BROCADE

SOFTWARE LICENSING GUIDE

Brocade Fabric OS Software Licensing Guide, 8.1.0

Supporting Fabric OS 8.1.0

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Contents

Preface

Document conventions

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

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.

Text formatting conventions

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

Format	Description
bold text	Identifies command names.
	Identifies keywords and operands.
	Identifies the names of GUI elements.
	Identifies text to enter in the GUI.
italic text	Identifies emphasis.
	Identifies variables.
	Identifies document titles.
`Courier font`	Identifies CLI output.

Format	Description
	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.
italic text	Identifies a variable.
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, *member*[*member*...].
\	Indicates a "soft" line break in command examples. If a backslash separates two lines of a command input, enter the entire command at the prompt without the backslash.

Brocade resources

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

White papers, data sheets, and the most recent versions of Brocade software and hardware manuals are available at www.brocade.com. Product documentation for all supported releases is available to registered users at MyBrocade.
Click the **Support** tab and select **Document Library** to access documentation on MyBrocade or www.brocade.com You can locate documentation by product or by operating system.

Release notes are bundled with software downloads on MyBrocade. Links to software downloads are available on the MyBrocade landing page and in the Document Library.

Document feedback

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.

Contacting Brocade Technical Support

As a Brocade customer, you can contact Brocade Technical Support 24x7 online or by telephone. Brocade OEM customers should contact their OEM/solution provider.

Brocade customers

For product support information and the latest information on contacting the Technical Assistance Center, go to www.brocade.com and select **Support**.

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
Preferred method of contact for non-urgent issues: • Case management through the MyBrocade portal. • Quick Access links to Knowledge Base, Community, Document Library, Software Downloads and Licensing tools	Required for Sev 1-Critical and Sev 2-High issues: • Continental US: 1-800-752-8061 • Europe, Middle East, Africa, and Asia Pacific: +800-AT FIBREE (+800 28 34 27 33) • Toll-free numbers are available in many countries. • For areas unable to access a toll-free number: +1-408-333-6061

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.

About This Document

Supported hardware and software

The following hardware platforms are supported by Fabric OS 8.1.0.

Although many different software and hardware configurations are tested and supported by Brocade for Fabric OS 8.1.0, documenting all possible configurations and scenarios is beyond the scope of this document.

Fabric OS support for the Brocade Analytics Monitoring Platform (AMP) device depends on the specific version of the software running on that platform. For more information, refer to the Brocade Analytics Monitoring Platform documentation and release notes.

Brocade Gen 5 (16-Gbps) fixed-port switches

- Brocade 6505 Switch
- Brocade 6510 Switch
- Brocade 6520 Switch
- Brocade M6505 blade server SAN I/O module
- Brocade 6542 blade server SAN I/O module
- Brocade 6543 blade server SAN I/O module
- Brocade 6545 blade server SAN I/O module
- Brocade 6546 blade server SAN I/O module
- Brocade 6547 blade server SAN I/O module
- Brocade 6548 blade server SAN I/O module
- Brocade 6558 blade server SAN I/O module
- Brocade 7840 Extension Switch

Brocade Gen 5 (16-Gbps) Directors

For ease of reference, Brocade chassis-based storage systems are standardizing on the term "Director." The legacy term "Backbone" can be used interchangeably with the term "Director."

- Brocade DCX 8510-4 Director
- Brocade DCX 8510-8 Director

Brocade Gen 6 (32-Gbps) fixed-port switches

- Brocade G610 Switch
- Brocade G620 Switch

Brocade Gen 6 (32-Gbps) Directors

- Brocade X6-4 Director
- Brocade X6-8 Director

What's new in this document

This document includes new and modified information for the Fabric OS 8.1.0 release.

The following content is new or has been significantly revised for this release of this document:

- Updated ICL POD license details for Brocade X6 platforms in Available Fabric OS licenses on page 19 and ICL POD license on Brocade X6 platforms on page 23.

Software Licensing Overview

Licensing overview

Feature licenses are often part of the licensed paperpack 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.

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 19 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 or e-license*) 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 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.

Generating a license

Before you can use a software license, you must generate it from the Brocade software portal.

The following procedure demonstrates how to generate and obtain a software license.

1. Order a license.

   You will receive the license transaction key in the form of a paperpack or electronic transaction key. When you receive the paperpack or electronic transaction key, retrieve the LID of your Brocade device by entering the **show version** command on the device. If you have received a paperpack transaction key, write the LID in the space provided on the entitlement certificate and on the unit ID label.

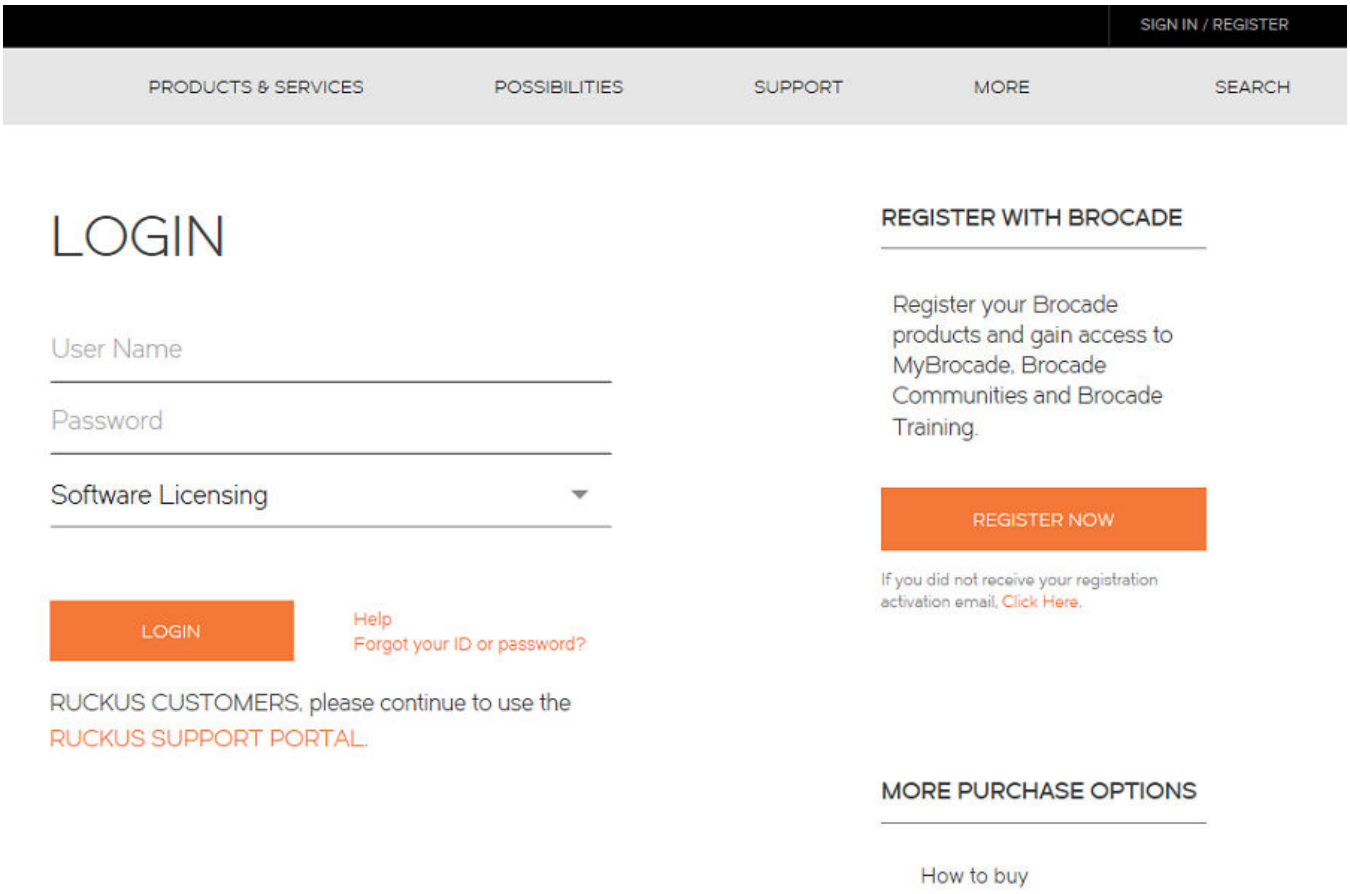
   NOTE
   To order and obtain a trial license, contact your Brocade representative.

