Brocade® Fabric OS® Software Licensing User Guide, 9.2.x

User Guide
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Introduction

The Fabric OS® licensing guide provides a list of Fabric OS licenses, the licensing models and tasks, and the licensing requirements for individual features.

Supported Hardware and Software

The following hardware platforms are supported by Brocade Fabric OS 9.2.x.

Brocade Gen 7 (64G) Fixed-Port Switches

- Brocade G720 Switch
- Brocade G730 Switch
- Brocade 7850 Extension Switch

Brocade Gen 7 (64G) Directors

- Brocade X7-4 Director
- Brocade X7-8 Director

Brocade Gen 6 (32G) Fixed-Port Switches

- Brocade G610 Switch
- Brocade G620 Switch
- Brocade G630 Switch
- Brocade 7810 Extension Switch
- Brocade G648 Blade Server SAN I/O Module
- Brocade MXG610 Blade Server SAN I/O Module

Brocade Gen 6 (32G) Directors

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

Contacting Technical Support for Your Brocade® Product

If you purchased Brocade® product support from a Broadcom® OEM or solution provider, contact your OEM or solution provider for all your product support needs.

- OEM and solution providers are trained and certified by Broadcom to support Brocade products.
- Broadcom provides backline support for issues that cannot be resolved by the OEM or solution provider.
- Brocade Supplemental Support augments your existing OEM support contract, providing direct access to Brocade expertise. For more information on this option, contact Broadcom or your OEM.
- For questions regarding service levels and response times, contact your OEM or solution provider.

If you purchased Brocade product support directly from Broadcom, use one of the following methods to contact the Technical Assistance Center 24x7. For product support information and the latest information on contacting the Technical Assistance Center, go to www.broadcom.com/support/fibre-channel-networking/contact-brocade-support.

Online	Telephone
For nonurgent issues, the preferred method is to log on to the Support portal at support.broadcom.com. (You must initially register to gain access to the Support portal.) Once registered, log on and then select **Brocade Products**. You can now navigate to the following sites: • **Case Management** • **Software Downloads** • **Licensing** • **SAN Reports** • **Brocade Support Link** • **Training & Education**	For Severity 1 (critical) issues, call Brocade Fibre Channel Networking Global Support at one of the phone numbers listed at www.broadcom.com/support/fibre-channel-networking/contact-brocade-support.

Document Feedback

Quality is our first concern. We have made every effort to ensure the accuracy and completeness of this document. However, if you find an error or an omission or if you think that a topic needs further development, we want to hear from you. Send your feedback to documentation.pdl@broadcom.com. Provide the publication title; topic heading; publication number and page number (for PDF documents); URL (for HTML documents); and as much detail as possible.

Software Licensing Overview

Certain Fabric OS features require licenses to be enabled. These licenses, called feature licenses, are often factory-installed and supplied with your switch hardware; if they are 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 require its own license key.

See Available Fabric OS Licenses for a list of the optionally licensed features available in Fabric OS software.

Software Licensing Terminology

The following terms are used in this document:

- **Licensed feature** – Any hardware or software feature or set of features that requires a valid software license to operate on the device.
- **License file** – The file is produced by the Broadcom Licensing Portal when the license is generated. The license file can be an alphanumeric string formatted license or an XML file formatted license. The file is installed using the CLI or SANnav, and controls access to a licensed feature or feature set.
- **License ID (LID)** – The identification number that uniquely identifies a Brocade device. The LID is the same value as the WWN. The LID is used in conjunction with a transaction key to generate and download a software license from the Broadcom Licensing Portal. The software license is tied to the LID of the Brocade device for which the license was ordered and generated. You can view the LID using either the CLI or the GUI:
  - **CLI** – Connect to the switch and log in as an admin user. Enter `license --show -lid` to display the license ID of the switch.
  - **Web Tools GUI** – Connect to the switch using a web browser, which opens the Web Tools GUI. Log in as an admin and enter your switch password. Click **Switch Overview** in the top menu bar to view the switch details and WWN (LID).
- **Transaction key** – A unique key, along with the LID, is used to generate a software license from the Broadcom licensing portal. The transaction key is issued when a license is purchased. The transaction key is delivered in one of these methods:

  For POD Optic Kit and ICL Optic Kit:

  - **Paperpack** – The transaction key is printed and delivered within a POD optic hardware kit.
  - **Electronic** – The transaction key is generated in the Broadcom licensing portal when the customer enters a valid combination of the kit serial number and optic serial number.

  For standalone software:

  - **E-license** – The transaction key is contained in an email that is sent instantly to the customer after the sales order is created. The customer is sent the email message within a few minutes after the sales order is submitted, although the timing will vary depending on the network, internet connection, and so on.

License Models

Fabric OS software supports the following license models:

- **Regular model** – This license model is associated with a feature that has no scale or count parameter associated with it. Only a single instance of this license is supported on a target platform, and that license allows all capabilities for the feature.
- **Capacity model** – This license model is for a feature that has a scale or count parameter such as the count of additional ports allowed. Any previously installed capacity-based license is overwritten by the new higher capacity license for the same feature. Downgrading the capacity is not allowed.
- **Combo license** – This license model is for a group of features that have no scale or count parameter associated with them. This license includes a capacity-based feature only on the Brocade 7810 and the Brocade 7850 extension switches.

License Types for Different FOS Platforms

You can identify the license type for different Gen 6 and Gen 7 platforms based on their switch type. The following table provides you with the type of license used for different platforms.

Table 1: License Type for Different Platforms and Switch Types

Brocade Platform	Switch Type	License Type
Brocade G610 Switch	170	License string or XML file
Brocade G620 Switch	162	License string or XML file
Brocade G620 Switch	183	XML file
Brocade G630 Switch	173	License string or XMLfile
Brocade G630 Switch	184	XML file
Brocade 7810 Extension Switch	178	License string or XML file
Brocade X6-4 Director	165	License string or XML file
Brocade X6-8 Director	166	License string or XML file
Brocade G720 Switch	181	XML file
Brocade G730 Switch	189	XML file
Brocade X7-4 Director	179	XML file
Brocade X7-8 Director	180	XML file
Brocade 7850 Extension Switch	190	XML file

License Types

Fabric OS software supports the following license types:

- **Permanent license** – A permanent license enables a license-controlled feature to run on a switch indefinitely. Customers with active support can transfer the permanent license from a failed switch to a replacement switch.
- **Temporary license** – A temporary license enables a license-controlled feature to run on a switch on a temporary basis. A temporary license enables the 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 be installed only once on a switch, but it can be applied to as many switches as required. The temporary use duration (the length of time for which the feature will be enabled on a switch) is provided with the license keys.

How Software Licensing Works

A permanent license is ordered for selected features, after a switch is first shipped from the factory, or a switch SKU can be ordered that include the factory-installed license.

When a license is ordered separately (not preinstalled), a paperpack or email with a transaction key is sent by Broadcom. The transaction key and license ID (LID) of the FOS switch are used to generate a license key from the Broadcom software licensing portal. The FOS license keys are generated as an alphanumeric string format or as a license certificate in XML file format. You can install the license on the switch using the `license --install` command.

