade server adapters, this license optimizes overall application performance for physical servers with virtual machines by extending virtual channels to the server infrastructure. Application-specific traffic flows can be configured, prioritized, and optimized throughout the entire data center infrastructure. This license is not supported on the Brocade 8000.</p>
	<p>NOTE The Brocade 6520 does not require an SAO license to enable the capabilities associated with this license. These capabilities are included by default on the Brocade 6520.</p>
	<p>NOTE This license is automatically enabled for new switches that operate with only Fabric OS 7.2.0 or later and for existing switches that are upgraded to Fabric OS 7.2.0 or later.</p>
WAN Rate Upgrade 1	<p>Provides additional WAN transmission throughput up to 10 Gbps on Brocade 7840. Without WAN Rate Upgrade 1 license, Brocade 7840 provides WAN throughput of 5 Gbps.</p> <p>Upgrade licenses do not impose restriction on the number of physical ports used as long as the aggregate bandwidth of all configured FCIP tunnels does not exceed the licensed limit.</p>
	<p>NOTE Available on the Brocade 7840 only.</p>

TABLE 1 Available Brocade licenses (Continued)

License	Description
WAN Rate Upgrade 2	<p>Provides unlimited WAN transmission throughput (other than the physical port limit) and enables two 40 GbE ports on Brocade 7840 switch. You cannot use the 40 GbE ports without the WAN Rate Upgrade 2 license.</p> <p>You must have the WAN Rate Upgrade 1 license installed to install and activate the WAN Rate Upgrade 2 license. You cannot remove the WAN Rate Upgrade 1 license before removing the WAN Rate Upgrade 2 license.</p>
<p>NOTE Available on the Brocade 7840 only.</p>	

Brocade 7800 Upgrade license

The Brocade 7800 has four Fibre Channel (FC) ports and two GbE ports active by default. The number of physical ports active on the Brocade 7800 is fixed. There is one upgrade license to activate the rest of the FC and GbE ports for a total of 16 FC ports and 6 GbE ports. The 7800 Upgrade license activates FC and GbE ports, and also activates additional features outlined in the following table.

NOTE

You must reboot the Brocade 7800 switch after installing the 7800 Upgrade license.

TABLE 2 Base to Upgrade license comparison

Feature	Base model	7800 Upgrade license
Number of Fibre Channel (FC) ports	4	16
Number of GbE ports	2	6
Number of 10-GbE ports	0	0
Number of FCIP Tunnels	2	8
Tape Pipelining over FCIP Tunnel	No	Yes

ICL licensing

Brocade ICL links operate between the core blades of the DCX 8510 Backbone family, or between the core blades of the DCX and DCX-4S Backbones. Typically, if both core blades are installed, then they are active on the DCX and DCX-4S (or DCX 8510 family) Backbones.

ICL ports on core blades of a DCX 8510-8 can be used only with an ICL (1st or 2nd) POD license. ICL ports on core blades of a DCX 8510-4 can be used only with an ICL 1st POD license.

ICL ports on core blades of a DCX can be used only with an ICL 16-link or ICL 8-link license. ICL ports on core blades of a DCX-4S can be used only with an ICL 8-link license.

After the addition or removal of a license, the license enforcement is performed on the ICL ports only when the **portDisable** and **portEnable** commands are issued on the ports. An ICL license must be installed on the enterprise platforms at both ends of the ICL connection.

ICL 1st POD license

The ICL 1st POD license activates half of the ICL bandwidth on the Brocade DCX 8510-8 platform or all of the ICL bandwidth on the Brocade DCX 8510-4.

On the Brocade DCX 8510-8, this license enables QSFP ports 0-7; QSFP ports 8-15 are disabled. (QSFP ports 0-7 correspond to core blade port numbers 0-31, and QSFP ports 8-15 correspond to core blade port numbers 32-63, as observed in **switchShow** output.)

This license allows you to purchase half the bandwidth of the Brocade DCX 8510-8 ICL ports initially and upgrade with an additional ICL license to use the full ICL bandwidth later. This license is also useful for environments with ICL connections between a Brocade DCX 8510-8 and a DCX 8510-4, as the latter supports half the bandwidth of the DCX 8510-8 on each ICL port.

This license is available on the Brocade DCX 8510-8 and DCX 8510-4 platforms only.

ICL 2nd POD license

The ICL 2nd POD license provides dedicated high-bandwidth links between two Brocade DCX 8510-8 platforms without consuming valuable front-end ports. Each Brocade DCX 8510-8 platform must have the ICL 2nd POD license installed to enable the full number of ICL connections possible.

This license is available for the Brocade DCX 8510-8 only.

ICL 8-link license

The ICL 8-link license activates half of the ICL bandwidth for each ICL port on the Brocade DCX platform by enabling only half of the ICL links available. This allows you to purchase half the bandwidth of the Brocade DCX ICL ports initially and upgrade with an additional ICL license to use the full ICL bandwidth later. This license is also useful for environments with ICL connections between a Brocade DCX and a DCX-4S, as the latter cannot support more than eight links on an ICL port.

This license is available on the Brocade DCX-4S and DCX platforms only.

ICL 16-link license

The ICL 16-link license provides dedicated high-bandwidth links between two Brocade DCX chassis, without consuming valuable front-end ports. Each Brocade DCX chassis must have the ICL 16-link license installed in order to enable the full number of ICL connections possible (16 links in the case of a DCX chassis).

This license is available for the Brocade DCX only.

Enterprise ICL license

The Enterprise ICL (EICL) license allows you to connect four or more Brocade DCX 8510 Backbones through ICLs. This license is available on the Brocade DCX 8510-8 and DCX 8510-4 platforms only.

The EICL license is required in addition to the ICL POD license.

The following requirements apply:

- Connection of three or fewer DCX 8510 Backbones with ICLs does not require the EICL license. However, EICL license is required on a Brocade DCX 8510 chassis when that chassis is connected to four or more DCX 8510 Backbones via ICLs.
- With the EICL license installed, a maximum of 10 chassis are allowed to be connected together via ICLs.
- When Virtual Fabrics are used, the limit on the number of chassis connected together via ICLs depends only on the physical chassis and not on the logical switches.
- If the maximum number of ICL-connected chassis exceeds the allowed limit with or without the EICL license, additional links may either be disabled or segmented. The disabling or segmenting reason code depends on whether the EICL license is installed.
- If ICL links to a chassis become segmented for non-EICL-related reasons, these links are part of the fabric, and the chassis containing these segmented links is included in the maximum chassis count. If the maximum chassis count (with or without the EICL license) is reached with these segmented links, then any additional links will become segmented. Therefore, to add additional links, you first must disable the links that became segmented due to non-EICL reasons. This should reduce the maximum chassis count and allow the new links to join.

Example: switchShow output if no Enterprise ICL license is installed

A message such as the following is displayed if a required EICL license is not installed:

```
440    8    24    -----    id    16G        Online        FC    E-Port    segmented,
10:00:00:05:33:0d:52:00 (No EICL License) (Trunk master)
441    8    25    -----    id    16G        Online        FC    E-Port    segmented,
10:00:00:05:33:0d:52:00 (No EICL License) (Trunk master)
```

Example: switchShow output if maximum number of chassis is reached

A message such as the following is displayed if the maximum number of supported chassis is reached:

```
384    5    0    -----    id    16G        Online        FC    E-Port    segmented,
10:00:00:05:1e:39:bf:9a (EICL License Limited) (Trunk master)
385    5    1    -----    id    16G        Online        FC    E-Port    segmented,
10:00:00:05:1e:39:bf:9a (EICL License Limited) (Trunk master)
```

8G licensing

ATTENTION

The 8G license is installed by default and you should not remove it. Port operation may become disrupted, and ports may be prevented from operating at 8 Gbps when the license is removed.

The 8G license applies to the Brocade 300, 5100, 5300, and VA-40FC switches and the 8 Gbps embedded switches; this license does *not* apply to the Brocade 6505, 6510, or 6520.

The following list describes the basic rules of using, adding, or removing 8G licenses:

- Without an 8G license, even if there is an 8 Gbps SFP plugged into a port in an applicable platform, the port would be enabled to run at a maximum speed of 4 Gbps.
- To obtain an 8G license, only the license ID from the switch is required. When you add the 8G license, you must enter either the **portDisable** and **portEnable** commands on each individual

port on the switch, or the **switchDisable** and **switchEnable** commands on the switch, to enable 8 Gbps features.