   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).

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

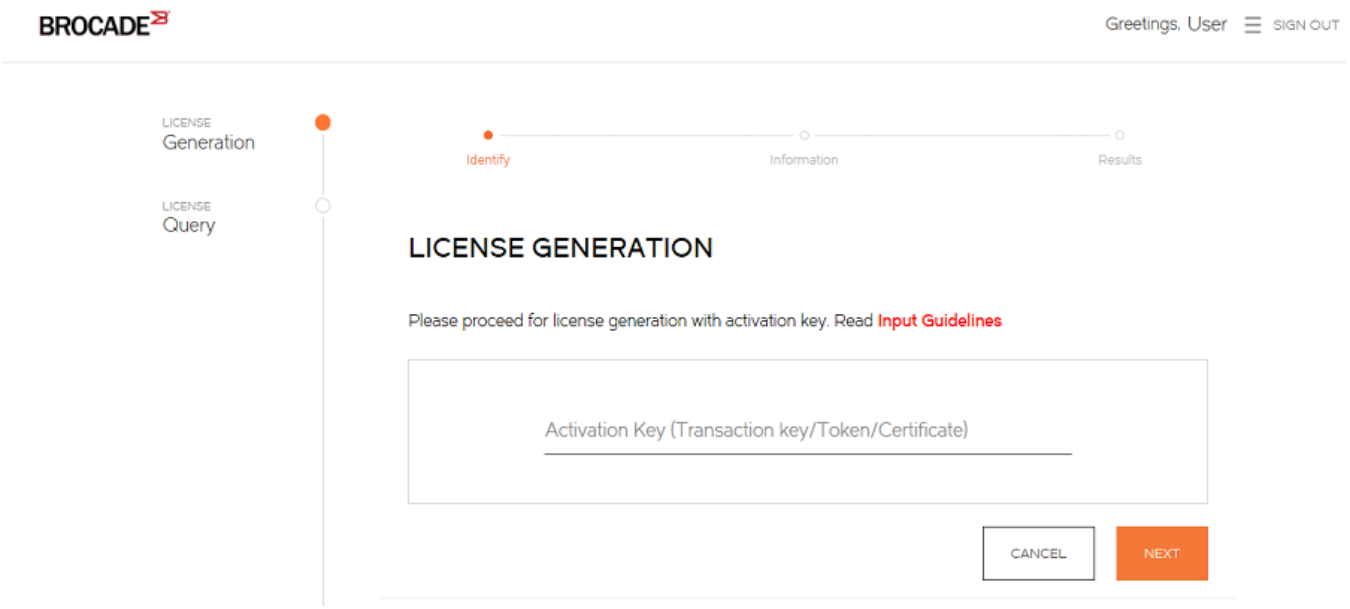
   The following figure shows the Software Licensing portal login window.

FIGURE 1 Software Licensing portal login window



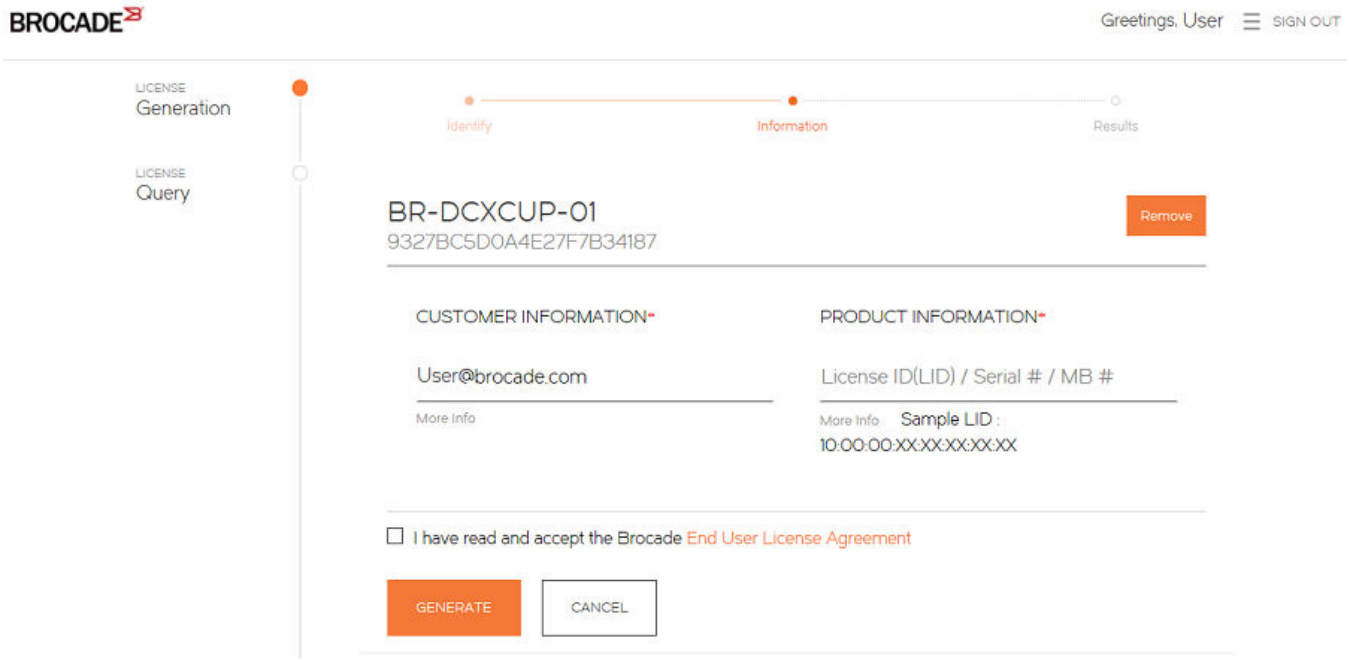
3. Enter your user name and password and click **LOGIN**.
   The **License Generation** window appears.