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

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

Available Fabric OS Licenses

This section lists the optionally licensed features in Fabric OS software. On Gen 7 platforms, many of these features may be included in the base product. On Gen 6 platforms, several of these features are available through the Enterprise Bundle in Fabric OS software.

Table 2: Fabric OS Licenses Available through the Enterprise Bundle

License	Description
Brocade Trusted FOS (TruFOS) Certificate	Brocade TruFOS Certificates ensure the integrity and authenticity of the Fabric OS firmware by validating the digital signature. This validation is useful during critical operations such as firmware upgrade or migration. Brocade TruFOS Certificates are factory-installed certificates that are supplied with all the Gen 6 and Gen 7 platforms.
Brocade Extended Fabrics	Provides greater than 10 km of switched fabric connectivity at full bandwidth over long distances (depending on the platform, the distance can be up to 3000 km). This license is not required for long-distance connectivity using licensed 10G ports.
Brocade Trunking	Provides the ability to aggregate multiple physical links into one logical link for enhanced network performance and fault tolerance.
Ports on Demand	Allows you to instantly scale the fabric by provisioning additional ports using license key upgrades. Applies to the G610, G620, G630, G720, and G730 Switches.
Double Density Ports on Demand	Allows you to instantly scale the fabric by provisioning additional ports using license key upgrades. Applies to the G720 and G730 Switches.
Fabric Vision (FV)	Allows you to activate the following features: • Monitoring and Alerting Policy Suite (MAPS) • Flow Vision • Running D_Port tests between a switch and non-Brocade HBAs On Brocade Gen 6 platforms, this license enables the IO Insight capability and is displayed as `Fabric Vision and IO Insight` in the `license --show` output.
FICON Management Server (Also known as Control Unit Port or "CUP")	Enables host control of switches in mainframe environments.
Integrated Routing	Allows any port in the G620 platform and Gen 7 platforms to be configured as an EX_Port supporting FC-FC routing.
Integrated Routing Ports on Demand	Supported only on Gen 6 platforms. It 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 fails with the warning message `Ex_Port IR POD License Limit Exceeded` and the port is disabled.
Inter-Chassis Link (ICL)	Supported on Gen 6 and Gen 7 directors. See ICL Licensing on Brocade Directors.
Q-Flex Ports on Demand	On Brocade G620 and Brocade G630 Switches, this license enables ports with a QSFP media module. For a Brocade G630 Switch, each module allows eight QSFPs, each containing four links up to a capacity of 32. The total number of user ports that are enabled by the license is displayed as the capacity for this license.
Advanced FICON Accelerator License	This license only enables the FCIP FICON emulation feature to be configured on a FCIP tunnel. It does not control usage of the FICON capability on the platform.

Table 3: Supported Fabric OS Licenses on Different Platforms

License	G610	G620	G630	7810	X6 Director	G720	G730	X7 Director	7850
Ports on Demand	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No
DD Ports on Demand	No	No	No	No	No	Yes	Yes	No	No
Q-Flex Ports on Demand	No	Yes	Yes	No	No	No	No	No	No
Integrated Routing	No	Yes	No Yes (For switch type 184)	No	No	Yes	Yes	Yes	Yes
Integrated Routing Port on Demand	No	No	Yes	Yes	Yes	No	No	No	No
Extended Fabrics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Trunking	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FICON Management Server	No	No	No	Yes	Yes	No	No	Yes	Yes
Fabric Vision	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ICL	No	No	No	No	Yes	No	No	Yes	No

ICL Licensing on Brocade Directors

Brocade inter-chassis links (ICLs) are high-performance ports for interconnecting multiple Brocade X7, X6, and DCX 8510 Directors. The ICL feature is used on the X7-4, X7-8, X6-4, X6-8, DCX 8510-4, and DCX 8510-8. This document focuses on the Brocade X7 and X6 product families that are supported by Fabric OS version 9.2.x.

After the addition or removal of a license, license enforcement is performed on the ICL ports only after being disabled and enabled. An ICL license must be installed on the enterprise platforms at both ends of the ICL connection.

ICL License on Brocade X6 Directors

The ICL license activates ICL ports on the X6 platform core blades.

- **On the Brocade X6-8** – For an X6-8 director, a maximum of two licenses is required to fully enable all ICL ports on each blade. Each core blade in the X6-8 supports 16 QSFP ports or 64 ICL links, for a total of 32 QSFP ports or 128 ICL links per system. Each ICL license has a capacity that can be displayed by the `license --show` command. The capacity defines the number of ICL links that can be enabled on each core blade once a license is installed.
  - **ICL license with 32-link capacity** – This license capacity enables the QSFP ports 0–3 (links 0–15) and 8–11 (links 32–47) on each core blade of the director. This license enables 64 ICL links on the system.
  - **ICL license with 64-link capacity** – This license capacity enables all of the QSFP ports 0–15 (links 0–63) on each core blade of the director. This license enables 128 ICL links on the system.
- **On the Brocade X6-4** – For an X6-4 director, a maximum of two licenses is required to fully enable all ICL ports on each blade. Each core blade in the X6-4 supports 8 QSFP ports or 32 ICL links. Each ICL license has a capacity that can be displayed by the `license --show` command. The capacity defines the number of ICL links that can be enabled on each core blade once a license is installed.

  - **ICL license with 16-link capacity** – This license capacity enables the QSFP ports 0–1 (links 0–7) and 4–5 (links 16–23) on each core blade of the director. This license enables 32 ICL links on the system.
  - **ICL license with 32-link capacity** – This license capacity enables all of the QSFP ports 0–7 (links 0–31) on each core blade of the director. This license enables 64 ICL links on the system.

ICL License on Brocade X7 Directors

The ICL license activates ICL ports on the X7 platform core blades. An ICL license must be installed on director platforms at both ends of the ICL connection. X7 licenses can be applied to either X7-4 or X7-8 directors and can support 8 QSFP ports (or 32 links).

- **On the Brocade X7-8** – For an X7-8 director, four licenses are required to fully enable all ICL ports. Each core blade in the X7-8 supports 16 QSFP ports or 64 ICL links. Each ICL license has a capacity that can be displayed by the `license --show` command. The capacity defines the number of ICL links that can be enabled on each core blade once a license is installed.
  - **ICL license with 16-link capacity** – This license capacity enables the QSFP ports 0–1 (links 0–7) and 8–9 (links 32–39) on each core blade of the director. This enables 32 ICL links on the system.
  - **ICL license with 32-link capacity** – This license capacity enables the QSFP ports 0–3 (links 0–15) and 8–11 (links 32–47) on each core blade of the director. This enables 64 ICL links on the system.
  - **ICL license with 48-link capacity** – This license capacity enables the QSFP ports 0–5 (links 0–23) and 8–13 (links 32–55) on each core blade of the director. This enables 96 ICL links on the system.
  - **ICL license with 64-link capacity** – This license capacity enables all the QSFP ports on each core blade of the director. This enables 128 ICL links on the system.
- **On the Brocade X7-4** – A 4-slot X7 director requires two licenses to enable all 16 ICL QSFP ports on both core blades. Each core blade in the X7-4 supports 8 QSFP ports or 32 ICL links. Each ICL license has a capacity that can be displayed by the `license --show` command. The capacity defines the number of ICL links that can be enabled on each core blade once a license is installed.
  - **ICL license with 16-link capacity** – This license capacity enables the QSFP ports 0–1 (links 0–7) and 4–5 (links 16–23) on each core blade of the director. This enables 32 ICL links on the system.
  - **ICL license with 32-link capacity** – This license capacity enables all QSFP ports on each core blade of the director. This enables 64 ICL links on the system.