- When you remove the 8G license, the ports that are online and already running at 8 Gbps are not disturbed until the port goes offline or the switch is rebooted. The switch ports return to their pre-licensed state maximum speed of 4 Gbps.

10G licensing

The 10 Gbps FCIP/Fibre Channel license (10G license) enables the following features:

- 10 Gbps access on the 16-Gbps FC ports on Brocade 6510 or 6520 switches, and FC16-32 and FC16-48 port blades.
- The two 10-GbE ports on the FX8-24 extension blade.

This 10G license is applied as a slot-based license on the FC16-32 and FC16-48 port blades and on the FX8-24 extension blade; generic rules for adding slot-based licenses apply, as described in [Slot-based licensing](#) on page 24. When this license is applied to a Brocade 6510 or 6520 switch, it is applied to the whole chassis.

Whether you have a bladed (DCX, DCX-4S, DCX 8510-8, or DCX 8510-4) platform or nonbladed (Brocade 6510 or 6520) switch, you add the 10G license to the chassis using the **licenseAdd** command, as for any license.

For the bladed platforms, you can either allow automatic license assignment, or choose the blades you want the licenses assigned to manually, as for any slot-based license. Automatic assignment is done sequentially by slot number, beginning with the lowest numbered slot with an enabled blade that supports this feature (FX8-24, FC16-32, or FC16-48 blade), and that does not already have the license applied. If the automatic license assignment does not match your needs, you can use the **licenseSlotCfg --remove** and **licenseSlotCfg --add** commands to remove the license manually from a slot and assign it to a different slot with an FX8-24, FC16-32, or FC16-48 blade.

The same multiple slot-based 10G license can be applied to a mixture of 16-Gbps blades and FX8-24 blades. For example, if you have a 10G license for two-slot capacity, and you have an FX8-24 blade in one slot and an FC16-48 blade in a second slot, then the same license can activate the 10GE ports on the FX8-24 blade and enable 10 Gbps operation on the 10-Gbps FC ports on the FC16-48 blade.

After applying a 10G license to the Brocade 6510 or 6520 chassis or to a 16-Gbps FC blade, you must also configure the port octet (**portCfgOctetSpeedCombo** command) with the correct port octet speed group and configure each port to operate at 10 Gbps (**portCfgSpeed** command). It is necessary to configure the port octet because only certain combinations of port speeds are allowed within the port octet. No license is required for the octet group. If the speed configuration operation succeeds and a 10G-capable SFP is inserted in the port connector, the port will allow operation at 10 Gbps when the link becomes active at that speed.

Before removing a 10G license from an entire platform (**licenseRemove** command) or from a specific blade (**licenseSlotCfg --remove** command), you must first deconfigure all affected FC ports to no longer operate at 10 Gbps.

NOTE

An FC port that is operating at 10 Gbps FC speed on a 16-Gbps FC blade or 16-Gbps FC switch does not need an Extended Fabrics license to be used for FC long distance connectivity. FC ports licensed and configured to operate at 10 Gbps on a Brocade 6510 or 6520 switch or 16-Gbps FC port blade cannot interoperate with 10-Gbps FC ports on the M-6140 platform or the FC10-6 blade. The new FC ports use different protocols and physical connections.

Slot-based licensing

Slot-based licensing is used on the Brocade DCX and DCX 8510 Backbone families to support the FX8-24 blade, and on the Brocade DCX 8510 Backbone family to support the 16-Gbps FC port blades (FC16-24, FC16-48, and FC16-64). Slot-based licensing is used for the WAN Rate Upgrade 1 and WAN Rate Upgrade 2 features on the Brocade 7840. Brocade 7840 has only a single slot that can be licensed. License capacity is equal to the number of slots.

Slot-based licenses allow you to select the slots that the license will enable up to the capacity purchased and to increase the capacity without disrupting slots that already have licensed features running. Each slot-based license key is for a single feature.

Features utilizing slot-based licenses on the FX8-24 blade include:

- 10 Gigabit FCIP/Fibre Channel
- Advanced Extension
- Advanced FICON Acceleration

NOTE

The 10 GbE feature on the FX8-24 blade and the 10 Gbps FC feature on the 16-Gbps FC blades are both enabled by the same 10 Gigabit FCIP/Fibre Channel license (10G license). This license can also enable the 10 Gbps FC feature on a Brocade 6510 or 6520 switch as a chassis-based license.

Any unassigned slot-based license will be automatically assigned to applicable blades that are detected in the chassis when the license is installed. If you have more applicable blades than available license capacity, then you can manually assign or re-assign the licenses as necessary.

Once a license is assigned to a slot, whether it has been automatically assigned or manually assigned, the assignment will remain until you manually reassign the license to another slot. This design allows for various maintenance operations to occur without having the license move around to other slots.

The 10 Gigabit FCIP/Fibre Channel, Advanced Extension, Advanced FICON Acceleration, WAN Rate Upgrade 1, and WAN Rate Upgrade 2 are slot-based features. After running the **configDefault** command, you must explicitly remove and add these slot-based licenses for the license slot assignment to be activated on a non-DCX platform.

On the Brocade 7840 switch, you can configure IP interfaces on 40-GbE ports (GE0 or GE1) only when both WAN Rate Upgrade 1 and WAN Rate Upgrade 2 licenses are installed.

Upgrade and downgrade considerations

When a slot-based license is present on the switch, firmware downgrade to pre-Fabric OS v6.3.0 is allowed, but the slot-based features that were licensed will not be functional.

On upgrade to Fabric OS v7.0.0 or later, any slot-based license that displayed the 10-GbE feature name in the earlier release now appears as "10 Gigabit FCIP/Fibre Channel (FTR_10G) license."

Temporary licenses

A temporary license applies a "try-before-you-buy" approach to certain features so that you can experience the feature and its capabilities prior to buying the license. Once you have installed the

license, you are given a time limit to use the feature. A temporary license can be either a regular temporary license or a universal temporary license.

- A regular temporary license is available on a per-switch basis.
- A universal temporary license can be installed on a switch, but can be applied to multiple switches.

The following licenses are available as temporary or universal temporary licenses:

- 10 Gigabit FCIP/Fibre Channel license (slot-based)
- Adaptive Networking License (deprecated from Fabric OS v7.2.0)
- Advanced Extension license (slot-based)
- Advanced FICON Acceleration license (slot-based)
- Advanced Performance Monitoring license
- Enterprise ICL license
- Fabric (E_Port) license
- Fabric Watch license
- FICON Management Server (CUP) license
- Full Fabric license
- High Performance Extension over FCIP/FC license
- Integrated Routing license
- ISL Trunking license
- Server Application Optimization license (deprecated from Fabric OS v7.2.0)
- WAN Rate Upgrade 1 license
- WAN Rate Upgrade 2 license

NOTE

To obtain a trial license, contact your Brocade representative.

Restrictions on upgrading temporary slot-based licenses

If the capacity of the permanent license is equal to or greater than the capacity of the temporary license and you use the same slot assignments, then replacing the temporary license with a permanent license is non-disruptive. If either condition changes, however, then the process is disruptive.

If the permanent license is for fewer slots than the temporary license and does not match the above criteria, you must do the following:

1. Remove the temporary license. The removal process disables the feature.
2. Install the permanent license on the appropriate slots.
3. If the permanent license is for different slots than the temporary license, you must do the following:
 - a) Install the permanent license. The temporary license is automatically replaced on the original slots.
 - b) Deconfigure the application that uses the licensed feature on the original slots.
 - c) Remove the license from the original slots using the `licenseSlotCfg -remove` command.
 - d) Add the license to the new slots using the `licenseSlotCfg -add` command.

Date change restriction

Once the temporary license is installed, you cannot change the time of the switch until the temporary license is removed. To change the time, you must remove the license, change the date and time, and then re-install the license on the switch.



CAUTION

If you are using NTP to synchronize the time between your network devices, including switches or Backbones, then do not attempt to change the system date and time when a temporary license is installed.

Configupload and download considerations

The **configDownload** and **configUpload** commands download the legacy, enhanced, consumed capacities, and temporary licenses.

Expired licenses

Once a temporary license has expired, you can view it through the **licenseShow** command. Expired licenses have an output string of "License has expired". RASlog warning messages are generated every hour for licenses present in the database which have expired or are going to expire in the next five days. An expired license may become unusable after a reboot, failover, firmware download, or a port or switch disable or enable operation.