   FIGURE 2 License Generation window



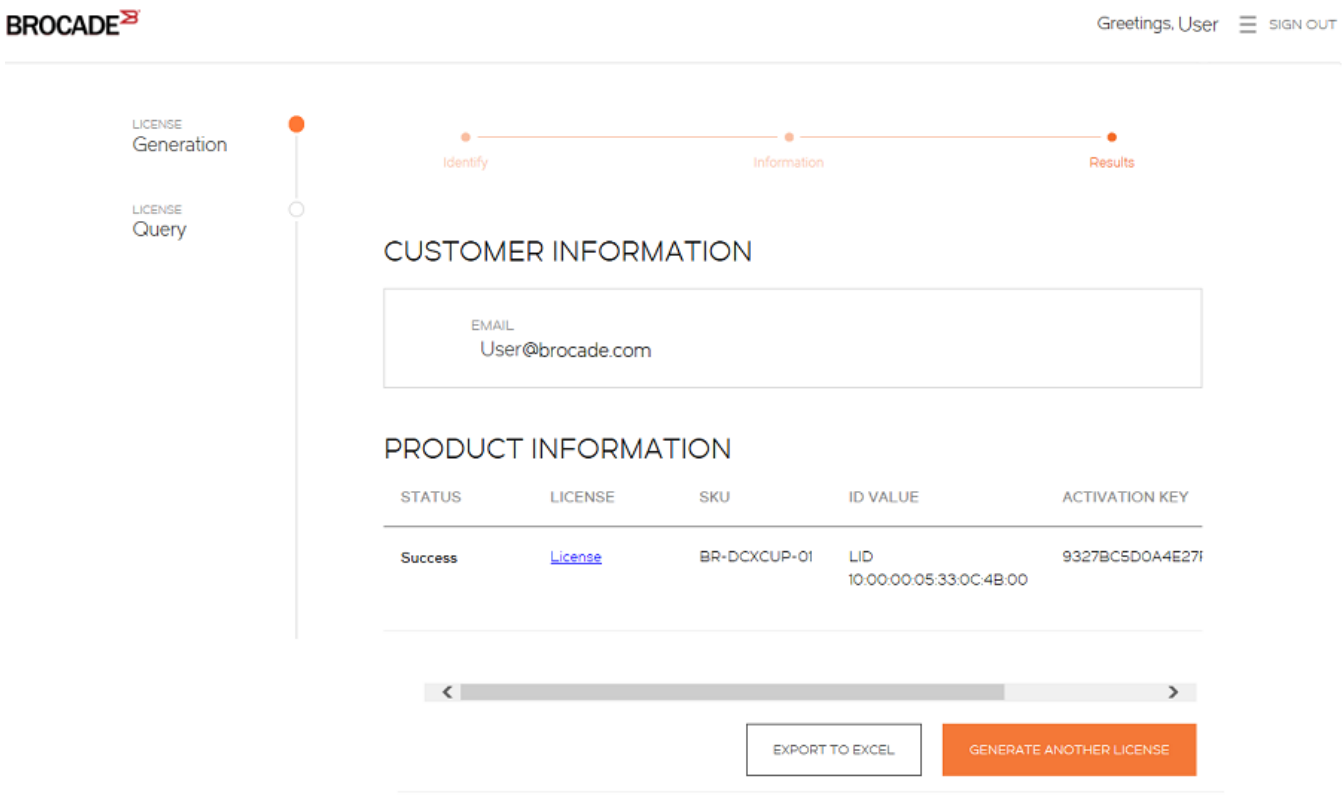
4. Enter the licensing transaction key, token, or certificate and click **Next**.
   The **License Information** window is displayed.

   FIGURE 3 License Information window



5. Enter the requested information in the **Product Information** field.
6. Read the Brocade End User License Agreement and select the **I have read and accept** check box.
7. Click **Generate**.
   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** 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 reason it failed and the action to be taken is displayed on the page.

FIGURE 4 Results window



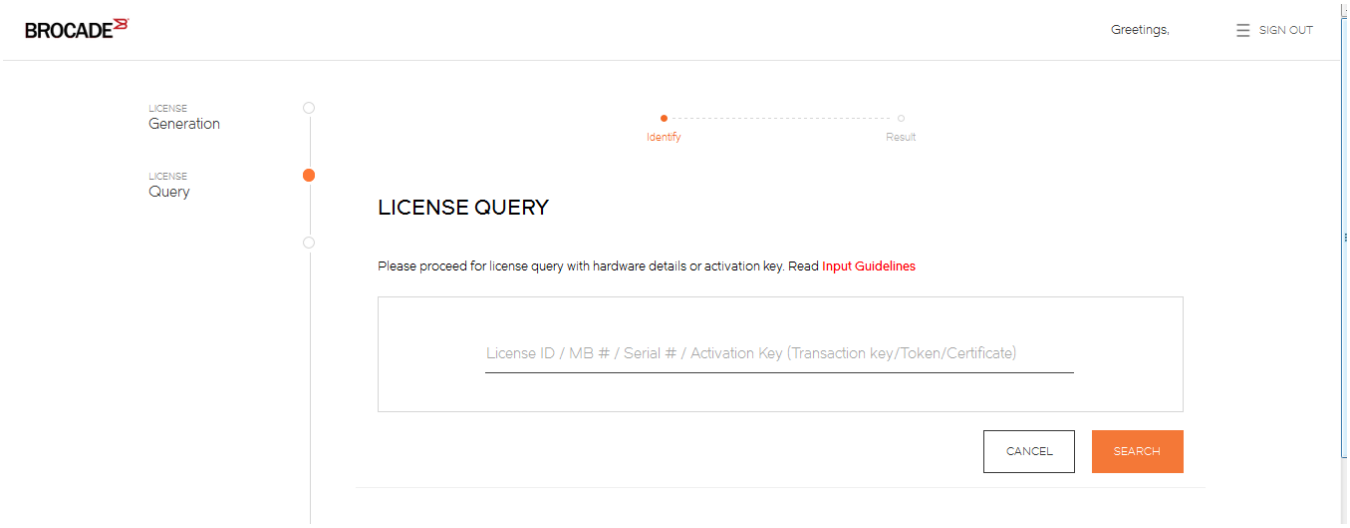
8. Click the hyperlink in the **License** field to download the license file to your PC.
9. Upload the license file to the Brocade device. You can also refer to the e-mail sent with the license files for instruction on installing a license.
10. Click **Export to Excel** to export the results to a Microsoft Excel file or click **Generate Another License** to generate a new license.

Querying a license

To view software license information for a particular product, you can use the License Query option with an Activation key or License ID (LID).

1. To display the License Query window, you must enter the **License Query** option, from the **License Management Welcome** window, select **License Management** > **Brocade vADC** > **License Generation and Query** > **License Query**.

   FIGURE 5 License Query window

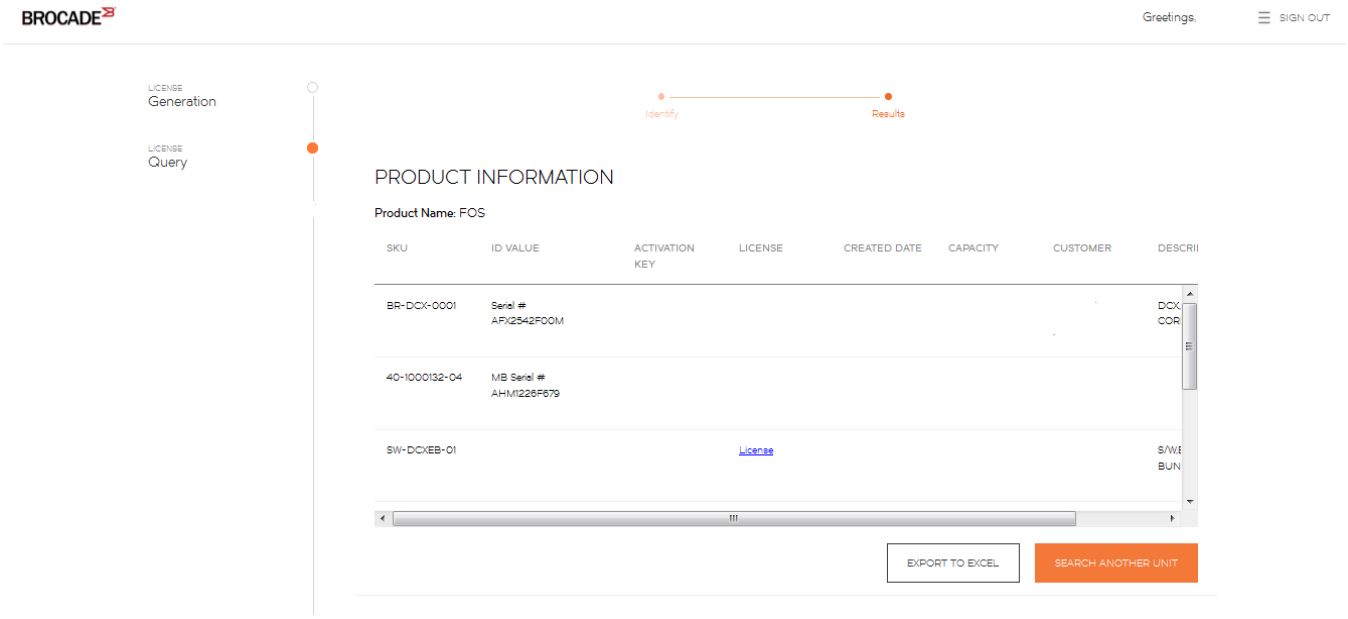


   Click **input guidelines** for more information on the input value.