Support for the Brocade 7810 Upgrade License

The Brocade 7810 Extension Switch supports a single upgrade license to enable features and capabilities available in a fully upgraded switch model.

The Brocade 7810 single upgrade license supports a combination of the following licenses:

- Advanced Extension
- Extension Fabric
- Fabric Vision and IO Insight
- Integrated Routing Ports on Demand
- Ports on Demand
- Trunking
- WAN Rate Upgrade

The following table lists the limitations of the base model, the base model with an upgrade license, and the fully upgraded license model for the Brocade 7810 Extension Switch.

Table 4: Base Model and Upgrade License for the Brocade 7810 Extension Switch

Features	Base Model	Base Model with Upgrade License or Fully Upgraded License Model
Adaptive Rate Limiting Support	Yes	Yes
Compression Support	Yes	Yes
Extension Trunking Support	No	Yes
Fabric Vision™ Support	No	Yes
FC Port Limits	4	12
FC Trunking Support	No	Yes
FICON Support	No	No
GE LAN Port Limits	4	4
GE Port Speed Limit	10Gb/s	10Gb/s
GE WAN Port Limits	2	6
IPsec Support	Yes	Yes
Max IPEX Flows (LAN TCP Connections)	128 per DP/128 per box	128 per DP/128 per box
VE Port Limits	2	4
WAN Bandwidth Limit	1Gb/s	2.5Gb/s

Support for the Brocade 7850 License

The Brocade 7850 extension switch supports the following licenses to enable the features and capabilities.

The Brocade 7850 extension switch supports the following combo licenses.

- Enterprise bundle, which supports a combination of the following licenses:
  - Extended Fabric
  - Trunking
  - Integrated Routing
  - Fabric Vision
- Mainframe enterprise bundle, which supports a combination of the following licenses:
  - Extended Fabric
  - Trunking
  - Integrated Routing
  - Fabric Vision
  - FICON Management Server (CUP)
  - Advanced Accelerator for FICON

Temporary Licensing

A temporary license allows you to try certain features before 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 applied on 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 regular temporary or universal temporary licenses:

- Advanced FICON Acceleration
- FICON Management Server (CUP)
- Integrated Routing
- Integrated Routing Ports on Demand
- ISL Trunking

NOTE
To obtain a temporary license, contact your Broadcom representative.

Date Change Restriction

Once a temporary license is installed, you cannot change the time maintained by the switch until the temporary license is removed. To change the time, you must remove the license, change the date and time, and then reinstall the license on the switch.

NOTE
A valid TruFOS Certificate on the platform is required for Restricted Time Adjustment (RTA).

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 because the license may no longer be valid.

Configuration Upload and Download Considerations

The `configdownload` or `configupload` commands download or upload the legacy, enhanced, consumed capacities, and temporary licenses.

The string-based licenses are uploaded and installed on `configdownload` after license validation. The XML-file-based licenses are installed as license certificates, and all license certificates are appended to the configuration file on `configupload`.

On `configdownload`, each license certificate is validated and installed on the switch.

Expired Licenses

The `license --show` 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, once the license is expired. 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 the license expires. Consequently, universal temporary licenses must not be installed on a switch until you are ready to use or test the feature, or you will unnecessarily consume a portion of the temporary-use duration.

The expiration date is based on the system time when the license is installed 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 product's license database 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 expiration date after the universal temporary license expiration date or by adding a permanent license. Reapplying 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.

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.

NOTE

- Capacity-based feature licenses (IR Ports on Demand, Ports on Demand, Q-Flex Ports on Demand, or ICL) are not allowed to be created as combination licenses with any other features in the same license (only the capacity-based feature and its capacity are allowed in the license). The capacity value in a capacity feature license cannot be zero or not specified.
- The POD features cannot be included in a single combination license with any other features.
- Trial licenses are supported only for a single feature, and a combination of trial licenses is not supported. On Brocade 7810 extension switch, the combo trial license is supported.

Table 5: License Requirements and Location by Feature

Feature	License	Where the License Should Be Installed
ClearLink Diagnostics (D_Port)	No license required for D_Port tests between two switches or between a switch and a Brocade HBA. A Fabric Vision license is required for D_Port tests between a switch and a non-Brocade HBA.	If a Fabric Vision license is required, it must be installed on the local switch.
Extended Fabrics	Extended Fabrics	Local and attached switches.
FCIP Trunking	Advanced Extension	Local and attached switches.
Fibre Channel Routing/EX_Ports	Integrated Routing or Integrated Routing Ports On Demand	Local switch.
FICON-CUP	FICON Management Server	Local switch.
Flow Vision: • Flow Generator • Flow Performance Monitor • Flow Mirror	Fabric Vision	Local switch.
Inter-Chassis Link (ICL)	ICL POD license on the Brocade X6 and X7 Director.	Local and attached platforms.
Long Distance	Extended Fabrics	Local and attached switches. A license is needed on both sides of the connection.

Feature	License	Where the License Should Be Installed
Monitoring and Alerting Policy Suite (MAPS)	Fabric Vision If you have the Advanced Performance Monitoring and the Fabric Watch licenses installed, you do not need the Fabric Vision license. MAPS basic monitoring (system resources, SFP, Fabric Performance Impact) does not require a license.	Local switch.
Ports	Ports on Demand and Q-Flex Ports on Demand licenses required; applicable to a select set of switches only.	Local switch.
Slow Drain Device Quarantine	Fabric Vision	Local and attached switches.
Trunking	Trunking license For ICL trunking, no license is required.	Local and attached switches.

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.

To install a license on a switch, perform the following tasks:

1. Order the desired license. For a list of available licenses, see the Available Fabric OS Licenses section.

   NOTE

   To obtain a trial license, contact your Broadcom representative.
2. When you receive the transaction key, retrieve the license ID (LID) of the switch using the CLI or the Web Tools GUI. See Obtaining the License ID.

   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 or XML-file-based license certificate. For instructions on obtaining a license, see the Generating a License Key or Certificate task.
4. Install the license on the switch.
   a. For instructions on installing the license using a license string, see the Installing a License Using License String task.
   b. For instructions on installing the license using an XML file, refer to the Installing the License Using XML File task.
5. Verify that the license is installed. For instructions on viewing an installed license, see the Viewing Licenses Installed on a Switch task.

Licensing Commands

The following table summarizes the Fabric OS CLI commands that can be used to manage licensed features. For detailed information on these commands, refer to the *Brocade Fabric OS Command Reference Manual*.