Universal temporary licenses

Universal temporary license keys include a duration period. Once installed on a switch, an expiration date is calculated and the duration is decremented until there is no remaining time, at which point it is expired. Because of this, universal temporary licenses should not be installed on a switch until you are ready to use or test the feature, so as not to unnecessarily consume a portion of the temporary-use duration.

The expiration date is based on the system time at the installation of the license plus the number of days for which the universal temporary license is valid. Universal temporary licenses cannot be removed and reinstalled on the same switch.

Universal temporary licenses are always retained in the license database on the product even though they can be explicitly deleted from any user interface.

Extending a universal temporary license

Extending a universal temporary license is done by adding a temporary license with an expiry date after the universal temporary license expiry date, or by adding a permanent license. Re-applying an existing universal temporary license is not allowed.

Universal temporary license shelf life

All universal temporary licenses are encoded with a "shelf life" expiration date. Once this date is reached, the temporary licensed feature can no longer be used on the switch.

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 Fabric OS switch.

TABLE 3 Configuration tasks for software licensing

Configuration task	Reference
1. Order the desired license.	For a list of available licenses, refer to Available Fabric OS licenses on page 15.
NOTE To obtain a trial license, contact your Brocade representative.	
2. When you receive the transaction key, retrieve the LID of the Brocade switch. If you received the transaction key by way of paperpack, record the LID on the entitlement certificate in the space provided.	Viewing the license ID using a Telnet session on page 33
3. Log in to the Brocade software portal to generate and obtain the license key.	Obtaining a license on page 10
4. Install the license on the switch.	Adding a licensed feature on page 28
5. Verify that the license is installed.	Viewing licenses installed on a switch on page 32

Licensing commands

The following table summarizes the Fabric OS CLI commands that can be used for licensed feature management. For detailed information on these commands, refer to the *Fabric OS Command Reference*.

TABLE 4 Fabric OS commands related to licensing

Command	Description
licenseAdd	Adds a license to the switch. The license key is case-sensitive and must be entered exactly.
licenseIdShow	Displays the license ID of the system.
licensePort	Manages and displays Dynamic Ports on Demand (DPOD) license assignments.
licenseRemove	Removes a license from the switch.
licenseShow	Displays current license keys, along with a list of licensed products enabled by these keys.
licenseSlotCfg	Configures and manages licenses for the Brocade FX8-24 extension blade on the slot where the blade is installed.

Adding a licensed feature

NOTE

Enabling a feature on a switch may be a separate task from adding the license. Refer to the *Fabric OS Administrator's Guide* for information on enabling a feature.

For the Brocade Backbones, licenses are effective on both control processor (CP) blades, but are valid only when the CP blade is inserted into a Backbone that has an appropriate license ID stored in the WWN card. If a CP is moved from one Backbone to another, the license works in the new Backbone only if the WWN card is the same in the new Backbone. Otherwise, you must transfer licenses from the old platform to the new platform by obtaining new licenses for the previously licensed features using the new license ID.

For example, if you swap one CP blade at a time, or replace a single CP blade, then the existing CP blade (the active CP blade) propagates the licenses to the new CP blade if the WWN card has been moved to the new platform.

If you move a standby CP from one Backbone to another, then the active CP will propagate its configuration (including license keys) onto that standby CP.

Use the following procedure to add a licensed feature.

1. Connect to the switch and log in using an account with admin permissions.
2. Activate the license using the **licenseAdd** *license_key* command.
3. Verify the license was added by entering the **licenseShow** command. The licensed features currently installed on the switch are listed. If the feature is not listed, enter the **licenseAdd** command again.

Some features may require additional configuration, or you may need to disable and re-enable the switch to make them operational; refer to the feature documentation in *Fabric OS Administrator's Guide* for details.

```
switch:admin> licenseshow
aAYtMJg7tmMZrTZ9JTWBC4SXWLJMY3QfBJYHG:
  Fabric license
  Remote Switch license
  Remote Fabric license
  Extended Fabric license
  Entry Fabric license
  Fabric Watch license
  Performance Monitor license
  Trunking license
  4 Domain Fabric license
  FICON CUP license
  High-Performance Extension over FCIP/FC license
  Full Ports on Demand license - additional 16 port upgrade license
  2 Domain Fabric license
  Integrated Routing license
  Storage Application Services license
  FICON Tape license
  FICON XRC license
  Inter Chassis Link license
  Enhanced Group Management license
  8 Gig FC license
  DataFort Compatibility license
```

Activating a slot-based licensed feature

Use the following procedure to activate a slot-based licensed feature:

1. Install a slot-based license on the platform with sufficient slot count for the number of slots upon which you plan to activate the feature.
2. Configure slots so that the licensed feature is assigned to slots. No more slots can be configured than specified in the license.
3. Configure the application that uses the licensed feature on the blade in the slot. This operation verifies that the previous two steps have been successfully completed.

Once these steps are complete, the feature will work on the blade.

Assigning a license to a slot

Use the following procedure to assign a license to a slot.

1. Connect to the switch and log in using an account with admin permissions, or an account with OM permissions in the license class of RBAC commands.
2. Enter the **licenseSlotCfg --add** command to add the license to the appropriate slot.

Assigning 10G licenses

This section describes the procedures to assign 10G licenses.

Enabling 10 Gbps operation on an FC port

Use the following procedure to enable 10 Gbps operation on an FC port on a Brocade 6510 or 6520 switch or an FC16-32 or FC16-48 blade:

1. Connect to the switch and log in using an account with admin permissions, or an account with OM permissions for the license and SwitchPortConfiguration classes of RBAC commands.
2. Use the **licenseAdd** command to add the 10G license.
3. Use the **licenseShow** command to verify the license.

Bladed platforms only: If the results of the automatic license assignment are not what you intended, use the **licenseSlotCfg** command to reassign the license to the desired blades.

4. Use the **portCfgOctetSpeedCombo** command to set the combination speed for the port octet to a setting that supports 10 Gbps operations. Valid settings for 10 Gbps operations include:
 - **2** - Auto-negotiated or fixed port speeds of 10 Gbps, 8 Gbps, 4 Gbps, and 2 Gbps
 - **3** - Auto-negotiated or fixed port speeds of 16 Gbps and 10 Gbps
5. Use the **portCfgSpeed** command to set the port speed on each port you want to operate at 10 Gbps.

This example assigns a license to slot 4 on a DCX 8510-8 Backbone and enables 10 Gbps operation on port 2 of the port blade in that slot. In this example, the 10G license was first automatically assigned to slot 1.

```
8510-8switch:admin> licenseadd aTFPNFXGLmABANMGtT4LfSBJSDDLWTYD3EFrr4WGAEMBA
8510-8switch:admin> licenseshow
aTFPNFXGLmABANMGtT4LfSBJSDDLWTYD3EFrr4WGAEMBA
  10 Gigabit FCIP/Fibre Channel (FTR_10G) license
  Capacity 1
  Consumed 1
  Configured Blade Slots 1
8510-8switch:admin> licenseslotcfg -remove FTR_10G 1
8510-8switch:admin> licenseslotcfg -add FTR_10G 4
8510-8switch:admin> licenseshow
aTFPNFXGLmABANMGtT4LfSBJSDDLWTYD3EFrr4WGAEMBA
  10 Gigabit FCIP/Fibre Channel (FTR_10G) license
  Capacity 1
  Consumed 1
  Configured Blade Slots 4
8510-8switch:admin> portcfgoctetspeedcombo 4/2 2
8510-8switch:admin> portcfgspeed 4/2 10
8510-8switch:admin>
```

This example assigns a license to a Brocade 6510 switch and enables 10 Gbps operation on port 2.

```
6510-switch:admin> licenseadd aTFPNFXGLmABANMGtT4LfSBJSDDLWTYD3EFrr4WGAEMBA
6510-switch:admin> licenseshow
aTFPNFXGLmABANMGtT4LfSBJSDDLWTYD3EFrr4WGAEMBA
  10 Gigabit FCIP/Fibre Channel (FTR_10G) license
  Capacity 1
  Consumed 1
6510-switch:admin> portcfgoctetspeedcombo 2 2
6510-switch:admin> portcfgspeed 2 10
```

Enabling the 10-GbE ports on an FX8-24 blade

Use the following procedure to enable the 10-GbE ports on an FX8-24 blade:

1. Connect to the Brocade Backbone and log in using an account with admin permissions, or an account with OM permissions for the license class of RBAC commands.
2. Use the **licenseAdd** command to add the 10G license.

