

Installing and Maintaining Firmware

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Firmware management overview

Brocade firmware upgrades consist of multiple firmware packages listed in a `.plist` file. The `.plist` file contains specific firmware information (time stamp, platform code, version, and so forth) and the names of the firmware packages to be downloaded. These packages are made available periodically to add features or to remedy defects in the firmware. In SLX-OS, the firmware upgrade is performed incrementally. The **firmware download** command compares the new firmware packages against the current installation and only downloads the packages that contain new features or have been modified.

You can download the firmware from a remote server by means of the File Transfer Protocol (FTP), SSH File Transfer Protocol (SFTP), Trivial File Transfer Protocol (TFTP), or Secure Copy Protocol (SCP). If you want to download firmware from a remote server, you must connect the management Ethernet port of the router to the server. In a modular chassis, both management Ethernet ports need to be connected. Downloading from a Brocade proprietary USB drive is also supported.

If a **firmware download** session is interrupted by an unexpected reboot, SLX OS attempts to recover the previously installed firmware. Success depends on the state of the firmware download. You must wait for the recovery to complete before initiating another firmware download.

Preserving the configuration

To preserve the configurations, back up the configuration using the **copy running-config filename** command before the firmware download. After the upgrade is completed, run the **copy filename running-config** command.

Automatic firmware synchronization

When you replace or insert a second management module into a chassis, the active management module automatically synchronizes the hot-plugged standby management module with the same firmware version. The standby management module restarts with the upgraded firmware. The automatic firmware synchronization takes place only if all of the following conditions are met:

- The standby management module is inserted while the chassis is already up (hot-plugged insert).
- There was no firmware download process running when the standby management module was inserted.
- The active and standby firmware versions must be different.

NOTE

Automatic firmware synchronization is intrinsic to SLX OS and no corresponding **enable** or **disable** commands are associated with the feature. As a result, the feature cannot be disabled.

Supported platforms

The following lists supported firmware versions by platform.

TABLE 3 SLX-OS firmware support by platform

Platform	16r.1.00	16r.1.01	17r.1.00
Brocade SLX 9850 Router	yes	yes	yes
Brocade SLX 9540 Router	no	no	yes

Connecting to the device

When you upgrade firmware in default mode, you connect to the device through the management IP address.

Use the **show system** command to display the management IP address for the chassis.

```
device# show system
Stack MAC                : 60:9c:9f:b0:92:00

  -- UNIT 0 --
Unit Name                 : cedar-spine-2
Ethernet Port(s)         : 32
Up Time                   : up 17 days 0:33
Current Time              : 23:20:38 GMT
SLX-OS Version            : 17s.1.0017s.1.00_bld63
Jumbo Capable             : yes
Burned In MAC            : 60:9C:9F:B0:93:1A
Management IP             : 10.20.234.119 <- Chassis Management IP address
Management Port Status    : UP

  -- Power Supplies --
PS1 is faulty
PS2 is OK

  -- Fan Status --
Fan 1 is Ok, speed is 6409 RPM
Fan 2 is Ok, speed is 6225 RPM
Fan 3 is Ok, speed is 6225 RPM
Fan 4 is Ok, speed is 6409 RPM
Fan 5 is Ok, speed is 6409 RPM
Fan 6 is Ok, speed is 6409 RPM
```

NOTE

You must configure the gateway and default route that is pointing to the management interface within the mgmt-vrf and address-family unicast context.

Upgrading considerations and restrictions

Consider the following when upgrading your firmware version:

- Upgrading SLX-OS is automatically allowed because the Telnet server and SSH server status are enabled by default.

Prerequisites

To prepare for a firmware download, perform the tasks listed in this section. In the unlikely event of a failure or timeout, you will be able to provide your router support provider the information required to troubleshoot the firmware download.