Table 6: Fabric OS Commands Related to Licensing

Command	Description
`license --export`	Exports the license certificate installed on the switch to a remote server.
`license --install`	Adds a license to the switch. The license key is case-sensitive and must be entered exactly.
`license {--release|--reserve} -port <port1>[-<port2>]`	Manages the release and reservation of a port before using a port on Dynamic Ports on Demand (DPOD) or Double Density Ports on Demand (DDPOD) license assignments.
`license --remove`	Removes a license from the switch.
`license --show`	Displays the license ID of the system. It also displays current license keys, along with a list of licensed products enabled by these keys.
`license --show -port`	Displays the details of the PORT, DD-PORT, or QUAD PORT license status and port assignments.
`license --help`	Use the --help argument to display a list of the available command arguments of `license` command.

Obtaining the License ID

You must have a license ID to generate the license file in the Broadcom Licensing Portal.

Obtain the license ID of the switch or chassis using the CLI method:

1. Connect to the switch, and log in using an account with admin permissions.
2. Enter `license --show -lid` to display the license ID of the switch.

```
switch:admin> license --show -lid
10:00:00:00:00:00:00:00
```

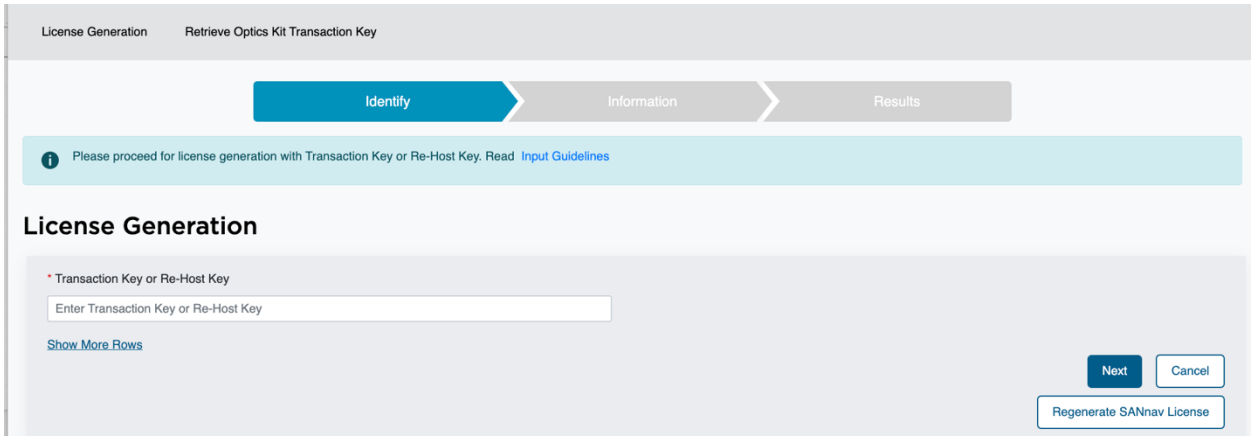
NOTE
To obtain the license ID using the Web Tools GUI, refer to the *Brocade Fabric OS Web Tools User Guide*.

Generating a License Key or Retrieving a Transaction Key

Use the following procedure to generate and obtain a FOS license key or retrieve an Optics Kit transaction key.

1. Go to https://www.support.broadcom.com, and then select **Login** or **Register** at the top-right of the web page.
2. Select **Hardware** > **Brocade Storage Networking** from the drop-down menu.
3. Click **+** next to the **Brocade Storage Networking**.
4. On the flyout menu, click **Licensing Portal**.
5. Enter the **Transaction Key or Re-Host Key** under License Generation. Click **Next** to continue.

Figure 1: License Generation

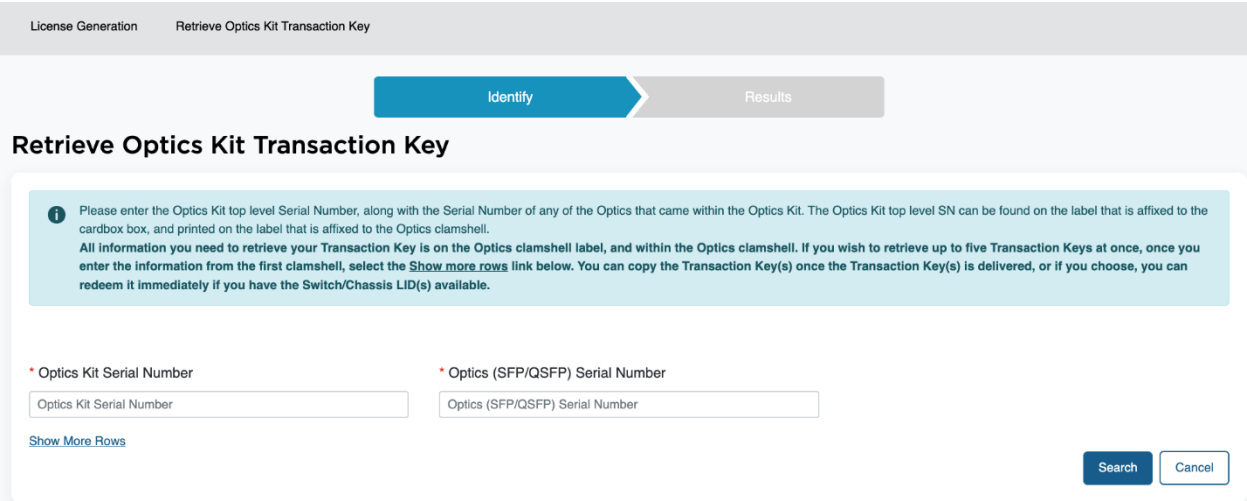


6. In the **Product Information Field**, enter the license ID (LID) that is on your switch. Click **Next** to continue.
7. Read the Broadcom End User License Agreement, and if you agree to the terms, select the **I have read and accept** checkbox.
8. Click **Generate** to generate the license. The license key is sent by email and can also be downloaded by selecting the blue license hyperlink from the Broadcom License Portal UI.
9. If an XML certificate file is generated, save it to the remote server, where it is retrieved for installing the license.
10. Next, you must install the license on the FOS device.

NOTE
Re-host keys are generated only by the SANnav™ application and are used only on SANnav.

11. If you are retrieving an Optics kit, enter the **Optics Kit Serial Number** of the Optics kit and Optics under **Retrieve Optics Kit Transaction Key** and follow the instructions on the screen.

Figure 2: Retrieving Optics Kit Transaction Key



Installing FOS Software Licenses

This section describes the procedure to install a FOS software license.

Installing a License Using a License String

Use this method to install a license on Gen 6 platforms with specific switch types. For more information on supported platforms, see License Types for Different FOS Platforms.

For Brocade Gen 6 switches and directors, you must pass the license key in the `license --install` command to install the license.