3. Use the **licenseShow** command to check the results of automatic license assignment. If the results are not what you intended, use the **licenseSlotCfg** command to reassign the license to the desired FX8-24 blades.
4. Use the **licenseShow** command to verify the license.
5. Use the **bladeCfgGeMode --set** command to configure the GbE port mode for the FX8-24 blade.

```
bladecfggemode --set mode -slot slot
```

To enable the 10-GbE ports, set the mode to one of the following:

- **10g** - Enables both 10-GbE ports, disables all ten 1-GbE ports.
- **dual** - Enables the xge0 port (but not xge1) and also enables all ten 1-GbE ports.

This example assigns a license to slot 7 on a DCX 8510-4 Backbone and enables both 10-GbE ports on the FX8-24 blade in that slot. In this example, the license was first automatically assigned to slot 1.

```
8510-4switch:admin> licenseadd aTFPNFXGLmABANMGtT4LfSBJSDDLWTYD3EFrr4WGAEMBA
8510-4switch:admin> licenseshow
aTFPNFXGLmABANMGtT4LfSBJSDDLWTYD3EFrr4WGAEMBA
  10 Gigabit FCIP/Fibre Channel (FTR_10G) license
  Capacity 1
  Consumed 1
  Configured Blade Slots 1
8510-4switch:admin> licenseslotcfg -remove FTR_10G 1
8510-4switch:admin> licenseslotcfg -add FTR_10G 7
8510-4switch:admin> licenseshow
aTFPNFXGLmABANMGtT4LfSBJSDDLWTYD3EFrr4WGAEMBA
  10 Gigabit FCIP/Fibre Channel (FTR_10G) license
  Capacity 1
  Consumed 1
  Configured Blade Slots 7
8510-4switch:admin> bladecfggemode --set 10G -slot 7
8510-4switch:admin> switchshow -slot 7
...
158   7   30   019e00  --   --   Offline   VE
159   7   31   019f00  --   --   Offline   VE
      7   ge0   --   1G   No_Module FCIP   Disabled (10G Mode)
      7   ge1   --   1G   No_Module FCIP   Disabled (10G Mode)
      7   ge2   --   1G   No_Module FCIP   Disabled (10G Mode)
      7   ge3   --   1G   No_Module FCIP   Disabled (10G Mode)
      7   ge4   --   1G   No_Module FCIP   Disabled (10G Mode)
      7   ge5   --   1G   No_Module FCIP   Disabled (10G Mode)
      7   ge6   --   1G   No_Module FCIP   Disabled (10G Mode)
      7   ge7   --   1G   No_Module FCIP   Disabled (10G Mode)
      7   ge8   --   1G   No_Module FCIP   Disabled (10G Mode)
      7   ge9   --   1G   No_Module FCIP   Disabled (10G Mode)
      7   xge0  --   10G  No_Module FCIP
      7   xge1  --   10G  No_Module FCIP
```

Removing software licenses

This section describes the procedures to remove the software licenses.

Removing a licensed feature

Use the following procedure to remove a licensed feature.

1. Connect to the switch and log in using an account with admin permissions.
2. Enter the **licenseShow** command to display the active licenses.
3. Remove the license key using the **licenseRemove** command.

The license key is case-sensitive and must be entered exactly as given. The quotation marks are optional. After removing a license key, the licensed feature is disabled when the switch is rebooted or when a switch disable and enable is performed.

4. Enter the **licenseShow** command to verify the license is disabled.

```
switch:admin> licenseshow  
  
bQebzbRdScRfc0iK:  
    Entry Fabric license  
    Fabric Watch license  
SybbzQQ9edTzcc0X:  
    Fabric license  
switch:admin> licenseremove "bQebzbRdScRfc0iK"  
removing license key "bQebzbRdScRfc0iK"
```

Entering the **licenseShow** command after the **licenseRemove** command displays the remaining licenses.

```
switch:admin> licenseshow  
SybbzQQ9edTzcc0X:  
    Fabric license
```

If there are no license keys, **licenseShow** displays "No licenses."

Removing a license from a slot

Use the following procedure to remove a slot-based license from a blade slot.

1. Connect to the switch and log in using an account with admin permissions, or an account with OM permissions in the license class of RBAC commands.
2. Deconfigure the application that uses the licensed feature on the blade slot.
3. Enter the **licenseSlotCfg --remove** command to remove the license from the slot.

Removing an expired license



CAUTION

This procedure is disruptive to the switch.

Use the following procedure to remove an expired license.

1. Connect to the switch and log in using an account with admin permissions.
2. Enter the **reboot** command for the expiry to take affect.

Viewing information about software licenses

This section describes the procedures used to view the installed licenses. You can also view information about software licenses from the Brocade software portal.

Viewing licenses installed on a switch

Use the following procedure to view all installed licenses.

1. Connect to the switch and log in using an account with admin permissions.
2. Enter the **licenseShow** command.

```
switch:admin> licenseshow
bQebzbRdScRfc0iK:
    Entry Fabric license
    Fabric Watch license
SybbzQQ9edTzcc0X:
    Fabric license
gFEfTam4YHDLGXZBZ7RHHMBGmrrS3aNWgANKggEAGAJB:
    WAN Rate Upgrade 1 license
ARSNJE4GC9aJ4Y7FrBgYaEWBfKK3EMRFHSBhtHAEERB:
    WAN Rate Upgrade 2 license
```

Save the output to a text file in a secure location. If licenses are lost or removed from the switch, you can use the saved output to recover or add the lost licenses.

Some licenses may display with the text “Obsolete license.” This happens because of changes in licensing requirements of some features that no longer require a license key, yet are still installed on a switch.

Viewing the license ID using a Telnet session

Use the following procedure to view the license ID using Telnet.

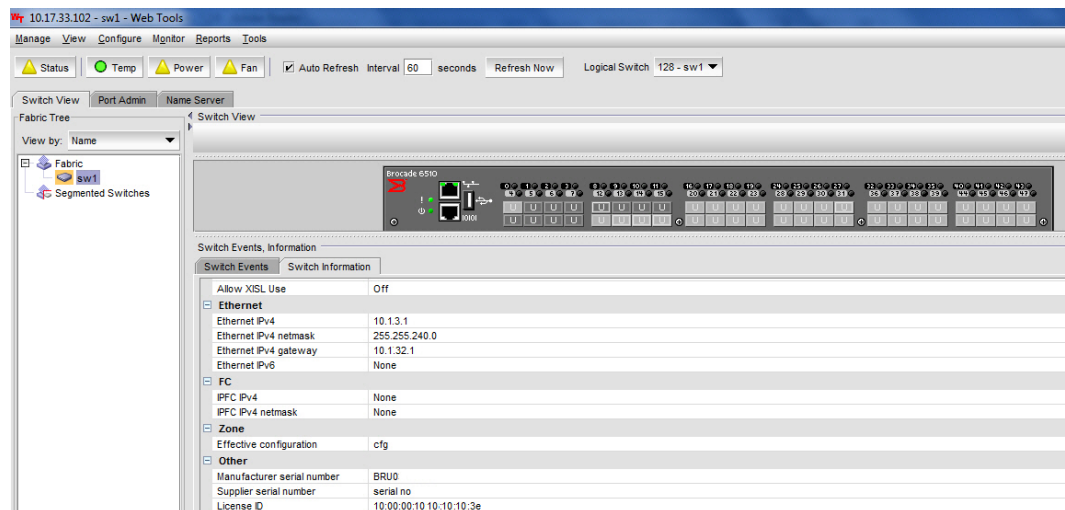
1. Connect to the switch and log in using an account with admin permissions.
2. Enter the **licenseIdShow** command.

```
switch:admin> licenseidshow
a4:f8:69:33:22:00:ea:18
```

Viewing the license ID using Web Tools

1. Connect to the switch using a Web browser, and this will open the Web Tools.
2. Log in as admin and enter your switch password. The License ID value is shown in the **Switch Information** tab for the switch.

FIGURE 4 Switch Information tab



Troubleshooting licensing issues

Some features require licenses in order to work properly. To view a list of features and their associated licenses, refer to [License Requirements for Features](#) on page 47. Licenses are created using a switch license identifier (LID), so you cannot apply one license to different switches. Before calling your switch support provider, verify that you have the correct licenses installed by using the **licenseShow** command.

1. Connect to the switch and log in using an account with admin permissions.
2. Enter the **licenseShow** command to determine if the appropriate licenses are installed on the local switch and any connecting switches.