2. You must enter the **License ID**,**Serial #** or **Activation Key** to query a particular product.

3. Click **Search**. Depending on the status of the license (for example, whether or not the license was generated), the report includes the following product information:
   - Product name SKU
   - ID value
   - Activation key
   - License
   - Created date
   - Capacity
   - Customer name
   - Description

FIGURE 6 License Product Information window



In the figure, the first row under PRODUCT INFORMATION displays hardware-related information and the second row displays software-related information. If the query is performed before the transaction key is generated, the hardware-related information will not appear as part of the search results. Similarly, if the query is performed before the license is generated, some of the information in the software-related information will not be displayed.

4. Click **more** or **less** in **ID value** to view the License ID.
5. Click the **License** hyperlink to download the license information.
6. Click **Export to Excel** to download the report for sharing or archiving purposes, or Click **Search Another Unit** to query another product.

Fabric OS Licenses

Available Fabric OS licenses

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

TABLE 1 Available Fabric OS licenses

License	Description
10 Gigabit FCIP/ Fibre Channel (10G license)	• 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 a Brocade DCX 8510-4 or Brocade DCX 8510-8 Backbone. • Allows selection of the following operational modes on the FX8-24 blade: – 10 1-GbE ports and 1 10-GbE port – 2 10-GbE ports • License is slot-based when applied to a Brocade DCX Backbone. It is chassis-based when applied to a Brocade 6510 or 6520 switch. **NOTE** Not applicable on Brocade Gen 6 platforms.
Advanced Extension	• Enables two advanced extension features: FCIP Trunking and Adaptive Rate Limiting. • FCIP Trunking feature allows all of the following: – 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 7840 Extension Switch and Brocade DCX 8510 Backbones for the FX8-24 on an individual slot basis. • This license is not required on Brocade Gen 6 platforms with Brocade SX6 blade.
Advanced FICON Acceleration	• 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 7840 Extension Switch and Brocade DCX 8510 Backbones for the FX8-24 on an individual slot basis. **NOTE** This license is not required on a Brocade X6 Director with a Brocade SX6 blade.
Brocade Advanced Performance Monitoring	The Advanced Performance Monitor features are deprecated but the license is available for upgrade to Fabric Vision features on Brocade Gen 5 platforms.

TABLE 1 Available Fabric OS licenses (continued)

License	Description
	The Fabric Vision license is equivalent to the combination of both the Advanced Performance Monitor (APM) and Fabric Watch (FW) licenses. If you have both the Advanced Performance Monitoring and the Fabric Watch licenses installed, you do not need the Fabric Vision license. NOTE Applies to Brocade Gen 5 platforms only.
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). NOTE This license is not required for long distance connectivity using licensed 10-Gb ports.
Brocade Fabric Watch	The Fabric Watch feature is deprecated but the license is available for upgrade to Fabric Vision features on Brocade Gen 5 platforms. The Fabric Vision license is equivalent to the combination of both the Advanced Performance Monitor (APM) and Fabric Watch (FW) licenses. If you have both the Advanced Performance Monitoring and the Fabric Watch licenses installed, you do not need the Fabric Vision license. NOTE Applies to Brocade Gen 5 platforms only.
Brocade ISL Trunking	• 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. NOTE Applies to the Brocade G620, G610, M6505, 6505, 6510, 6520, and 6547 switches.
Enterprise ICL	Allows you to connect four or more chassis to a Brocade DCX 8510 using ICLs. For each Brocade DCX 8510 Backbone, you can connect up to three chassis via ICLs without this license. This license is required only on the chassis that is connected to four or more chassis. This license requirement does not depend upon the total number of chassis that exist in a fabric, but only on the number of chassis connected directly to a device via ICLs. You must also have an ICL POD license on each chassis 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. NOTE Applies to the Brocade DCX 8510 Backbones only.
Fabric Vision (FV)	Allows you to activate the following features: • Monitoring and Alerting Policy Suite (MAPS) • Flow Vision • Run D_Port tests between a switch and non-Brocade HBAs The Fabric Vision license is equivalent to the combination of both the Advanced Performance Monitor (APM) and Fabric Watch (FW) licenses. If you have both the Advanced Performance Monitoring and the Fabric Watch licenses installed, you do not need the Fabric Vision license. On Brocade Gen 6 platforms, this license enables the IO Insight capability and is displayed as "Fabric Vision and IO Insight" in the **licenseshow** output.
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.

TABLE 1 Available Fabric OS licenses (continued)

License	Description
Integrated Routing	Allows any ports in Brocade 6510, 6520, and 7840 switches, and DCX 8510 and Brocade G620 platforms to be configured as an EX_Port supporting FC-FC routing.
Integrated Routing Ports on Demand	On Brocade X6 Director family, allows any port, within the license capacity limit, to be configured as an EX_Port supporting FC-FC routing. If the maximum limit of EX_Ports that can be enabled is reached, enabling a new EX_Port will fail with the warning message "Ex_Port IR POD License Limit Exceeded" and the port will be disabled.
Inter-Chassis Link (ICL) POD	Activates half of the ICL bandwidth on a Brocade DCX 8510-8, or all the ICL bandwidth on a Brocade 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 Brocade DCX 8510-8 and a Brocade DCX 8510-4; the latter platform supports only half the number of ICL links that the former platform supports. On Brocade X6 directors, each ICL POD license activates the specified number of QSFP ports in a trunk group. • For Brocade X6-8, each license has a capacity of 32 links, which activates 16 QSFP ports across both core blades with a license that has capacity of 32, the QSFP port numbers that can be activated on each X6-8 core blade are 0, 1, 2, 3, 8, 9, 10, and 11; with a license that has capacity of 64, all of the QSFP ports on each core blade can be activated. • For Brocade X6-4, each license has a capacity of 16 links, which activates 8 QSFP ports across both core blades The number of links enabled via ICL on a single core blade is displayed as the capacity for this license with a license that has capacity of 16, the QSFP port numbers that can be activated on each X6-4 core blade are 0, 1, 4, and 5; with a license that has capacity of 32, all of the QSFP ports on each core blade can be activated. Available on Brocade DCX 8510 Backbones and Brocade X6 Directors only.
Inter-Chassis Link (ICL) 2nd POD	Activates the remaining ICL bandwidth on a Brocade DCX 8510-8 Backbone. Each chassis must have this ICL license installed in order to enable all available ICL connections. Available on Brocade DCX 8510-8 Backbones only.
Q-Flex Ports on Demand	On Brocade G620 switches, this enables ports with QSFP media module. Each module allows 4 individual user ports. Total number of user ports enabled by the license is displayed as the capacity for this license.
WAN Rate Upgrade 1	Provides additional WAN transmission throughput up to 10 Gbps on a Brocade 7840 Extension Switch. Without WAN Rate Upgrade 1 license, the device provides WAN throughput of 5 Gbps. Upgrade licenses do not impose restrictions on the number of physical ports used as long as the aggregate bandwidth of all configured FCIP tunnels does not exceed the licensed limit.
WAN Rate Upgrade 2	Provides unlimited WAN transmission throughput (other than the physical port limit) and enables two 40 GbE ports on a Brocade 7840 Extension Switch. You cannot use the 40 GbE ports without the WAN Rate Upgrade 2 license. 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.