1. Connect to the switch, and log in using an account with admin permissions.
2. Activate the license using the `license --install -key <lic_key>` command.

```
switch:admin> license --install -key xxxxxxNSgmB4MCD3NmNWgQDWtAKBFtXtBSFJF

2019/09/19-03:06:06, [SEC-3051], 4715, SLOT 1 | CHASSIS, INFO, G620, The license key/serial number
 xxxxxxNSgmB4MCD3NmNWgQDWtAKBFtXtBSFJF is Added.
```

3. Verify that the license was installed by entering the `license --show` command. The licensed features that are currently installed on the switch are listed. If the feature is not listed, use the `license --install` command to install the license.

```
switch:admin> license --show

License Id: 10:00:00:00:00:00:00:00
License 1 :
-----------------------------------------------------------------
License key              : xxxxxxNSgmB4MCD3NmNWgQDWtAKBFtXtBSFJF
License features         : Ports on Demand
License Capacity         : 24
```

Installing a License Using an XML File

Use this method to install a license on Gen 6 and Gen 7 platforms using an XML certificate file. For more information on supported platforms, see License Types for Different FOS Platforms.

For Brocade Gen 6 and Gen 7 switches or directors, you must use the XML-file-based certificate file in the `license --install` command to install the license.

1. Connect to the switch, and log in using an account with admin permissions.
2. Activate the license using the `license --install` command.

```
switch:admin> license --install -h 10.10.10.10 -t scp -u UserName -p Password -f scp/repository/
FOS-87-0-04-00000040.xml
License Installed [FOS-87-0-04-00000040]
switch:admin>
```

3. Verify that the license was installed by entering the `license --show` command. The licensed features that are currently installed on the switch are listed. If a feature is not listed, use the `license --install` command to install the license.

```
switch:admin> license --show

License Id: 10:00:00:00:00:00:00:00
License 1:
--------------------------------------------------------------------------------
License serial number: FOS-87-0-04-00000040
License features     : Trunking
Generation Date      : 11/17/2021
```

Installing License Using a USB Storage Device

This section describes the method to install a license on Gen 6 and Gen 7 platforms using a USB storage device. For more information on supported platforms, see License Types for Different FOS Platforms. The `usb` option is used in `license --install` command to install the license certificate file from the USB storage.

Perform the following steps to install the license

1. Connect to the switch, and log in using an account with admin permissions.
2. Download the license certificate file from the licensing portal and copy the file to the USB storage.
3. Enable the USB storage using the `usbstorage --enable` command. Make sure the USB path is the relative path to the license certificate present in the USB storage.
4. Install the license using the `license --install -usb` command.

```
switch:admin> license --install -usb /license/FOS-87-0-04-00000040.xml
License Installed [FOS-87-0-04-00000040]

2022/05/11-08:19:01 (GMT),[SEC-3051], 1100, SLOT 1 | CHASSIS, INFO, sw0, The license key/serial number
 FOS-87-0-04-00000040 is Added.
```

5. Verify that the license was installed by entering the `license --show` command. The licensed features that are currently installed on the switch are listed.

```
switch:admin> license --show
License Id: 10:00:00:00:00:00:00:00
License 1:
-----------------------------------------
License serial number: FOS-87-0-04-00000040
License features     : Trunking
Generation Date      : 05/11/2022
```

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 Administration Guide* for information about enabling a feature.

Use the following procedure to add a licensed feature:

1. Connect to the switch, and log in using an account with admin permissions.
2. Install the license using the `license --install` command.
3. Verify that the license was installed by entering the `license --show` command. The licensed features that are currently installed on the switch are listed. If a feature is not listed, use the `license --install` command to install the license.

   Some features may require additional configuration, or you might need to disable and re-enable the switch to make them operational; refer to the *Brocade Fabric OS Administration Guide* for more information on feature configuration.

   The following command output example shows all possible licenses in addition to the Ports on Demand licenses for the Brocade G630 switch with switch type 173 running Fabric OS 9.2.0. The example includes a combination license for the non-capacity-licensed features.

   NOTE
   Any capacity license is overwritten when a license with equal or higher capacity for that same feature is added. Removing a newly added license leaves the switch without any license for the feature, as the prior license is not retained.

```
switch:admin> license --show
License Id:  10:00:00:00:00:00:00:00

switch:admin> license --install -key xxxxxxZ3m4FWYMJaK7JrH7DaJDDYFPfKBAY

2019/09/12-03:06:06, [SEC-3051], 4715, CHASSIS, INFO, G630, The license key/serial number
 xxxxxxZ3m4FWYMJaK7JrH7DaJDDYFPfKBAY is Added.


For license change to take effect, it may be necessary to enable affected ports...

switch:admin> license --install -key xxxxxxSS3FXXmHga4DNFSKZDQANmKWJPCSFYMWHAXHAA
2017/02/23-15:20:23, [SEC-3051], 1835, CHASSIS, INFO, G630, The license key
 xxxxxxSS3FXXmHga4DNFSKZDQANmKWJPCSFYMWHAXHAA is Added.

switch:admin> license --show
License Id:  10:00:00:00:00:00:00:00

License 1 :
-----------------------------------------------------------------
```

```
License key      : xxxxxxZ3m4FWYMJaK7JrH7DaJDDYFPfKBAYHA
License features : Extended Fabric
                   Trunking
                   Integrated Routing
                   Fabric Vision and IO Insight
```

The following command output example shows the Ports on Demand licenses for the Brocade G720 Switch running Fabric OS 9.2.0 using an XML file. Here, the example shows that the Enterprise bundle has been factory installed to include all FOS feature licenses.

```
switch:admin> license --show
  License Id : 10:00:00:00:00:00:00:00
  License 1 :
  ----------------------------------------------------------
    License serial number   : FOS-xx-0-04-xxxxxx74
    License features        : Ports on Demand
    License Capacity        : 30
    Generation date         : 05/10/2021
  License 2 :
  ----------------------------------------------------------
    License serial number   : FOS-xx-0-04-xxxxxx70
    License features        : Extended Fabric
                              Trunking
                              FICON_CUP
                              Integrated Routing
                              Fabric Vision and IO Insight
    Generation date         : 01/05/2021
```

The following command output example shows the Ports on Demand licenses for the Brocade G730 Switch running Fabric OS 9.2.0 using an XML file.

```
switch:admin> license --show
  License Id : 10:00:d8:1f:cc:3d:7c:c6
  License 1 :
  ----------------------------------------------------------
    License serial number   : FOS-xx-0-04-xxxxxx72
    License features        : Trusted FOS (TruFOS) Certificate
    Generation date         : 07/13/2022
    Expiry date             : 07/13/2023
  License 2 :
  ----------------------------------------------------------
    License serial number   : FOS-xx-0-04-xxxxxx90
    License features        : Inter Chassis Link (ICL)
    License Capacity        : 32 ICL links per CR blade (8 QSFPs per CR blade)
    Generation date         : 10/07/2021
  License 3 :
  ----------------------------------------------------------
    License serial number   : FOS-xx-0-04-xxxxxx91
    License features        : Extended Fabric
                              Trunking
                              FICON_CUP
                              Integrated Routing
                              Fabric Vision and IO Insight
```

Removing FOS Software Licenses

This section describes the procedures to remove 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 `license --show` command to display the active licenses.

```
switch:admin> license --show

License Id : 10:00:00:00:00:00:00:00
License 1 :
 ----------------------------------------------------------
License serial number   : FOS-01-0-01-00000006
License features        : Q-Flex Ports on Demand
License 2 :
----------------------------------------------------------
License serial number   : FOS-01-0-03-00000011
License features        : Trunking
License 3
----------------------------------------------------------
License key : xxxxxxLmRLCJ3rDGJ3NZrFNEgSNrCt4RB79mQ
License features : Fabric Vision and IO Insight
```