A list of the currently installed licenses on the switch is displayed. If the license is not listed, install the license using the **licenseAdd** command.

Activating or removing licenses using Web Tools

A Web Tools license is not required, and a basic version of Web Tools is available for free. Additional functionality may be added by obtaining the Enhanced Group Management (EGM) license. The EGM license is only for 8 Gbps platforms, such as the Encryption Switch, and the 300, 5100, and 5300 switches. For non-8 Gbps platforms, all functionalities are available without the EGM license. For information about the Web Tools features that require the EGM license, refer to the *Web Tools Administrator's Guide*.

The licensed features currently installed on the switch are listed in the **License** tab of the **Switch Administration** window. For time-based licenses, the expiry date is included. Right-click a license key to export data, copy data, or search the table.

Activating a license on a switch

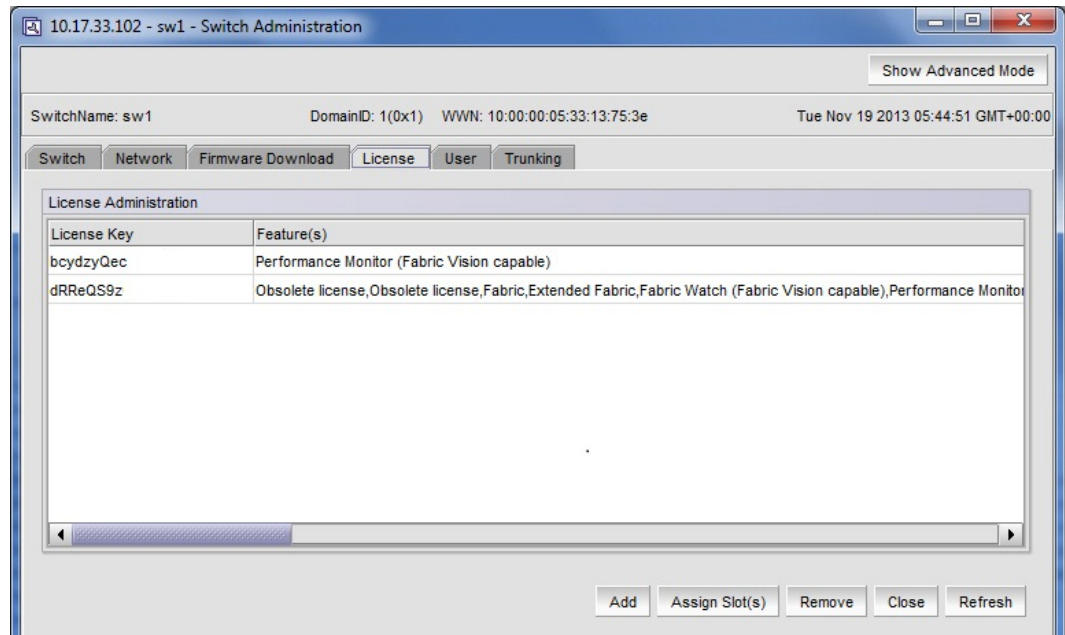
Before you can unlock a licensed feature, you must obtain a license key. Refer to [Obtaining a license](#) on page 10 for instructions on how to obtain a license key at the Brocade website.

To activate a license, perform the following steps.

1. Click **Configure** > Switch Admin to open the **Switch Administration** window.

The **Switch Administration** window displays.

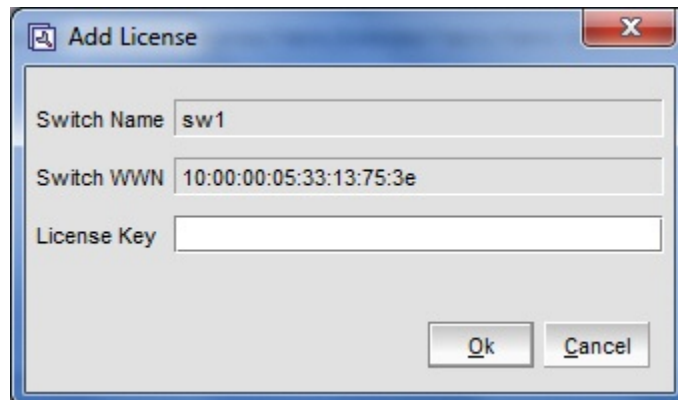
FIGURE 5 Switch Administration window



2. Select the **License** tab and click **Add**.

The **Add License** dialog box displays.

FIGURE 6 Add License dialog box



3. Paste or enter a license key in the **License Key** field and click **Ok**.
4. Click **Refresh** to display the new licenses in the **License** tab.

If the feature is listed, the licensed feature is installed and immediately available. When you enable some licenses, such as ISL Trunking, you may need to change the state of the port to enable the feature on the link. Some licenses, such as the Trunking or Brocade 7800 Upgrade license do not take effect until the switch is restarted.

Assigning slots for a license key

This feature allows you to increase the capacity without disrupting the slots that already have licensed features running.

NOTE

You can enable slot-based licenses only on 10 Gigabit Ethernet (FTR_10G), Advanced Extension (FTR_AE), and Advanced FICON Acceleration (FTR_AFA) features.

Use the following procedure to assign slots for a license key.

1. Click **Configure > Switch Admin** to open the **Switch Administration** window.
2. Select the **License** tab.
3. Select the license key for which you want to assign slots from the **License Administration** table.
4. Click **Assign Slot(s)**.
The **Assign Slots** window displays.
5. Select the slots you want to assign.
6. Click **OK**.

Removing a license from a switch

To remove a license from a switch in the **Switch Administration** window, perform the following steps.

ATTENTION

Use care when removing licenses. If you remove a license for a feature, that feature no longer works.

1. Click **Configure > Switch Admin** to open the **Switch Administration** window.
2. Select the **License** tab.
3. Select the license key you want to remove.
4. Click **Remove**.

Ports on Demand Licensing

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Ports on Demand overview

The Brocade models in the following list can be purchased with the number of licensed ports indicated. As your needs increase, you can activate unlicensed ports up to a device-constrained maximum by purchasing and installing the optional Ports on Demand licensed product.

- Brocade 300 - Can be purchased with 8 ports and no E_Port, 8 ports with full fabric access, or 16 ports with full fabric access. A maximum of 16 ports is allowed; 8-port systems can be upgraded in 4-port increments. An E_Port license upgrade is also available for purchase.
- Brocade 5100 - Can be purchased with 24, 32, or 40 licensed ports. A maximum of 40 ports is allowed.
- Brocade 5300 - Can be purchased with 48, 64, or 80 licensed ports. A maximum of 80 ports is allowed.
- Brocade M6505 - Can be purchased with 12 or 24 licensed ports. A maximum of 24 ports is allowed.
- Brocade 6505 - Can be purchased with 12 or 24 licensed ports. A maximum of 24 ports is allowed.
- Brocade 6510 - Can be purchased with 24, 36, or 48 licensed ports. A maximum of 48 ports is allowed.
- Brocade 6520 - Can be purchased with 48, 72, or 96 licensed ports. A maximum of 96 ports is allowed.
- Brocade 6547 - Can be purchased with 12, 24, or 48 licensed ports. A maximum of 48 ports is allowed.
- Brocade 6548 - Can be purchased with 16, 22, or 28 licensed ports. A maximum of 28 ports is allowed.
- Brocade VA-40FC - Can be purchased with 24, 32, or 40 licensed ports. A maximum of 40 ports is allowed.

ATTENTION

Licenses are not interchangeable between units. For example, if you bought a POD license for a Brocade 300, you cannot use that license on a Brocade 5100 or VA-40FC. The licenses are based on the switch License Identifiers and are not interchangeable.

The following table shows the ports that are enabled by default and the ports that can be enabled after you install the first and second Ports on Demand licenses for each switch type.

