



## **Set up the switch**

### **Cluster and storage switches**

NetApp

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# Set up the switch

## BES-53248 cluster switch configuration requirements

To configure your cluster, you need the appropriate number and type of cables and cable connectors for your cluster switches. Depending on the type of cluster switch you are initially configuring, you need to connect to the switch console port with the included console cable and you need specific network information.

### BES-53248 cluster switch port assignments

You can use the Broadcom-supported BES-53248 cluster switch port assignments table as a guide to configuring your cluster.

Switch ports	Ports usage
01-16	10/25GbE cluster port nodes, base configuration
17-48	10/25GbE cluster port nodes, with licenses
49-54	100GbE cluster port nodes, with licenses, added right to left
55-56	100GbE cluster Inter-Switch Link (ISL) ports, base configuration

#### Port group speed constraint

On BES-53248 cluster switches, the 48 10/25GbE (SFP28/SFP+) ports are combined into 12 x 4-port groups as follows:

- Ports 1-4, 5-8, 9-12, 13-16, 17-20, 21-24, 25-28, 29-32, 33-36, 37-40, 41-44, and 45-48.

The SFP28/SFP+ port speed must be the same (10GbE or 25GbE) across all ports in the 4-port group.

## BES-53248 cluster switch required documentation

You need specific switch and controller documentation to set up your Cluster-Mode configuration.

#### Required documentation for BES-53248 cluster switches

To set up the BES-53248 cluster switch, you need the following documents available from the Broadcom Support Site: [Broadcom Ethernet Switch Product Line](#)

Document title	Description
<i>EFOS Administrator's Guide v3.4.3</i>	Provides examples of how to use the BES-53248 switch in a typical network.

Document title	Description
<i>EFOS CLI Command Reference v3.4.3</i>	Describes the command-line interface (CLI) commands you use to view and configure the BES-53248 software.
<i>EFOS Getting Started Guide v3.4.3</i>	Provides detailed information about for the BES-53248 switch.
<i>EFOS SNMP Reference Guide v3.4.3</i>	Provides examples of how to use the BES-53248 switch in a typical network.
<i>EFOS Scaling Parameters and Values v3.4.3</i>	Describes the default scaling parameters with which EFOS software is delivered and validated on the supported platforms.
<i>EFOS Functional Specifications v3.4.3</i>	Describes the specifications for the EFOS software on the supported platforms.
<i>EFOS Release Notes v3.4.3</i>	Provides release-specific information about BES-53248 software.

### Required documentation for supported ONTAP systems

To set up an ONTAP system, you need the following documents from the NetApp Support Site at [mysupport.netapp.com](https://mysupport.netapp.com)

Name	Description
<a href="#">NetApp Hardware Universe</a>	Describes the power and site requirements for all NetApp hardware, including system cabinets.
<i>Controller-specific Installation and Setup Instructions</i>	Describes how to install NetApp hardware.
ONTAP 9	Provides detailed information about all aspects of the ONTAP 9 release.

## Configure your BES-53248 cluster switches

### Configure a new BES-53248 cluster switch

You can configure a new BES-53248 cluster switch by completing the steps detailed in this chapter.

#### About this task

Installing the BES-53248 cluster switch on systems running ONTAP starts with setting up an IP address and configuration to allow the switch to communicate through the management interface. Then you can install the Ethernet Fabric OS (EFOS) software, reference configuration file (RCF), and other licenses as needed. This procedure is intended for preparing the BES-53248 switch before controllers are added. In addition, you might need to install the required configuration file to support the Cluster Switch Health Monitor (CSHM) for the BES-53248 cluster switches. See [Installing the Cluster Switch Health Monitor \(CSHM\) configuration file](#) for more details.

The examples in this procedure use the following switch and node nomenclature:

- The NetApp switch names are `cs1` and `cs2`.
- The example used in this procedure starts the upgrade on the second switch, `cs2`.
- The cluster LIF names are `node1_clus1` and `node1_clus2` for node1, and `node2_clus1` and `node2_clus2` for node2.
- The IPspace name is `Cluster`.
- The `cluster1::>` prompt indicates the name of the cluster.
- The cluster ports on each node are named `e0a` and `e0b`.

See the [NetApp Hardware Universe](#) for the actual cluster ports supported on your platform.

- The Inter-Switch Links (ISLs) supported for the NetApp switches are ports 0/55 and 0/56.
- The node connections supported for the NetApp switches are ports 0/1 through 0/16 with default licensing.
- The examples in this procedure use two nodes, but you can have up to 24 nodes in a cluster.