The Brocade G610 switch supports the following licenses:

- Extended Fabrics license
- ISL Trunking license
- Fabric Vision and IO Insight license
- Ports on Demand license

The Brocade G620 switch supports the following licenses:

- Extended Fabrics license
- ISL Trunking license
- FICON Management Server license
- Integrated Routing license
- Fabric Vision and IO Insight license

- Ports on Demand license
- Q-Flex Ports on Demand license

The Brocade X6 Directors support the following licenses:

- Extended Fabrics license
- ISL Trunking license
- FICON Management Server license
- Inter Chassis Link license
- Integrated Routing Ports on Demand license
- Fabric Vision and IO Insight license

ICL licensing

Brocade ICL links operate between the core blades of the Brocade DCX 8510 and Brocade X6 family. 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 a core blades of X6 directors can be used only with an ICL POD license up to the capacity specified within the 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 platforms 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 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 POD license on Brocade X6 platforms

On X6 directors, each ICL POD license contains a capacity to activate certain number of QSFP ports. Capacity in the license allows incremental links in trunk groups starting with the lowest QSFP port number on the core blades. Capacity applies across both core blades, if present. That is, capacity of 4 allows 4 links on each core blade on the first QSFP (core blade QSFP number 0). For the X6-8, each license has a capacity of 32 links, which activates 16 QSFP ports across both core blades. For the X6-4, each license has a capacity of 16 links, which activates 8 QSFP ports across both core blades. Each ICL license has the capacity of enabling half of the ICL bandwidth on the X6-8 or X6-4 respectively. The ICL license capacity is applied to enable all links within each trunk group on both core blades starting with the user ports. The ICL 1st POD license activates half of the ICL bandwidth and the ICL 2nd POD license activates the remaining ICL bandwidth.

Enterprise ICL license

The Enterprise ICL (EICL) license allows you to connect a single DCX 8510 Backbone to four or more other Brocade DCX 8510 or X6 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 to three or fewer DCX 8510 Backbones with ICLs does not require the EICL license. However, the EICL license is required on a Brocade DCX 8510 chassis when that chassis is connected to four or more DCX 8510 or X6 directors via ICLs.
- With the EICL license installed, a maximum of 10 chassis are allowed to be connected to a single director 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)
```

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 platform.

Whether you have a director or fixed-port switch, you add the 10G license to the platform 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 M6140 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 8510 Backbone family to support the FX8-24 blade and the 16-Gbps FC port blades (FC16-32, FC16-48, and FC16-64).

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 non-DCX 8510 and non-X6 platforms.

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.

A regular temporary license can be added to replace a universal temporary license and vice-versa, but neither can be added when a permanent license for the feature is already installed.

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

- 10 Gigabit FCIP/Fibre Channel license (slot-based)
- Advanced Extension license (slot-based)
- Advanced FICON Acceleration license (slot-based)
- Advanced Performance Monitoring license
- Enterprise ICL license
- Fabric Watch license
- FICON Management Server (CUP) license
- Full Fabric license
- Integrated Routing license
- Integrated Routing Ports on Demand license
- ISL Trunking license
- WAN Rate Upgrade 1 license
- WAN Rate Upgrade 2 license

  NOTE
  To obtain a trial license, contact your Brocade representative.

NOTE
On Brocade Gen 5 platforms, a combination of Advanced Performance Monitoring and Fabric Watch licenses is equivalent to the Fabric Vision license.

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 the capacity of the permanent license is less than that of the temporary license and the number of slots assigned is not less than the capacity of the permanent license, then the process is non-disruptive. If any 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 associated criteria, you must do the following:

1. Remove the temporary license. This 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) Reconfigure 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 and Backbones, do not attempt to change the system date and time when a temporary license is installed.

Configuration upload and download considerations

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

Expired licenses

The **licenseShow** command allows you to see installed temporary licenses, even after they have expired. Expired licenses have the output string "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 disable or enable operation for a port or switch.

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 on a daily basis until there is no remaining time, at which point it expires. 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 either 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 also 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

Software licensing configuration tasks

The following steps describe the configuration tasks for generating and obtaining a software license, and then installing it on the Brocade Fabric OS switch.

1. Order the desired license. For a list of available licenses, refer to Available Fabric OS licenses on page 19.

   NOTE
   To obtain a trial license, contact your Brocade representative.

2. When you receive the transaction key, retrieve the License ID (LID) of the switch. For instructions to view the LID, refer to Viewing the license ID using a Telnet session on page 35.

   If you received the transaction key in a paperpack, record the LID on the entitlement certificate in the space provided.

3. Log in to the Brocade software portal to generate and obtain the license key. For instructions to obtain a license, refer to Obtaining a license.

4. Install the license on the switch. For instructions to add a license, refer to Adding a licensed feature on page 30.

5. Verify that the license is installed. For instructions to view an installed license, refer to Viewing licenses installed on a switch on page 34.

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 *Brocade Fabric OS Command Reference*.

TABLE 2 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.

TABLE 2 Fabric OS commands related to licensing (continued)

Command	Description
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 *Brocade Fabric OS Administrator's Guide* for information on enabling a feature.

For Brocade Backbones and Directors, licenses are effective on both control processor (CP) blades, but are valid only when the CP blade is inserted into a Backbone or Director 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 or Director only if the WWN card is the same in the new Backbone or Director. 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 or Director, 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 *Brocade Fabric OS Administrator's Guide* for details.

```
switch:admin> licenseshow
r3HDJYLmALNQYWLZMYLQRYDa3SZGKStYTgNmYKgECJMJTT7WJTSDSKB7:
    Ports on Demand license
    Capacity 25
    Expiry Date 12/05/2015
QRRR4mPYCWHKLKYYTAWQGGMDZtEHLYtCBSWTG:
    Extended Fabric license
G3FaaM4NtECSJLFMEGQ74a3rH77HDCCRBSKYK:
    Integrated Routing license
YZXZJAgFJGa7fWXCC4KBDMARBJCQAaNfENJQAmfJAEgYHg3C9DGCSSY9:
    Q-Flex Ports on Demand license
    Capacity 40
    Expiry Date 12/14/2015
9atZM3MrtWTJBLFBD9FrN9QQfKJKFafaBSa4H:
    Fabric Vision and IO Insight
LYXSL4aQDMLEQrraYRAZrDfWYWfXTDH9BSLCJ:
    FICON_CUP 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 a sufficient slot count for the number of slots that you plan to activate the feature.
2. Configure the slots so that the licensed feature is assigned to the slots. No more slots can be configured than specified in the license.
3. Configure the application that uses the licensed feature to use the blade in the licensed 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. Use 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.

   Chassis 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.

   The following 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 aTFPNFXGLmABANMGtT4LfSBJSDLWTYD3EFrr4WGAEMBA
8510-8switch:admin> licenseshow
aTFPNFXGLmABANMGtT4LfSBJSDLWTYD3EFrr4WGAEMBA
        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
aTFPNFXGLmABANMGtT4LfSBJSDLWTYD3EFrr4WGAEMBA
        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>
```

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

```
6510-switch:admin> licenseadd aTFPNFXGLmABANMGtT4LfSBJSDLWTYD3EFrr4WGAEMBA
6510-switch:admin> licenseshow
aTFPNFXGLmABANMGtT4LfSBJSDLWTYD3EFrr4WGAEMBA
        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 chassis 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 blade.
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.