3. Remove the license key or XML-file-based license using the `license --remove` command.

```
switch:admin> license --remove -key xxxxxxLmRLCJ3rDGJ3NZrFNEgSNrCt4RB79mQ
License Removed [xxxxxxLmRLCJ3rDGJ3NZrFNEgSNrCt4RB79mQ]
switch:admin>
```

   The license key is case-sensitive and must be entered exactly as shown. After removing a license key, the licensed feature is disabled when the switch is rebooted or when it is disabled and enabled.

```
switch:admin> license --remove "FOS-01-0-03-00000011"
removing license serial number "FOS-01-0-03-00000011"
```

4. Enter the `license --show` command to verify that the license is disabled.

   Entering the `license --show` command after the `license --remove` command displays the remaining licenses.

```
switch:admin> license --show

License Id : 10:00:00:00:00:00:00:00
License 1 :
 ----------------------------------------------------------
License serial number   : FOS-01-0-01-00000006
License features        : Q-Flex Ports on Demand
```

   If there is no license serial number or XML-file-based license certificate, the `license --show` command displays the message `No licenses`.

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. Remove the license key using the `license --remove` command.

```
switch:admin> license --remove "FOS-01-0-03-00000011"
removing license serial number "FOS-01-0-03-00000011"
```

3. Enter the `reboot` command for the expiration to take effect.

Exporting a License Certificate

Use the following procedure to export a license certificate:

1. Connect to the switch, and log in using an account with admin permissions.
2. Enter the `license --export` command.

   Example 1: Export a license certificate with the default name.

```
switch:admin> license --export -h 10.10.10.10 -t scp -u UserName -p Password -d scp/repository -s
 FOS-87-0-04-00000028
```

   Example 2: Export a license certificate with the file name specified by the user.

```
switch:admin> license --export -h 10.10.10.10 -t scp -u UserName -p Password -f scp/repository/
LicenseFileName.xml -s FOS-87-0-04-00000028
```

   Example 3: Export all license certificates with the default name. When the license certificate filename is not specified by the user, the system provides a default name. The naming convention of a default license certificate name is *serialnumber-LicenseID_Feature_name*.xml.

```
switch:admin> license --export -h 10.10.10.10 -t scp -u UserName -p Password -d scp/repository -s all
```

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 `license --show` command.
   The first example shows the output for an XML-file-based license key, and the second example shows the output for a license string.

   Example 1:

```
switch:admin> license --show

License Id : 10:00:00:00:00:00:00:00
License 1 :
 ----------------------------------------------------------
License serial number   : FOS-01-0-01-00000006
License features        : Q-Flex Ports on Demand
```

```
License Capacity        : 16
Generation date         : 11/17/2021
License 2 :
-------------------------------------------------------------
License serial number   : FOS-01-0-03-00000011
License features        : Trunking
Generation date         : 11/17/2021
```

Example 2:

```
switch:admin> license --show
License Id : 10:00:00:00:00:00:00:00
License 1 :
-------------------------------------------------------------
License key             : xxxxxxgmYZ7F3A7WCaPr4mmHXWJ9mG3BSQ3D
License features        : Fabric Vision and IO Insight
```

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 re-add them. This is applicable only for key-based licenses. For an XML-file-based license, the `license --export` command must be used to export a license.

Some licenses might display with the message `Obsolete license` or `Unknown license`. This message happens because of changes in the licensing requirements. There are some features that no longer require a license key but are still installed on a switch.

Troubleshooting Licensing Issues

Some features require licenses to work properly. To view a list of features and their associated licenses, see License Requirements for Individual Features. Licenses are created using a switch license ID (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 `license --show` command.

1. Connect to the switch, and log in using an account with admin permissions.
2. Enter the `license --show` 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 `license --install` command.

Ports on Demand Overview

As your needs increase, you can activate unlicensed ports up to a device-constrained maximum by purchasing and installing the optional Ports on Demand (POD) licensed product.

The Brocade models in the following table can be purchased with the number of licensed ports indicated.

Table 7: POD 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. The Q-Flex Ports on Demand license provides 4 QSFP ports, providing a total of 16 individual links.
Brocade G630	Can be purchased with a base allowance of 48 licensed SFP ports and two license step upgrades of 24 ports each. A maximum of 96 SFP ports is allowed. The Q-Flex Ports on Demand license provides 8 QSFP ports, providing a total of 32 individual links.
Brocade 7810 Extension	Can be purchased with 4 or 12 licensed Fibre Channel ports. A maximum of 12 Fibre Channel ports is allowed.
Brocade G720	Can be purchased with 24, 32, 40, 48, 56, or 64 licensed ports. A maximum of 64 ports is allowed. The POD licenses are offered as 8 port POD licenses with 8 SFPs and 16 port POD licenses bundled with SFP-DDs (only one 16 port SFPDD POD bundled with SFP-DDs can be applied per switch).
Brocade G730	Can be purchased with 48, 72, 80, 96, 104, or 128 licensed ports. A maximum of 128 ports is allowed. The POD licenses are offered as 24 port POD licenses with 16 SFPs and 32 port POD licenses bundled with SFP-DDs (only one 32 port SFPDD POD bundled with SFP-DDs can be applied per switch).

ATTENTION

Licenses are not interchangeable between platforms. For example, if you bought a POD license for a Brocade G720, you cannot use that license on another Brocade G720 or Brocade G620. The licenses are based on the switch license IDs 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 8: Available User Ports When Implementing PODs and DDPODs

Platform	Available User Ports Without a POD License	Available User Ports With a POD License	POD Increments	DDPOD Increments	QSFP POD
Brocade G610	8 SFP+ ports	Ports on Demand: 24 SFP+ ports	8	N/A	N/A
Brocade G620	24 SFP+ ports	Ports on Demand: 48 SFP+ ports	12	N/A	Q-Flex Ports on Demand: 16 QSFP ports (4 ports on each QSFP)
Brocade G630	48 SFP+ ports	Ports on Demand: 96 SFP+ ports	24	N/A	Q-Flex Ports on Demand: 32 QSFP ports (4 ports on each QSFP)

Platform	Available User Ports Without a POD License	Available User Ports With a POD License	POD Increments	DDPOD Increments	QSFP POD
Brocade 7810 Extension	4 SFP+ ports	Ports on Demand: 12 SFP+ ports	8	N/A	N/A
Brocade G720	24 SFP+ ports	Ports on Demand: 56 SFP+ ports Double Density Ports on Demand: 16 SFPDD ports	8	16	N/A
Brocade G730	48 SFP+	Ports on Demand: 96 SFP+ ports Double Density Ports on Demand: 32 SFPDD ports	24	32	N/A

Ports on Demand is ready to be unlocked in the switch firmware. Its license key might be part of the licensed paperpack supplied with the switch software, or you can purchase the license key separately from your switch vendor. You might need to generate a license key from a transaction key supplied with your purchase. See Generating a License Key or Certificate for instructions on generating a license key.