TABLE 5 List of available user ports when implementing PODs

Platform	Available user ports, No POD license	Available user ports, POD1 or POD2 present	Available user ports, Both POD licenses present
Brocade 300	0-7	0-15	0-23
Brocade 5100	0-23	0-31	0-39
Brocade 5300	0-47	0-63	0-79
Brocade 5410	0-11	N/A	N/A
Brocade M5424	1-8 and 17-20	POD1: 0, 9-16, and 21-23	0-23
Brocade 5450	1-10 and 19-22	POD1: 0, 11-18, and 23-25	0-25
Brocade 5480	1-8 and 17-20	POD1: 9-12 and 21-22 POD2: 0, 13-16, and 23	0-23
Brocade M6505	1-8 and 17-20	0-23	N/A
Brocade 6505	0-11	POD 1: 0-23	N/A
Brocade 6510	0-23	0-35	0-47
Brocade 6520	0-47	0-71	0-95
Brocade 6547	0-8 and 29-31	POD1: 0-14 and 29-37 POD2: 0-8, 15-31, and 39-47	0-47
Brocade 6548	1-10 and 17-22	POD1: 11-13 and 23-25 POD2: 0, 14-16, and 26-27	0-27
Brocade VA-40FC	0-23	0-31	0-39

Ports on Demand is ready to be unlocked in the switch firmware. Its license key may be part of the licensed paperpack supplied with switch software, or you can purchase the license key separately from your switch vendor. You may need to generate a license key from a transaction key supplied with your purchase. Refer to [Obtaining a license](#) on page 10 for instructions to generate the license key.

Each Ports on Demand license activates the next group of ports in numerical order in either 4-port or 8- or 12-port increments, depending on the model. Before installing a license key, you must insert transceivers in the ports to be activated. Remember to insert the transceivers in the lowest group of inactive port numbers first. For example, if only 16 ports are currently active and you are installing one Ports on Demand license key, make sure to insert the transceivers in ports 16 through 23. If you later install a second license key, insert the transceivers in ports 24 through 31. For details on inserting transceivers, see the switch's hardware reference manual.

Activating Ports on Demand using a Telnet session

Use the following procedure to activate Ports on Demand.

1. Connect to the switch and log in using an account with admin permissions.
2. Verify the current states of the ports using the **portShow** command.

In the **portShow** output, the Licensed field indicates whether the port is licensed.

3. Install the Brocade Ports on Demand license.

For instructions on how to install a license, refer to [Adding a licensed feature](#) on page 28.

4. Use the **portEnable** command to enable the ports.

Alternatively, you can disable and re-enable the switch to activate ports.

5. Use the **portShow** command to check the newly activated ports.

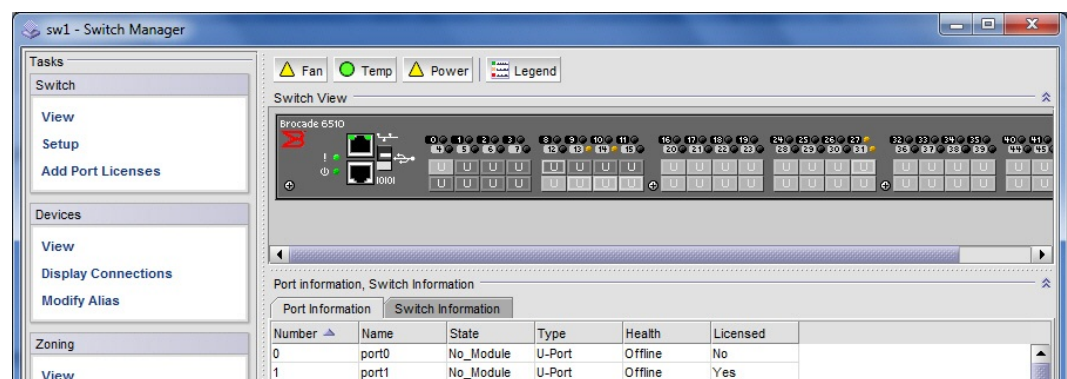
Activating Ports on Demand using EZSwitchSetup

EZSwitchSetup Switch Manager allows you to enable Ports on Demand (POD) if you have a license available. For the Brocade 7800, you can add the 7800 Upgrade License to activate ports 4 through 25. This option is not available if all ports are already licensed.

Use the following procedure to activate Ports on Demand using EZSwitchSetup.

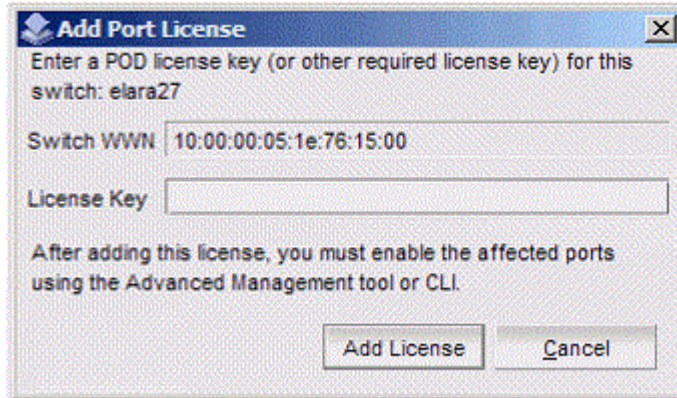
1. Launch the EZSwitchSetup wizard.
 - On Windows - EZSwitchSetup starts automatically after it is installed. If it does not, then from the **Start** menu, select **Programs > EZSwitchSetup > EZSwitchSetup**.
 - On Linux - EZSwitchSetup does not start automatically, so you must start it manually.
2. Click **Add Port License** under **Switch** in the **Task** panel.

FIGURE 7 EZSwitchSetup Switch Manager



The **Add Port License** dialog box is displayed.

FIGURE 8 Add Port License dialog box



3. Enter the license key in the **License Key** field to add the additional ports.
4. Click **Add License**.
5. Enable the ports using one of the following methods:
 - Use the **portDisable** and **portEnable** commands on the command line interface.
 - Reboot or power cycle the switch
 - Use the Advanced Management tool. Refer to the *EZSwitchSetup Administrator's Guide* for information on accessing Web Tools for advanced management.

Activating Ports on Demand using Web Tools

To enable Ports on Demand using Web Tools, perform the following steps.

1. Install the Brocade Ports on Demand licensed product. For instructions, refer to [Activating a license on a switch](#) on page 34.
2. Enable the port by performing the following steps.
 - a) Click the port in the **Switch View** to open the **Port Admin** tab.
 - b) Select the **FC Ports** or **GigE Ports** tab.
 - c) From the tree on the left, select the switch or slot that contains the port you want to enable.
 - d) From the table, select one or more ports.

NOTE

Use **Shift + click** and **Ctrl + click** to select multiple ports. You can select multiple ports from the table. You cannot select multiple ports from the tree.

- e) Select **Enable/Disable > Enable** from the **Actions** list.
- f) Click **Yes** in the confirmation window.

Displaying installed licenses

If a single license is installed that enables all Ports on Demand, the license will display as "Full Ports on Demand license - additional X port upgrade license." If there are other individual Ports on Demand licenses installed, these will also be displayed when listing the licenses for a switch, and you will see either "First Ports on Demand license - additional Y port upgrade license" or "Second Ports on Demand license - additional Z port upgrade license." In cases where there are multiple Ports on Demand licenses, the total additional allowed ports will not exceed the total displayed for the "Full Ports on Demand" license.

1. Connect to the switch and log in using an account with admin permissions.
2. Enter the **licenseshow** command.

```
switch:admin> licenseshow
SdSSc9SyRSTuTTdz:
    First Ports on Demand license - additional 16 port upgrade license
SdSSc9SyRSTeXTdn:
    Second Ports on Demand license - additional 16 port upgrade license
SdSSc9SyRSTuXTd3:
    Full Ports on Demand license - additional 32 port upgrade license
```

ATTENTION

If you enable or disable an active port, you will disrupt any traffic and potentially lose data flowing on that port. If the port is connected to another switch, you will segment the switch from the fabric and all traffic flowing between the disabled port and the fabric will be lost. If you remove a Ports on Demand license, the licensed ports will become disabled after the next platform reboot or the next port deactivation.

Dynamic Ports on Demand

The Dynamic Ports on Demand (POD) feature automatically assigns POD licenses from a pool of available licenses based on the server blade or switch installation.

The following platforms support Dynamic POD:

- Switches:
 - Brocade 6505
 - Brocade 6510
 - Brocade 6520
- Embedded switch modules for bladed servers:
 - Brocade 5410
 - Brocade M5424
 - Brocade 5450
 - Brocade 5460
 - Brocade 5470
 - Brocade 5480
 - Brocade M6505
 - Brocade 6547
 - Brocade 6548

For the embedded switch modules, the Dynamic POD feature detects and assigns ports to a POD license only if the server blade is installed with an HBA present. A server blade that does not have a functioning HBA is treated as an inactive link during initial POD port assignment. For the non-server blade switches, the dynamic assignment occurs when an attached Fibre Channel link transitions to the "link active" state.