   The following 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 aTFPNFXGLmABANMGtT4LfSBJSDLWTYD3EFrr4WGAEMBA
8510-4switch:admin> licenseshow
aTFPNFXGLmABANMGtT4LfSBJSDLWTYD3EFrr4WGAEMBA
        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
aTFPNFXGLmABANMGtT4LfSBJSDLWTYD3EFrr4WGAEMBA
        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:
        Enterprise ICL license
SybbzQQ9edTzcc0X:
        Full 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:
    Full 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
Scz9y9QQSdTf0AzV:
    FICON_CUP license
Scz9y9QQSdTt4Azn:
    Full Ports on Demand license - additional 24 port upgrade license
Sbccb9QzbRTcddcP:
    Full Fabric license
    Extended Fabric license
BTPMBmMNSTmEN7PSYYJ3WtHCWTQfHRPYBAHNL:
    Trunking 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” or "Unknown 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
```

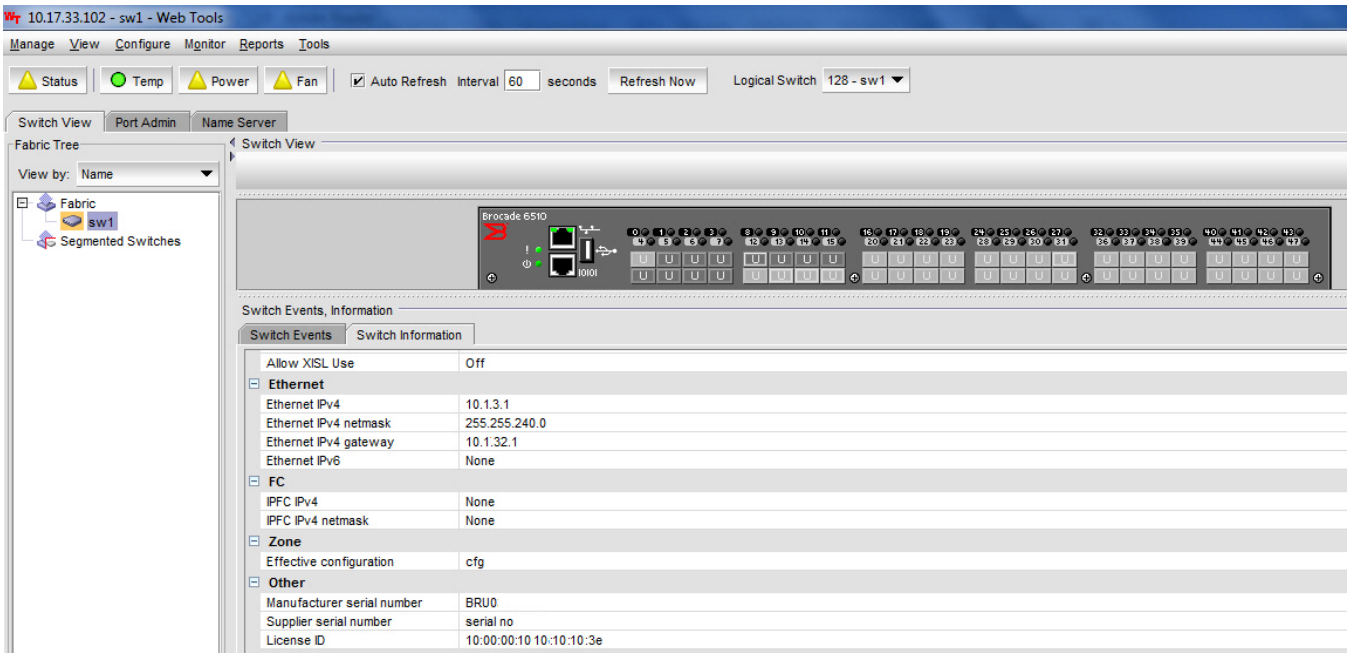
Viewing the license ID using Web Tools

Use the following procedure to view the license ID using the Brocade Web Tools application.

1. Connect to the switch using a web browser; this will automatically open 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 7 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 Individual Features on page 49. 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

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

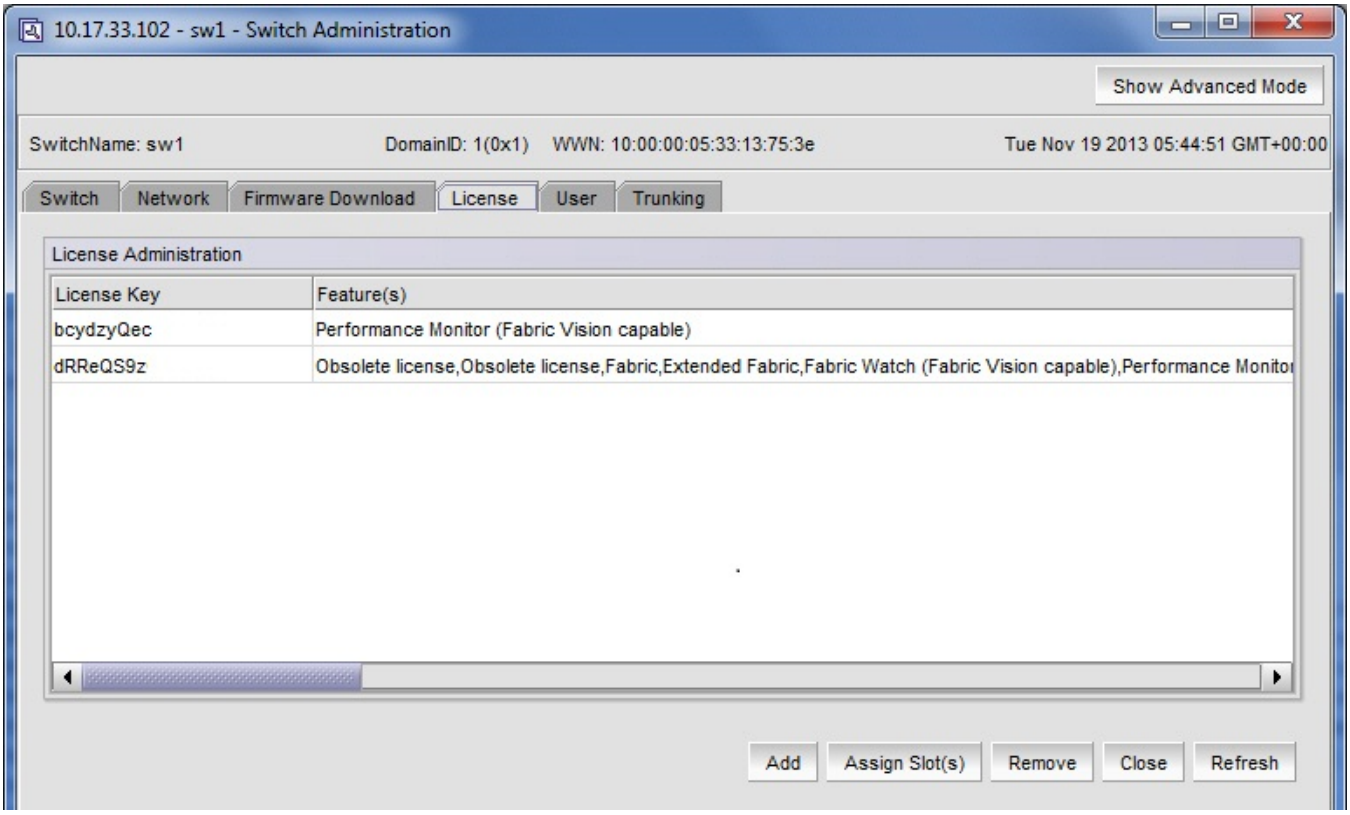
Before you can unlock a licensed feature, you must obtain a license key. Refer to Obtaining a license for instructions on how to obtain a license key using the Brocade website.

To activate a license, perform the following steps.

1. Click **Configure** > **Switch Admin**.

   The **Switch Administration** window displays.

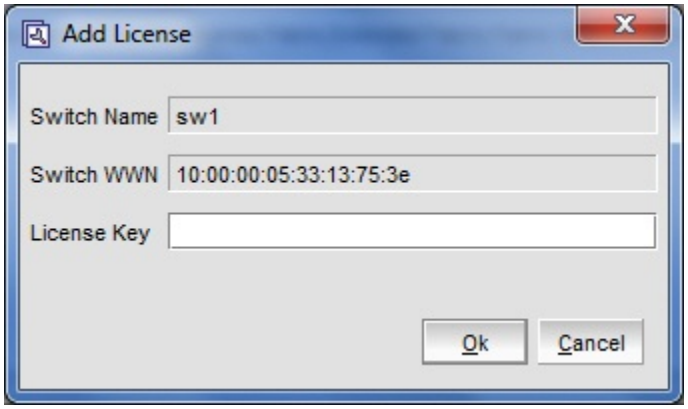
   FIGURE 8 Switch Administration window



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

   The **Add License** dialog box displays.

   FIGURE 9 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 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 the 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

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.

TABLE 3 Ports on Demand licensed port count by platform

Platform	Description
Brocade G610	Can be purchased with 8, 16, or 24 licensed ports. A maximum of 24 ports is allowed.
Brocade G620	Can be purchased with 24, 36, or 48 licensed SFP ports. A maximum of 48 SFP ports is allowed Q-Flex Ports on Demand license provides 4 QSFP ports providing a total of 16 individual links.
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.

ATTENTION