1. Verify the current firmware version. Refer to [Obtaining the firmware version](#) on page 13 for details.
2. Download the firmware package from the Brocade website to an FTP server.
3. Decompress the firmware archive. Refer to [Obtaining and decompressing firmware](#) on page 13.
4. Decide on a migration path. Check the connected devices to ensure firmware compatibility. Refer to the "SLX OS Compatibility" section of the *SLX OS Release Notes* for the recommended firmware version.
5. In a modular system, if you are to download firmware from a file server, verify that the management ports on both MMs are connected to the firmware file server.
6. Back up your router configuration using the **copy running-config filename** command before the firmware download.
7. For additional support, connect the router to a computer with a serial console cable. Ensure that all serial consoles and any open network connection sessions, such as Telnet, are logged and included with any trouble reports.
8. Enter the **copy support** command to collect all current core files prior to executing the firmware download. This information helps to troubleshoot the firmware download process in the event of a problem. Once the **copy support** command is issued and the files collected, the **clear support** command can be issued to remove the files from the list.
9. Enter the **clear logging raslog** command to erase all existing messages in addition to internal messages.

Obtaining the firmware version

Enter the **show version** command to obtain the firmware version for both primary and secondary partitions of each module.

```
device# show version

SLX-OS Operating System Software
SLX-OS Operating System Version: 16r.1.01
Copyright (c) 1995-2016 Brocade Communications Systems, Inc.
Firmware name:      16r.1.01slxos_16r.1.x_maint_160819_1858
Build Time:         05:11:01 Aug 20, 2016
Install Time:       18:32:33 Aug 22, 2016
Kernel:             2.6.34.6

Control Processor:  GenuineIntel with 7890 MB of memory

System Uptime:      0days 12hrs 35mins 29secs

Slot  Name      Primary/Secondary Versions      Status
-----
M1    SLX-OS      16r.1.01slxos_16r.1.x_maint_160819_1858  STANDBY*
      16r.1.01slxos_16r.1.x_maint_160819_1858
```

Obtaining and decompressing firmware

Firmware upgrades are available for customers with support service contracts and for partners on the Brocade website at www.mybrocade.com.

You must download the firmware package to an FTP-variant server and decompress the package *before* you can use the **firmware download** command to upgrade the firmware on your equipment.

You may also download the firmware from a USB drive using the **firmware download usb** command.

When you unpack the downloaded firmware, it expands into a directory that is named according to the firmware version. When issued with the path to the directory where the firmware is stored, the **firmware download** command performs an automatic search for the correct package file type associated with the device.

Five **firmware download** download options are available:

- **coldboot** - Downloads the firmware to the system and reboots the device.
- **default-config** - Removes all configuration and is similar to an initial installation and configuration.
- **usb** - Downloads the firmware to the system without activating it, so the device is not automatically rebooted.
- **noactivate** - Downloads the firmware to the system without activating it, so the device is not automatically rebooted.
- **nocommit** - Disables auto-commit mode. When auto-commit mode is disabled, firmware is downloaded only to the primary partition.
- **noceboot** - Disables auto-reboot mode. When auto-reboot mode is disabled, you must reboot the device manually.

Refer to the *Brocade SLX-OS Command Reference* for complete information on all of the available options for the **firmware download** command.

NOTE

To be able to address the FTP server by its name, ensure that a Domain Name System (DNS) entry is established for the server.

NOTE

SLX-OS does not support the use of special characters (such as & ! % #) in FTP, TFTP, SFTP, or SCP passwords. If your password contains special characters, the download fails.

Standard method for downloading firmware

The **firmware download** has several options for downloading firmware for your device that help control the process. For complete information on the remaining **firmware download** command options, refer to the *Brocade SLX-OS Command Reference*.

By default, if you enter the firmware download command without any options, the command invokes ISSU to upgrade the entire system. ISSU involves an High Availability failover of the active management module and is non-disruptive. In contrast, both of the coldboot and default-config options involve system reboots and are disruptive to traffic.