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 number of ports does not exceed the licensed capacity.

Activating Ports on Demand Using an SSH Session

Use the following procedure to activate Ports on Demand using an SSH session:

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, see Adding a Licensed Feature.
4. Use the `portenable` command to enable the ports.

   Alternatively, you can disable and then enable the switch to activate the ports.
5. Use the `portshow` command to check the newly activated ports.

Dynamic Ports on Demand

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

The following switches support Dynamic POD:

- Brocade G610
- Brocade G620
- Brocade G630
- Brocade 7810 Extension
- Brocade G720
- Brocade G730

NOTE
Brocade G720 and Brocade G730 platforms support the DDPOD license.

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

If the switch detects more active links than allowed by the current POD licenses, 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 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 `license --show -port` command.

   The following example shows manually assigned POD licenses for the Brocade G620 Switch.

```
switch:admin> license --show -port
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 *)
```

   The following example shows manually assigned POD licenses for the Brocade 7810 Extension Switch.

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

12 SFP-based port assignments are provisioned for use in this switch:
  4 SFP-based port assignments are provisioned by the base switch allowance
  8 SFP-based port assignments are provisioned by the Ports on Demand license
SFP-based ports assigned to the base switch allowance:
  0, 1*, 2, 3
```

```
SFP-based ports assigned to the Ports on Demand license:
  8, 9, 10, 11*
SFP-based ports that are not assigned:
  4, 5, 6, 7
4 license reservations are still available for use by unassigned ports

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

The following example shows manually assigned POD licenses for the Brocade G720 Switch.

```
switch:admin> license --show -port
    64 ports are available in this switch
   Ports on Demand license is installed
     Dynamic POD method is in use

   64 port assignments are provisioned for use in this switch:
        24 port assignments are provisioned by the base switch allowance
        40 port assignments are provisioned by the Ports on Demand license
   64 ports are assigned to the base switch allowance or installed licenses:
        24 ports are assigned to the Ports on Demand base switch allowance
        40 ports are assigned to the Ports on Demand license
  ports assigned to the base switch allowance:
     0*, 1*, 2*, 3*, 4*, 5*, 6*, 7*, 8*, 9*
     10*, 11*, 12*, 13*, 14*, 15*, 50, 51*, 52*, 53*
     54*, 55*, 56*, 57*
  ports assigned to the Ports on Demand license:
     16*, 17*, 18*, 19*, 20*, 21*, 22*, 23*, 24*, 25*
     26*, 27*, 28*, 29*, 30*, 31*, 32*, 33*, 34*, 35*
     36*, 37*, 38*, 39*, 40*, 41*, 42*, 43*, 44*, 45*
     46*, 47*, 48*, 49*, 58*, 59*, 60*, 61*, 62*, 63*
  ports that are not assigned:
     None
   0 license reservations are still available for use by unassigned ports

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

The following example shows manually assigned DDPOD licenses for the Brocade G730 Switch.

```
switch:admin> license --show -port
   128 ports are available in this switch
   Ports on Demand license is installed
     Dynamic POD method is in use

  128 port assignments are provisioned for use in this switch:
        48 port assignments are provisioned by the base switch allowance
        80 port assignments are provisioned by the Ports on Demand license
  128 ports are assigned to the base switch allowance or installed licenses:
        48 ports are assigned to the Ports on Demand base switch allowance
        80 ports are assigned to the Ports on Demand license
  ports assigned to the base switch allowance:
     0, 1, 2, 3, 4, 5, 6, 7, 8, 9
     10, 11, 12, 13, 14, 15, 16, 17, 18, 19
     20, 21, 22, 23, 24, 25, 26, 27, 28, 29
     30, 31, 32, 33, 34, 35, 36, 37, 38, 39
     40, 41, 42, 43, 44, 45, 46, 47
```

```
  ports assigned to the Ports on Demand license:
     48*, 49*, 50*, 51*, 52*, 53*, 54*, 55*, 56*, 57*
     58*, 59*, 60*, 61*, 62*, 63*, 64*, 65*, 66*, 67*
     68*, 69*, 70*, 71*, 72*, 73*, 74*, 75*, 76*, 77*
     78*, 79*, 80*, 81*, 82*, 83*, 84*, 85*, 86*, 87*
     88*, 89*, 90*, 91*, 92*, 93*, 94*, 95*, 96*, 97*
     98*, 99*, 100*, 101*, 102*, 103*, 104*, 105*, 106*, 107*
     108*, 109*, 110*, 111*, 112*, 113*, 114*, 115*, 116*, 117*
     118*, 119*, 120*, 121*, 122*, 123*, 124*, 125*, 126*, 127*
  ports that are not assigned:
     None
   0 license reservations are still available for use by unassigned ports