Licenses are not interchangeable between units. For example, if you bought a POD license for a Brocade 6505, you cannot use that license on a Brocade 6510 or Brocade G620. 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 4 List of available user ports when implementing PODs

Platform	Available user ports, No POD license	Available user ports, POD license present
Brocade G610	0-8	0-24
Brocade G620	24 SFP+ ports	Ports on Demand: 48 SFP+ ports Q-Flex Ports on Demand: 16 QSFP ports (four ports on each QSFP)
Brocade M6505	1-8 and 17-20	N/A
Brocade 6505	0-11	N/A
Brocade 6510	0-23	0-47

TABLE 4 List of available user ports when implementing PODs (continued)

Platform	Available user ports, No POD license	Available user ports, POD license present
Brocade 6520	0-47	0-95
Brocade 6547	0-8 and 29-31	0-47
Brocade 6548	1-10 and 17-22	0-27

NOTE

A Ports on Demand license adds SFP ports in 12-port increments to the standard 24 SFP ports. Therefore, the possible SFP port configurations are 24 SFP ports, 36 SFP ports, and 48 SFP ports. With any of the SFP port configurations, the Q-Flex license adds up to 16 QSFP ports (four ports on each QSFP).

Ports on Demand is ready to be unlocked in the switch firmware. Its license key may be part of the licensed paperpack supplied with the 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 for instructions to generate the license key.

Each Ports on Demand license activates the next group of ports in numerical order in either 4-, 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, refer to the switch's hardware reference manual.

With Dynamic Ports on Demand mode on fixed-port switches, the order in which the ports are enabled does not matter; any ports can be used so long as the total allowed ports does not exceed the licensed capacity.

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 30.
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.

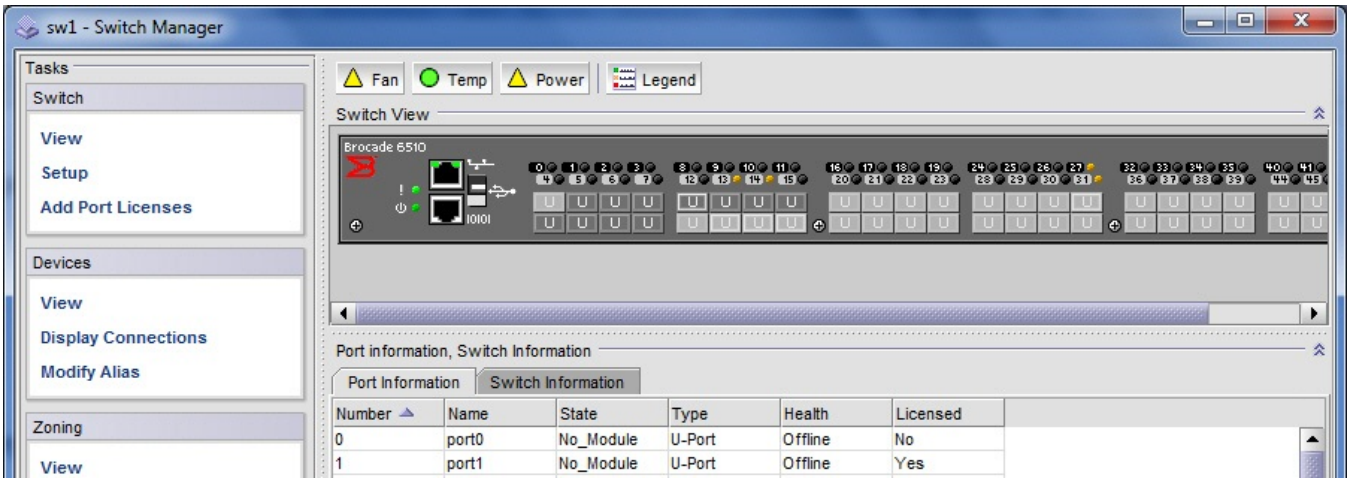
Activating Ports on Demand using EZSwitchSetup

EZSwitchSetup Switch Manager allows you to enable Ports on Demand (POD) if you have a license available.

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

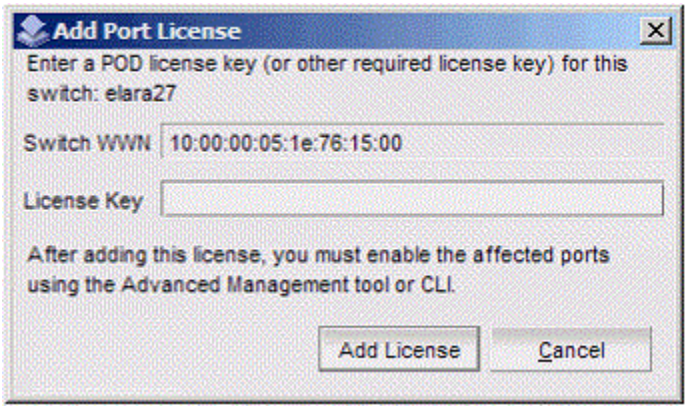
1. Launch the EZSwitchSetup wizard.
   - On Windows: EZSwitchSetup starts automatically after it is installed. If it does not, then from the **Start** menu, select **Programs** > **EZSwitchSetup** > **EZSwitchSetup**.
   - On Linux: EZSwitchSetup does not start automatically, so you must start it manually.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

   FIGURE 10 EZSwitchSetup Switch Manager



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

   FIGURE 11 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 37.
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

To display the installed licenses, perform the following steps.

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