If the **firmware download** command is interrupted because of an unexpected reboot, such as a result of a software error or power failure, the command automatically recovers the corrupted secondary partition. Wait for the recovery to complete before beginning another firmware download.

The follow example shows a typical firmware download command execution:

```
device# firmware download ftp directory /buildsjc/sre/SQA/slxos/17r.1.00/17r.1.00 host 10.31.2.27 user
releaseuser password releaseuser
```

```
Performing system sanity check...
```

```
This command will use the ISSU protocol to upgrade the system. It will cause a WARM reboot and will require
that existing telnet, secure telnet or SSH sessions be restarted.
```

```
Do you want to continue? [y/n]y
```

Once the process completes, log in to the device and execute the **show version** command. Both partitions on the device or on the modules should contain the new firmware.

```
device# show version
SLX-OS Operating System Software
SLX-OS Operating System Version: 17r.1.00
```

```

Copyright (c) 1995-2017 Brocade Communications Systems, Inc.
Firmware name:      17r.1.0017r.1.00_bld63
Build Time:         21:24:13 Mar  7, 2017
Install Time:       21:46:10 Mar  9, 2017
Kernel:            2.6.34.6
Host Version:       Ubuntu 14.04 LTS
Host Kernel:        Linux 3.14.17

```

```
Control Processor:   QEMU Virtual CPU version 2.0.0
```

```
System Uptime:      16days 23hrs 48mins 7secs
```

Slot	Name	Primary/Secondary Versions	Status
SW/0	SLX-OS	17r.1.0017r.1.00_bld63 17r.1.0017r.1.00_bld63	ACTIVE*

Downloading firmware using the default-config option

The **firmware download** has several options for downloading firmware for your device that help control the process. For complete information on the remaining **firmware download** command options, refer to the *Brocade SLX-OS Command Reference*.

The **firmware download default-config** command allows you to download a new firmware onto the router, clean up the configuration, and then force the router to perform a cold reboot.

This option is useful to prevent issues caused by incompatible configuration between the old and new firmware.



CAUTION

When you invoke **firmware download default-config**, traffic is disrupted and the configuration is lost. You must save the configuration information before you execute the command and then restore it afterwards.

1. Download the firmware from the source directory with the default-config option.

```

device# firmware download scp host 10.xx.xx.109 user fvt directory /buildsjc/sre/slx/slx17r.1.00/
slx17r.1.00 password pray4green coldboot
Performing system sanity check...

```

This command will cause a cold/disruptive reboot and will require that existing telnet, secure telnet or SSH sessions be restarted.

```
Do you want to continue? [y/n]:y
```

2. Log back into the device. Enter the **firmware commit** command to commit the new firmware. If you entered **y** after the prompt, the device will commit the firmware automatically upon booting up.

```

device# firmware commit
Validating primary partition...
Doing firmwarecommit now.
Please wait ...
Replicating kernel image
.....
FirmwareCommit completes successfully.

```

3. Enter the **show version** command. Both partitions on the device or on the modules should contain the new firmware.

```
device# show version
SLX-OS Operating System Software
SLX-OS Operating System Version: 17s.1.00
Copyright (c) 1995-2017 Brocade Communications Systems, Inc.
Firmware name:      17s.1.0017s.1.00_bld63
Build Time:         21:24:13 Mar  7, 2017
Install Time:       21:46:10 Mar  9, 2017
Kernel:             2.6.34.6
Host Version:       Ubuntu 14.04 LTS
Host Kernel:        Linux 3.14.17

Control Processor:   QEMU Virtual CPU version 2.0.0

System Uptime:      16days 23hrs 48mins 7secs

Slot   Name      Primary/Secondary Versions      Status
-----
SW/0   SLX-OS    17s.1.0017s.1.00_bld63
                  17s.1.0017s.1.00_bld63
                  ACTIVE*
```

4. a)
- b)

```
switch(mode)#command executable
Command output
```

Downloading firmware using the coldboot option

The **coldboot** option in the **firmware download** command allows you to download new firmware onto a device and forces the device to perform a cold reboot. For complete information on the remaining **firmware download** command options, refer to the *Brocade SLX-OS Command Reference*.