The Dynamic POD feature assigns the ports to the POD license as they come online. Typically, assignments are sequential, starting with the lowest port number. However, variations in the equipment attached to the ports can cause the ports to take different amounts of time to come online. This means that the port assignment order is not guaranteed.

If the switch detects more active links than allowed by the current POD licenses, then some ports will not be assigned a POD license. Ports that do not receive a POD assignment have a state of "No Sync" or "In Sync"; these ports are not allowed to progress to the online state. Ports that cannot be brought online because of insufficient POD licenses have a state of "(No POD License) Disabled". You can use the **switchShow** command to display the port states.

Displaying the port license assignments

When you display the available licenses, you can also view the current port assignment of those licenses.

Use the following procedure to display the port license assignments.

1. Connect to the switch and log in using an account with admin permissions.
2. Enter the **licensePort --show** command.

Example showing manually assigned POD licenses

```
switch:admin> licenseport --show
 24 ports are available in this switch
   Full POD license is installed
   Dynamic POD method is in use
 24 port assignments are provisioned for use in this switch:
    12 port assignments are provisioned by the base switch license
    12 port assignments are provisioned by a full POD license
 24 ports are assigned to installed licenses:
    12 ports are assigned to the base switch license
    12 ports are assigned to the full POD license
 Ports assigned to the base switch license:
   1, 2, 3, 4, 5, 6, 7, 8, 17, 18, 19, 20
 Ports assigned to the full POD license:
   0, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23
```

Enabling Dynamic Ports on Demand

If the switch is in the static POD mode, then activating the Dynamic POD will erase any prior port license assignments the next time the switch is rebooted. The static POD assignments become the initial Dynamic POD assignments. After the Dynamic POD feature is enabled, you can customize the POD license associations.

Use the following procedure to enable Dynamic Ports on Demand.

1. Connect to the switch and log in using an account with admin permissions.
2. Enter the **licensePort --method** command with the **dynamic** option to change the license assignment method to dynamic.

```
switch:admin> licenseport --method dynamic
The POD method has been changed to dynamic.
Please reboot the switch now for this change to take effect.
```

3. Enter the **reboot** command to restart the switch.

```
switch:admin> reboot
```

4. Enter the **licensePort --show** command to verify the switch started the Dynamic POD feature.

```
switch:admin> licenseport --show
24 ports are available in this switch
Full POD license is installed
Dynamic POD method is in use
24 port assignments are provisioned for use in this switch:
  12 port assignments are provisioned by the base switch license
  12 port assignments are provisioned by a full POD license
  8 ports are assigned to installed licenses:
    8 ports are assigned to the base switch license
    0 ports are assigned to the full POD license
Ports assigned to the base switch license:
  1, 2, 5, 6, 8*, 21, 22, 23
Ports assigned to the full POD license:
  None
Ports not assigned to a license:
  0, 3, 4, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20
16 license reservations are still available for use by unassigned ports
1 license assignment is held by an offline port (indicated by *)
```

Enabling Dynamic Ports on Demand

You must be logged in as Admin to enable the Dynamic Ports on Demand feature.

NOTE

The Dynamic Ports on Demand feature is supported on the Brocade 4018, 4020, 4024, 5460, and 5470 switches only. If you click the **Enable DPOD** button on an unsupported switch, an error message displays.

To enable Dynamic Ports on Demand, perform the following steps.

1. Select a port in the **Switch View** to open the **Port Admin** tab.
2. Select the **FC Ports** tab.
3. From the tree on the left, select the switch or the slot that contain the ports.
4. Click **Enable DPOD** to enable the licensing mechanism to be dynamic. If the button is labeled **Disable DPOD**, the licensing mechanism is already set to dynamic.

The existing POD associations and assignments are set as the initial Dynamic POD associations.

Two fields are displayed:

- **Available Licenses** indicate the number of free licenses. These can be allocated for any port.
- **Total Licenses** indicate the total number of licenses.

Disabling Dynamic Ports on Demand

Disabling the Dynamic POD feature changes the POD method to static and erases any prior port license associations or assignments the next time the switch is rebooted.

1. Connect to the switch and log in using an account with admin permissions.
2. Enter the **licensePort --method** command with the **static** option to change the license assignment method to static.

```
switch:admin> licenseport --method static
The POD method has been changed to static.
Please reboot the switch now for this change to take effect.
```

3. Enter the **reboot** command to restart the switch.
4. Enter the **licensePort --show** command to verify the switch changed to static POD.

```
switch:admin> licenseport --show
24 ports are available in this switch
Full POD license is installed
Dynamic POD method is in use
24 port assignments are provisioned for use in this switch:
12 port assignments are provisioned by the base switch license
12 port assignments are provisioned by a full POD license
24 ports are assigned to installed licenses:
12 ports are assigned to the base switch license
12 ports are assigned to the full POD license
Ports assigned to the base switch license:
1, 2, 3, 4, 5, 6, 7, 8, 17, 18, 19, 20
Ports assigned to the full POD license:
0, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23
```

Disabling Dynamic Ports on Demand

NOTE

Disabling DPOD causes traffic disruption. Any prior port associations and assignments are lost the next time the switch is restarted.

To disable the Dynamic Ports on Demand feature, log in and perform the following steps.

1. Select a port in the **Switch View** to open the **Port Admin** tab.
2. Select the **FC Ports** or **GigE Ports** tab.
3. From the tree on the left, select the switch or the slot that contain the ports.
4. Click **Disable DPOD** to set the licensing mechanism to static. If the button is labeled **Enable DPOD**, the licensing mechanism is already set to static.

Reserving a port license

You can allocate licenses by reserving and releasing POD assignments to specific ports. Disabled ports are not candidates for automatic license assignment by the Dynamic POD feature. Persistently disable an otherwise viable port to prevent it from coming online, and thereby preserve a license assignment for another port.

Reserving a license for a port assigns a POD license to that port whether the port is online or offline. That license will not be available to other ports that come online before the specified port.

To allocate licenses to a specific port instead of automatically assigning them as the ports come online, reserve a license for the port. The port receives a POD assignment if any are available.

Use the following procedure to reserve Dynamic Ports on Demand licenses.

1. Connect to the switch and log in using an account with admin permissions.
2. Enter the **licensePort --show** command to verify there are port reservations available.

```
switch:admin> licenseport --show
24 ports are available in this switch
Full POD license is installed
Dynamic POD method is in use
24 port assignments are provisioned for use in this switch:
12 port assignments are provisioned by the base switch license
12 port assignments are provisioned by a full POD license
10 ports are assigned to installed licenses:
0 ports are assigned to the base switch license
0 ports are assigned to the full POD license
Ports assigned to the base switch license:
1*, 2*, 3*, 4*, 5*, 6*, 8*, 21, 22, 23
Ports assigned to the full POD license:
```

```
None
Ports not assigned to a license:
0, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20
```

3. Take the following appropriate action based on whether port reservations are available:
 - If a port reservation is available, then issue the **licensePort --reserve** command to reserve a license for the port.


```
switch:admin> licenseport --reserve 0
```
 - If all port reservations are assigned, select a port to release its POD license. Follow the instructions in [Releasing a port from a POD set](#) to release a port from its POD assignment. Once the port is released, you can reserve it.

Releasing a port from a POD set

Releasing a port removes it from the POD set; the port then appears as "unassigned" until it comes back online. Persistently disabling the port ensures that the port cannot come back online and be automatically assigned to a POD assignment. Before you can re-assign a license, you must disable the port and release the license.

After a port is assigned to the POD set, the port is licensed until it is manually removed from the POD port set. When a port is released from its POD port set (Base, Single, or Double), it creates a vacancy in that port set.

Use the following procedure to release a port from a POD set:

1. Connect to the switch and log in using an account with admin permissions.
2. Enter the **portDisable** command to take the switch offline.


```
switch:admin> portdisable 0
```
3. Enter the **portShow** command to verify the switch state is offline.
4. Enter the **licensePort --release** command to remove the port from the POD license.


```
switch:admin> licenseport --release 0
```
5. Enter the **licensePort --show** command to verify the port is no longer assigned to a POD set.


```
switch:admin> licenseport --show
24 ports are available in this switch
Full POD license is installed
Dynamic POD method is in use
24 port assignments are provisioned for use in this switch:
12 port assignments are provisioned by the base switch license
12 port assignments are provisioned by a full POD license
10 ports are assigned to installed licenses:
10 ports are assigned to the base switch license
0 ports are assigned to the full POD license
Ports assigned to the base switch license:
1*, 2*, 3*, 4*, 5*, 6*, 8*, 21, 22, 23
Ports assigned to the full POD license:
None
Ports not assigned to a license:
0, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20
```
6. Enter the **portEnable** command to bring the switch back online.
7. Enter the **portShow** command to verify the switch state is now online.