```
switch:admin> licenseshow
RSrMDB39KRYrBfFM4QSRQQGXSf3ttKHaQL97fWHASL4B:
    WAN Rate Upgrade 1 (FTR_UPG1) license
    Capacity 4
    Consumed 3
    Configured Blade Slots 1,2,3
PMJmKQXTmHt9QDNACgT3MMT4AR4NgRgKBAPZR:
    WAN Rate Upgrade 2 (FTR_UPG2) license
   Capacity 4
   Consumed 2
   Configured Blade Slots 1,3
```

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 be disabled the next time the platform reboots 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 G610
  - Brocade G620
  - Brocade 6505
  - Brocade 6510
  - Brocade 6520
- Blade server SAN I/O modules for bladed servers:
  - Brocade M6505
  - Brocade 6547
  - Brocade 6548

For the blade server SAN I/O modules, Dynamic POD 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.

Dynamic POD 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 "On 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.

   The following example shows manually assigned POD licenses.

```
switch:admin> licenseport --show
24 SFP-based ports are available in this switch
Ports on Demand license is installed
  Dynamic POD method is in use

24 SFP-based port assignments are provisioned for use in this switch:
  8 SFP-based port assignments are provisioned by the base switch allowance
  16 SFP-based port assignments are provisioned by the Ports on Demand license
24 SFP-based ports are assigned to the base switch allowance or installed licenses:
  8 ports are assigned to the Ports on Demand base switch allowance
  14 SFP-based ports are assigned to the Ports on Demand license
SFP-based ports assigned to the base switch allowance:
  0, 1*, 2, 3, 4, 5, 6, 7*
SFP-based ports assigned to the Ports on Demand license:
  8, 9, 10, 11, 12, 13, 14, 15,
  16*, 17, 18, 19, 20, 21
SFP-based ports that are not assigned:
  22, 23
2 license reservations are still available for use by unassigned ports

3 license assignments are held by offline ports (indicated by *)
```

Reserving a port license

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

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 SFP-based ports are available in this switch
Ports on Demand license is installed
  Dynamic POD method is in use

24 SFP-based port assignments are provisioned for use in this switch:
  8 SFP-based port assignments are provisioned by the base switch allowance
  16 SFP-based port assignments are provisioned by the Ports on Demand license
24 SFP-based ports are assigned to the base switch allowance or installed licenses:
  8 ports are assigned to the Ports on Demand base switch allowance
  14 SFP-based ports are assigned to the Ports on Demand license
SFP-based ports assigned to the base switch allowance:
  0, 1*, 2, 3, 4, 5, 6, 7*
SFP-based ports assigned to the Ports on Demand license:
  8, 9, 10, 11, 12, 13, 14, 15,
  16*, 17, 18, 19, 20, 21
SFP-based ports that are not assigned:
  22, 23
2 license reservations are still available for use by unassigned ports

3 license assignments are held by offline ports (indicated by *)
```

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

     ```
     switch:admin> licenseport --reserve 0-47
     ```

   - 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 on page 47 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 a port or range of ports from the POD license.

   ```
   switch:admin> licenseport --release 0-47
   port 4 must be Offline to make changes to POD assignment
   port 16 must be Offline to make changes to POD assignment
   port 31 must be Offline to make changes to POD assignment
   ```

5. Enter the **licensePort --show** command to verify the port is no longer assigned to a POD set.

   ```
   switch:admin> licenseport --show
     48 ports are available in this switch
        Full POD license is installed
        Dynamic POD method is in use
     48 port assignments are provisioned for use in this switch:
        24 port assignments are provisioned by the base switch license
        24 port assignments are provisioned by a full POD license
      3 ports are assigned to installed licenses:
        3 ports are assigned to the base switch license
        0 ports are assigned to the full POD license
     Ports assigned to the base switch license:
        4, 16, 31
     Ports assigned to the full POD license:
        None
     Ports not assigned to a license:
        0, 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17
        18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34
        35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47
   ```

6. Enter the **portEnable** command to bring the switch back online.
7. Enter the **portShow** command to verify the switch state is now online.

License Requirements for Individual 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 5 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
Brocade Network Advisor	No license required for base use.	Refer to the *Brocade Network Advisor User Manual*.
Configuration upload and download	No license required. **NOTE** The **configUpload** and **configDownload** commands are provided automatically with Fabric OS on the switch.	N/A
ClearLink Diagnostics (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 must 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 Performance Impact	No license required.	N/A
FCIP Trunking	Advanced Extension	Local and attached switches
Fibre Channel Routing/EX_Ports	Integrated Routing or Integrated Routing Ports On Demand	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	• FICON Tape • High Performance Extension over FCIP/FC license	Local and attached switches
FICON XRC Sequence Emulation over an FCIP Tunnel	• FICON XRC • High Performance Extension over FCIP/FC license	Local and attached switches
FIPS	No license required.	N/A
Firmware download	No license required.	N/A

TABLE 5 License requirements and location name by feature (continued)

Feature	License	Where license should be installed
	NOTE The **firmwareDownload** command is provided automatically with Fabric OS on the switch.	
Flow Vision: • Flow Generator • Flow Performance Monitor • Flow Mirror	Fabric Vision NOTE On Gen 5 platforms, if you have both the Advanced Performance Monitoring and the Fabric Watch licenses installed, you do not need the Fabric Vision license.	Local switch
Full fabric connectivity	Full Fabric NOTE Also called the Fabric license (visible in **licenseShow** output) and the E_Port Upgrade license.	Local switch. May be required on attached switches.
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)	• 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 POD license on Brocade X6 directors. • 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	No license required.	N/A
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 NOTE License is needed on both sides of connection.
Monitoring and Alerting Policy Suite (MAPS)	Fabric Vision	Local switch

TABLE 5 License requirements and location name by feature (continued)

Feature	License	Where license should be installed
	NOTE If you have both the Advanced Performance Monitoring and the Fabric Watch licenses installed, you do not need the Fabric Vision license NOTE MAPS basic monitoring (system resources, SFP, Fabric Performance Impact) does not require a license.	
NPIV	No license required.	N/A
OpenSSH public key	No license required.	N/A
Port fencing	No license required.	Local switch
Ports	• Ports on Demand and Q-Flex Ports on Demand licenses required, applicable to a select set of switches only. • 10 Gigabit FCIP/Fibre Channel license to use 10-Gb FC ports on FC16-32 blades, FC16-48 blades, and the Brocade 6510 and 6520. • 10 Gigabit FCIP/Fibre Channel license to enable 10-Gb Ethernet ports on the FX8-24 extension blades.	Local switch
QoS	No license required.	N/A
QoS on HBA	No license required.	N/A
RADIUS	No license required.	N/A
RBAC	No license required.	N/A
Routing traffic	No license required. NOTE Port-based or exchanged-based routing, static routes, frame-order deliver, and dynamic routes all included.	N/A
Slow Drain Device Quarantine	Fabric Vision	Local and attached switches
Security	No license required. NOTE DCC, SCC, FCS, IP Filter, and authentication policies are all included.	N/A
SNMP	No license required.	N/A
Speed	A 10 Gigabit FCIP/Fibre Channel license is needed to support 10-Gb FC ports on FC16-32 blades, FC16-48 blades, and the Brocade 6510 and 6520, as well as to support the 10-Gb Ethernet ports on FX8-24 blades. (Refer to the previous Ports feature for more information.)	Local switch

TABLE 5 License requirements and location name by feature (continued)

Feature	License	Where license should be installed
SSH public key	No license required.	N/A
TACACS+	No license required.	N/A
Traffic Isolation	No license required.	N/A
Trunking	• ISL Trunking • ISL Trunking Over Extended Fabrics For ICL trunking, no license is required.	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	No license required for Brocade Gen 5 (16 Gbps) and Brocade Gen 6 (32 Gbps) platforms.	Local and any switch you will be managing using Web Tools.
Zoning	No license required.	N/A