After the firmware completes downloading the device reboots. This ensures that both partitions reboot with the same firmware, and prevents any firmware compatibility issues that may exist between the old and the new firmware.



CAUTION

When you invoke **firmware download coldboot**, traffic is disrupted and the configuration is lost. You must save the configuration information before you execute the command and then restore it afterwards.

1. Download the firmware from the source directory with the coldboot option.

```
device# firmware download default-config ftp host 10.xx.xx.3 user fvt password pray4green directory
dist file release.plist

Performing system sanity check...
This command will set the configuration to default.
This command will cause Cold reboot on both psrtitionss at the same time and will require that
existing telnet, secure telnet or SSH sessions be restarted.

Do you want to continue? [y/n]: y
```

- Log back into the device. Enter the **firmware commit** command to commit the new firmware. If you entered **y** after the prompt, the device will commit the firmware automatically upon booting up.

```
device# firmware commit
Validating primary partition...
Doing firmwarecommit now.
Please wait ...
Replicating kernel image
.....
FirmwareCommit completes successfully.
```

- Enter the **show version** command. Both partitions on the device or on the modules should contain the new firmware.

```
device# show version
SLX-OS Operating System Software
SLX-OS Operating System Version: 17s.1.00
Copyright (c) 1995-2017 Brocade Communications Systems, Inc.
Firmware name:      17s.1.0017s.1.00_bld63
Build Time:         21:24:13 Mar  7, 2017
Install Time:       21:46:10 Mar  9, 2017
Kernel:             2.6.34.6
Host Version:       Ubuntu 14.04 LTS
Host Kernel:        Linux 3.14.17

Control Processor:   QEMU Virtual CPU version 2.0.0

System Uptime:       16days 23hrs 48mins 7secs
```

Slot	Name	Primary/Secondary Versions	Status
SW/0	SLX-OS	17s.1.0017s.1.00_bld63 17s.1.0017s.1.00_bld63	ACTIVE*

Downloading firmware from a USB device

Brocade devices support firmware download from a Brocade-branded USB device. You cannot use a third-party USB device. Before you can access the USB device, you must enable the device and mount it as a file system. The firmware images to be downloaded must be stored in the factory-configured `firmware` directory. Multiple images can be stored under this directory.

- Ensure that the USB device is connected to the device.
- Enter the **usb on** command in privileged EXEC mode.
- Enter the **usb dir** command. In this sample output, the "X" refers to the current version number.

```
device# usb on
Trying to enable USB device. Please wait...
USB storage enabled
```

```
device# usb dir
firmwarekey\ 0B 2016 Dec 15 15:13
support\ 106MB 2016 Dec 24 05:36
config\ 0B 2016 Dec 15 15:13
firmware\ 380MB 2016 Dec 15 15:13
SLX-OS_vX.X.X\ 379MB 2016 Dec 15 15:31
Available space on usbstorage 74%
```

- Enter the **firmware download usb** command followed by the relative path to the firmware directory, where the "X" refers to the current version number.

```
device# firmware download usb directory SLX-OS_vX.X.X
```

5. Enter the **usb off** command to unmount the USB storage device for safe removal.

```
device# usb off
Trying to disable USB device. Please wait...
USB storage disabled.
```

Peripheral firmware upgrades

Some device peripherals can have their firmware upgraded through a Linux shell.

Brocade SLX 9850 peripheral firmware upgrade

This procedure upgrades the peripheral firmware on the Brocade SLX 9850.