Releasing a port from a POD set

License Requirements for Features

The following table lists licensed features, each feature's associated license name, and, if applicable, the location on the local or any connecting switch on which the license must be installed.

TABLE 6 License requirements and location name by feature

Feature	License	Where license should be installed
Adaptive Rate Limiting	Advanced Extension	Local switch.
Administrative Domains	No license required.	N/A
Bottleneck Detection	No license required.	N/A
Brocade Network Advisor	No license required for base use.	See the <i>Brocade Network Advisor User Manual</i> .
Configuration up/download	No license required.	N/A
<p>NOTE The configUpload and configDownload commands are provided automatically with Fabric OS on the switch.</p>		
D_Port	No license required for D_Port tests between two switches or between a switch and a Brocade HBA. Fabric Vision license is required for D_Port tests between a switch and a non-Brocade HBA.	If Fabric Vision license is required, it should be installed on the local switch.
Diagnostic tools	No license required.	N/A
Distributed Management Server	No license required.	N/A
Enterprise ICL	Enterprise ICL	Each ICL-connected chassis when four or more such chassis are connected to the Brocade DCX 8510.
Extended Fabrics	Extended Fabrics	Local switch and any attached switches.
Fabric Watch	No license required for baseline monitoring capabilities. Fabric Watch license or Fabric Vision license required for full functionality.	See the <i>Fabric Watch Administrator's Guide</i> .

TABLE 6 License requirements and location name by feature (Continued)

Feature	License	Where license should be installed
FCIP	High Performance Extension over FCIP/FC	NOTE Local and attached switches. License is needed on both sides of tunnel.
FCIP Trunking	Advanced Extension	Local and attached switches.
Fibre Channel Routing/ EX_Ports	Integrated Routing	Local switch.
FICON	No license required.	N/A
FICON-CUP	FICON Management Server	Local switch.
FICON Tape Read and Write Emulation over an FCIP Tunnel	<ul style="list-style-type: none"> FICON Tape High Performance Extension over FCIP/FC license or Advanced FICON Acceleration license on Brocade 7800 	Local and attached switches.
FICON XRC Sequence Emulation over an FCIP Tunnel	<ul style="list-style-type: none"> FICON XRC High Performance Extension over FCIP/FC license or Advanced FICON Acceleration license on Brocade 7800 	Local and attached switches.
FIPS	No license required.	N/A
Firmware download	No license required.	N/A
	NOTE The firmwareDownload command is provided automatically with Fabric OS on the switch.	
Flow Vision: <ul style="list-style-type: none"> Flow Generator Flow Performance Monitor Flow Mirror 	Fabric Vision	Local switch.
	NOTE If you have both the Advanced Performance Monitoring and the Fabric Watch licenses installed, you do not need the Fabric Vision license.	
Full fabric connectivity	Full Fabric	Local switch. May be required on attached switches.
	NOTE Also called the Fabric license (visible in licenseShow output) and the E_Port Upgrade license.	

TABLE 6 License requirements and location name by feature (Continued)

Feature	License	Where license should be installed
In-flight encryption and compression	No license required.	N/A
Inband Management	No license required.	N/A
Ingress rate limiting	No license required. Adaptive Networking with QoS license is required for switches running Fabric OS versions earlier than 7.2.0. The Brocade 6520 does not require a license regardless of Fabric OS version.	N/A for local switches running Fabric OS 7.2.0 or later. License required on local switches running Fabric OS versions earlier than 7.2.0.
Inter-chassis link (ICL)	<ul style="list-style-type: none"> • ICL 1st POD (Ports on Demand) on the Brocade DCX 8510 Backbone family only. • ICL 2nd POD on the Brocade DCX 8510-8 only. • ICL 8-link on the Brocade DCX and DCX-4S only. • ICL 16-link on the Brocade DCX only. • Enterprise ICL on the Brocade DCX 8510 Backbone family only, for topologies with more than four chassis with ICLs. 	Local and attached platforms.
IPSec	No license required.	N/A
IPsec for FCIP tunnels	High Performance Extension over FCIP/FC	<hr/> NOTE Local and attached switches. License is needed on both sides of tunnel.
LDAP	No license required.	N/A
Logical fabric	No license required.	N/A
Logical switch	No license required.	N/A
Long distance	Extended Fabrics	Local and attached switches. <hr/> NOTE License is needed on both sides of connection.
Monitoring and Alerting Policy Suite (MAPS)	Fabric Vision	Local switch.
	<hr/> NOTE If you have both the Advanced Performance Monitoring and the Fabric Watch licenses installed, you do not need the Fabric Vision license.	
NPIV	No license required.	N/A

TABLE 6 License requirements and location name by feature (Continued)

Feature	License	Where license should be installed
OpenSSH public key	No license required.	N/A
Performance monitoring	Advanced Performance Monitoring or Fabric Vision license for advanced features. No license required for basic features.	Local switch.
Port fencing	Fabric Watch	Local switch.
Ports	<ul style="list-style-type: none"> Ports on Demand licenses required, applicable to a select set of switches only. 7800 Upgrade license for the 7800 switches to use all ports. 10 Gigabit FCIP/Fibre Channel license to use 10Gb FC ports on FC16-32 blades, FC16-48 blades, and the Brocade 6510 and 6520. 10 Gigabit FCIP/Fibre Channel license to enable 10Gb Ethernet ports on the FX8-24 extension blades. 	Local switch.
QoS	<p>No license required.</p> <p>Adaptive Networking with QoS license is required for switches running Fabric OS versions earlier than 7.2.0.</p> <p>The Brocade 6520 does not require a license regardless of Fabric OS version.</p>	<p>N/A for local switches running Fabric OS 7.2.0 or later.</p> <p>License required on local and attached switches running Fabric OS versions earlier than 7.2.0.</p>
QoS on HBA	<p>No license required.</p> <p>Adaptive Networking with QoS license is required for switches running Fabric OS versions earlier than 7.2.0.</p> <p>The Brocade 6520 does not require a license regardless of Fabric OS version.</p>	<p>N/A for local switches running Fabric OS 7.2.0 or later.</p> <p>License required on local switches running Fabric OS versions earlier than 7.2.0.</p>
RADIUS	No license required.	N/A
RBAC	No license required.	N/A
Routing traffic	No license required.	N/A
	<p>NOTE Port-based or exchanged-based routing, static routes, frame-order deliver, and dynamic routes all included.</p>	
Security	No license required.	N/A
	<p>NOTE DCC, SCC, FCS, IP Filter, and authentication policies all included.</p>	
SNMP	No license required.	N/A

TABLE 6 License requirements and location name by feature (Continued)

Feature	License	Where license should be installed
Speed	8 Gbps license needed to support 8 Gbps on the Brocade 300, 5100, 5300, and VA-40FC switches and embedded switches only.	Local switch
	<p>NOTE The 8 Gbps license is installed by default, and you should not remove it.</p> <p>A 10-Gb FCIP/Fibre Channel license is needed to support 10Gb FC ports on FC16-32 blades, FC16-48 blades, and the Brocade 6510 and 6520, as well as to support the 10Gb Ethernet ports on FX8-24 blades. (See the Ports feature above for more information.)</p>	
SSH public key	No license required.	N/A
TACACS+	No license required.	N/A
Top Talkers	Advanced Performance Monitoring	Local switch and attached switches.
Traffic Isolation	No license required.	N/A
Trunking	<ul style="list-style-type: none"> • ISL Trunking or • ISL Trunking Over Extended Fabrics <p>For ICL trunking, no license is required.</p>	Local and attached switches.
Two-to-four domains in a fabric	Value Line (Two/Four)	Local switch. May be required on attached switches.
USB usage	No license required.	N/A
Virtual Fabrics	No license required.	N/A
Web Tools	<ul style="list-style-type: none"> • No license required for non-8 Gbps platforms. • The Enhanced Group Management (EGM) license is required for 8 Gbps platforms. <p>NOTE A limited set of features is accessible using Web Tools without a license. Additional switch management features are accessible with the EGM license.</p>	Local and any switch you will be managing using Web Tools.
Zoning	No license required.	N/A

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