  80 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 an 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 is not 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 is 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 `switchshow` and `license --show -port` commands to verify that port reservations are available.

```
switch:admin> switchshow
switchName:     G720_Switch
switchType:     181.0
switchState:    Online
switchMode:     Native
switchRole:     Subordinate
switchDomain:   6
switchId:       fffc06
switchWwn:      10:00:d8:1f:cc:66:79:4a
zoning:         ON (latest)
switchBeacon:   OFF
FC Router:      OFF
Fabric Name:    "FOS_SQA_IDC_8"
HIF Mode:       OFF
Allow XISL Use: ON
LS Attributes:  [FID: 128, Base Switch: No, Default Switch: Yes, Ficon Switch: No, Address Mode 0]
Index Port Address  Media Speed   State       Proto
==================================================
   0   0   060000   --    N64     No_Module   FC  LS (Ports on Demand license not assigned or reserved
 yet)
   1   1   060100   --    16G     No_Module   FC  (Ports on Demand license not assigned or reserved yet)
   2   2   060200   --    16G     No_Module   FC  (Ports on Demand license not assigned or reserved yet)
   3   3   060300   --    N64     No_Module   FC  (Ports on Demand license not assigned or reserved yet)
   4   4   060400   --    N64     No_Module   FC
```

```
  5   5   060500   id    N32     Online      FC  E-Port  10:00:88:94:71:b1:8a:70 "Awing" (upstream)
  6   6   060600   --    N64     No_Module   FC
  8   8   060800   --    N64     No_Module   FC
  9   9   060900   --    N64     No_Module   FC
 10  10   060a00   --    N64     No_Module   FC
 11  11   060b00   id    N32     Online      FC  E-Port  10:00:88:94:71:b6:e1:d0 "IDCTyr"
 12  12   060c00   id    N32     Online      FC  E-Port  10:00:d8:1f:cc:c5:5d:50 "Vesper" (Trunk master)

 13  13   060d00   id    N32     Online      FC  F-Port  10:00:00:10:9b:5a:24:c8
 14  14   060e00   --    N64     No_Module   FC
 15  15   060f00   --    N64     No_Module   FC
 16  16   061000   --    N64     No_Module   FC
 18  18   061200   --    N64     No_Module   FC  (Ports on Demand license not assigned or reserved yet)
 19  19   061300   --    N64     No_Module   FC  (Ports on Demand license not assigned or reserved yet)
 20  20   061400   --    N64     No_Module   FC  (Ports on Demand license not assigned or reserved yet)
 21  21   061500   --    N64     No_Module   FC  (Ports on Demand license not assigned or reserved yet)
 22  22   061600   --    N64     No_Module   FC  (Ports on Demand license not assigned or reserved yet)
 23  23   061700   --    N64     No_Module   FC  (Ports on Demand license not assigned or reserved yet)
 24  24   061800   id    N32     Online      FC  F-Port  10:00:00:10:9b:5a:24:63
 25  25   061900   --    N64     No_Module   FC  (Ports on Demand license not assigned or reserved yet)
 26  26   061a00   id    N64     No_Light    FC  (Ports on Demand license not assigned or reserved yet)
 27  27   061b00   --    N64     No_Module   FC  (Ports on Demand license not assigned or reserved yet)
 28  28   061c00   --    N64     No_Module   FC  (Ports on Demand license not assigned or reserved yet)
 29  29   061d00   --    N64     No_Module   FC  (Ports on Demand license not assigned or reserved yet)
 30  30   061e00   --    N64     No_Module   FC  (Ports on Demand license not assigned or reserved yet)
 31  31   061f00   --    N64     No_Module   FC  (Ports on Demand license not assigned or reserved yet)
 32  32   062000   --    N64     No_Module   FC  (Ports on Demand license not assigned or reserved yet)
 33  33   062100   --    N64     No_Module   FC  (Ports on Demand license not assigned or reserved yet)
 34  34   062200   id    N32     Online      FC  F-Port  20:08:00:11:0d:23:d3:00
 35  35   062300   --    N64     No_Module   FC  (Ports on Demand license not assigned or reserved yet)
 36  36   062400   --    N64     No_Module   FC  (Ports on Demand license not assigned or reserved yet)
 37  37   062500   --    N64     No_Module   FC  (Ports on Demand license not assigned or reserved yet)
 38  38   062600   id    N32     Online      FC  E-Port  10:00:d8:1f:cc:4d:f3:74 "X78"
 39  39   062700   --    N64     No_Module   FC  (Ports on Demand license not assigned or reserved yet)
 40  40   062800   id    N32     Online      FC  F-Port  10:00:00:10:9b:5a:24:f8
 41  41   062900   --    N64     No_Module   FC  (Ports on Demand license not assigned or reserved yet)
 42  42   062a00   --    N64     No_Module   FC  (Ports on Demand license not assigned or reserved yet)
 43  43   062b00   id    N64     No_Light    FC  (Ports on Demand license not assigned or reserved yet)
 44  44   062c00   --    N64     No_Module   FC  (Ports on Demand license not assigned or reserved yet)
 45  45   062d00   id    N32     Online      FC  E-Port  10:00:d8:1f:cc:4d:f3:74 "X78"
 46  46   062e00   id    N64     Online      FC  E-Port  10:00:d8:1f:cc:4d:f3:74 "X78"
 47  47   062f00   --    N64     No_Module   FC  (Ports on Demand license not assigned or reserved yet)
 48  48   063000   --    N64     No_Module   FC  (Ports on Demand license not assigned or reserved yet)
 49  49   063100   --    N64     No_Module   FC  (Ports on Demand license not assigned or reserved yet)
 50  50   063200   --    N64     No_Module   FC  (Ports on Demand license not assigned or reserved yet)
 51  51   063300   --    N64     No_Module   FC  (Ports on Demand license not assigned or reserved yet)
 52  52   063400   id    N64     Mod_Flt     FC  "SFP Media Fault"(Ports on Demand license not assigned
or reserved yet)
 53  53   063500   id    N64     Mod_Flt     FC  "SFP Media Fault"(Ports on Demand license not assigned
or reserved yet)
 54  54   063600   id    N64     Mod_Flt     FC  "SFP Media Fault"(Ports on Demand license not assigned
or reserved yet)
```

```
  55  55   063700   id    N64     Mod_Flt     FC  "SFP Media Fault"(Ports on Demand license not assigned
 or reserved yet)
  56  56   063800   id    N64     Mod_Flt     FC  "SFP Media Fault"(Ports on Demand license not assigned
 or reserved yet)
  57  57   063900   id    N64     Mod_Flt     FC  "SFP Media Fault"(Ports on Demand license not assigned
 or reserved yet)
  58  58   063a00   --    N64     No_Module   FC  (Ports on Demand license not assigned or reserved yet)
  59  59   063b00   --    N64     No_Module   FC  (Ports on Demand license not assigned or reserved yet)
  60  60   063c00   id    N64     Online      FC  E-Port  10:00:d8:1f:cc:c5:5d:50 "Vesper" (Trunk master)

  61  61   063d00   id    N64     Mod_Uns     FC  "SFP in a DD-SFP port"(Ports on Demand license not
 assigned or reserved yet)
  63  63   063f00   id    N64     Online      FC  E-Port  (Trunk port, master is Port 60  )
switch:admin> license --show -port
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 action based on whether port reservations are available:
   - If a port reservation is available, enter the `license --reserve -port` command to reserve a license for a port or range of ports.
     ```
     switch:admin> license --reserve -port 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 to release a port from its POD assignment. Once the port is released, you can reserve it.
4. Enter the `switchshow` and `license --show -port` commands to verify whether port reservations are available. The following example shows the remaining POD licenses after the reservation in the Brocade G720 Switch.

```
switch:admin> license --show -port
   64 ports are available in this switch
   Ports on Demand license is installed
     Dynamic POD method is in use

   58 port assignments are provisioned for use in this switch:
        24 port assignments are provisioned by the base switch allowance
        34 port assignments are provisioned by the Ports on Demand license
```

```
 23 ports are assigned to the base switch allowance or installed licenses:
      23 ports are assigned to the Ports on Demand base switch allowance
       0 ports are assigned to the Ports on Demand license
ports assigned to the base switch allowance:
   4*, 5, 6*, 7, 8*, 9*, 10*, 11, 12, 13
   14*, 15*, 16*, 17, 24, 34, 38, 40, 45, 46
   60, 62, 63
ports assigned to the Ports on Demand license:
   None
ports that are not assigned:
   0, 1, 2, 3, 18, 19, 20, 21, 22, 23
   25, 26, 27, 28, 29, 30, 31, 32, 33, 35
   36, 37, 39, 41, 42, 43, 44, 47, 48, 49
   50, 51, 52, 53, 54, 55, 56, 57, 58, 59
   61
35 license reservations are still available for use by unassigned ports

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

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. Before you can reassign 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), a vacancy is created 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 port offline.

```
switch:admin> portdisable 0
```

3. Enter the `portshow` command to verify that the port state is offline.
4. Enter the `license --release -port` command to remove a port or range of ports from the POD license.

```
switch:admin> license --release -port 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 `license --show -port` command to verify that the port is no longer assigned to a POD set.

```
switch:admin> license --show -port
  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 port back online.
7. Enter the `portshow` command to verify that the state of the port is now online.

Revision History

The revision history provides a list of the important changes made in each version of the document.

FOS-92x-Licensing-UG100; April 28, 2023

Initial document version.

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