1. After the device boots, log in to a Linux shell using the **start-shell**.

```
device# start-shell
```

2. Check the FPGA version. If FPGA version is not latest then use following example to upgrade it.

```
# fpga version
```

3. On the active MM use the **sysfpga_upgrade** command to upgrade the Active MM FPGA.

```
# sysfpga_upgrade
```

4. On the standby MM use the **sysfpga_upgrade** command to upgrade the Active MM FPGA.

```
# /fabos/link_bin/sysfpga_upgrade
```

5. Optional: On the active MM, upgrade the FPGA firmware for the linecard (LC) using the **sysfpga_upgrade lc <slot#>** command.

The range of valid slot values is from 1 through 4 for the Brocade SLX 9850-4.

The range of valid slot values is from 1 through 8 for the Brocade SLX 9850-8.

```
# sysfpga_upgrade lc 3
```

6. Optional: On the active MM, upgrade the FPGA firmware for the Switch Fabric Module (SFM) using the **sysfpga_upgrade sfm <slot#>** command.

The range of valid slot values is from 1 through 4 for the Brocade SLX 9850-4.

The range of valid slot values is from 1 through 8 for the Brocade SLX 9850-8.

```
# sysfpga_upgrade sfm 3
```

7. Verify the FPGA version with the **fpga version** to ensure the version is correct.

```
# fpga version
```


Brocade SLX 9540 peripheral firmware upgrade

This procedure upgrades the peripheral firmware on the Brocade SLX 9540.

1. After the device boots, log in to a Linux shell using the **start-shell**.

```
device# start-shell
```

2. Check the FPGA and CPLD versions.

```
# sysfpga_upgrade -v
# cpld_upgrade -v
```

3. Upgrade the FPGA firmware using the **sysfpga_upgrade -p** command.

```
# sysfpga_upgrade -p
```

4. Upgrade the CPLD firmware using the **cpld_upgrade -p** command.

```
# cpld_upgrade -p
```

5. Cycle the power on the device.

6. After the device boots, log in to a Linux shell using the **start-shell**.

```
device# start-shell
```

7. Verify the FPGA version with the **sysfpga_upgrade -v**

```
sysfpga_upgrade -v
```

8. Verify the CPLD version with the **cpld_upgrade -v**

```
cpld_upgrade -v
```

Creating a firmware snapshot

This procedure creates a snapshot image of the currently running Host and the SLX VM images and saves them to a snapshot partition on the device.

Snapshots are created only from the active partition.

Once this procedure is complete, Open Network Install Environment (ONIE) rescues can use the updated snapshot.

1. Execute the **image-snapshot create** command on the device in privileged EXEC mode.

```
device# image-snapshot create
Image Snapshot: Checking snapshot partition .... OK
Image Snapshot: Taking Snapshot of VM Images ..... Success
Image Snapshot: Taking snapshot of Host Images ..... Success
Image Snapshot: Checking for Standby ..... OK
Image Snapshot: Checking snapshot partition .... OK
Image Snapshot: updating Snapshot images to standby Host.... Success
Image Snapshot: Completed, Version 16r.1.01d, Date: Tue Nov 22 22:30:21 PST 2016
```

2. Execute the show image-snapshot command to verify the snapshot is updated.

```
device# show image-snapshot
SLX-OS Operating System Software
SLX-OS Operating System Version: 16r.1.01
Copyright (c) 1995-2016 Brocade Communications Systems, Inc.
Firmware name:      16r.1.01d
Build Time:         00:43:27 Nov 19, 2016
Install Time:       23:30:11 Nov 21, 2016
Kernel:             2.6.34.6
HOST Kernel:        3.14.17
Snapshot Time: Tue Nov 22 22:30:21 PST 2016 <==== This should match
```

Downgrading considerations and restrictions

Consider the following when downgrading your firmware version:

- If a feature is new for the current version of your firmware, it will not function if you downgrade your firmware version.
- Firmware downgrades to previous versions are prohibited when security parameters are configured for HTTPS support.

Always refer to the release notes for compatibility information and take note of restrictions that may exist regarding upgrades and downgrades under particular circumstances.