## Initial installation of the BES-53248 cluster switch

You can use this procedure to perform the initial installation of the BES-53248 cluster switch.

You can download the applicable Broadcom EFOS software for your cluster switches from the [Broadcom Ethernet Switch Support](#) site.

EFOS is a wide-ranging software set of advanced networking features and protocols necessary to develop a variety of Ethernet and IP infrastructure systems for data center applications. EFOS software is an architecture suitable for any network organizational device using leading-edge applications that require thorough packet inspection or separation.

This procedure provides a summary of the process to install your switches and get them running:

### Steps

1. Connect the serial port to the host or serial port of your choice.
2. Connect the management port (the RJ-45 wrench port on the left side of the switch) to the same network where your TFTP server is located.
3. At the console, set the host side serial settings:
  - 115200 baud
  - 8 data bits
  - 1 stop bit
  - parity: none
  - flow control: none
4. Log in to the switch as `admin` and press enter when prompted for a password. The default switch name is `routing`. At the prompt, `enable`. This gives you access to Privileged EXEC mode for switch configuration.

```
User: admin
Password:
(Routing)> enable
Password:
(Routing) #
```

5. Change the switch name to cs2:

```
(Routing) # hostname cs2
(cs2) #
```

6. To set a static IP address, use the `serviceport protocol`, `network protocol`, and `serviceport ip` commands as shown in the example.

The serviceport is set to use DHCP by default. The IP address, subnet mask, and default gateway address are assigned automatically.

```
(cs2) # serviceport protocol none
(cs2) # network protocol none
(cs2) # serviceport ip ipaddr netmask gateway
```

7. Verify the results using the command:

```
show serviceport
```

The following example shows IP information provided by DHCP server.

```
(cs2) # show serviceport
Interface Status..... Up
IP Address..... 172.19.2.2
Subnet Mask..... 255.255.255.0
Default Gateway..... 172.19.2.254
IPv6 Administrative Mode..... Enabled
IPv6 Prefix is .....
fe80::dac4:97ff:fe71:123c/64
IPv6 Default Router..... fe80::20b:45ff:fea9:5dc0
Configured IPv4 Protocol..... DHCP
Configured IPv6 Protocol..... None
IPv6 AutoConfig Mode..... Disabled
Burned In MAC Address..... D8:C4:97:71:12:3C
```

8. Configure the domain and name server:

```
configure
```

```
(cs2)# configure
(cs2) (Config)# ip domain name company.com
(cs2) (Config)# ip name server 10.10.99.1 10.10.99.2
(cs2) (Config)# exit
(cs2) (Config)#
```

9. Configure the NTP server.

a. Configure the time zone and time synchronization (SNTP):

sntp

```
(cs2)#
(cs2) (Config)# sntp client mode unicast
(cs2) (Config)# sntp server 10.99.99.5
(cs2) (Config)# clock timezone -7
(cs2) (Config)# exit
(cs2) (Config)#
```

b. Configure the time manually:

clock

```
(cs2)# config
(cs2) (Config)# no sntp client mode
(cs2) (Config)# clock summer-time recurring 1 sun mar 02:00 1 sun nov
02:00 offset 60 zone EST
(cs2) (Config)# clock timezone -5 zone EST
(cs2) (Config)# clock set 07:00:00
(cs2) (Config)# *clock set 10/20/2020

(cs2) (Config)# show clock

07:00:11 EST(UTC-5:00) Oct 20 2020
No time source

(cs2) (Config)# exit

(cs2)# write memory

This operation may take a few minutes.
Management interfaces will not be available during this time.

Are you sure you want to save? (y/n) y

Config file 'startup-config' created successfully.

Configuration Saved!
```

## Install the EFOS software

You can use this procedure to install the EFOS software on the BES-53248 cluster switch. You can download the applicable Broadcom EFOS software for your cluster switches from the [Broadcom Ethernet Switch Support site](#).

### About this task



**Note the following:**

- When upgrading from EFOS 3.4.x.x to EFOS 3.7.x.x or later, the switch must be running EFOS 3.4.4.6 (or later 3.4.x.x release). If you are running a release prior to that, then upgrade the switch to EFOS 3.4.4.6 (or later 3.4.x.x release) first, then upgrade the switch to EFOS 3.7.x.x or later.
- The configuration for EFOS 3.4.x.x and 3.7.x.x or later are different. Changing the EFOS version from 3.4.x.x to 3.7.x.x or later, or vice versa, requires the switch to be reset to factory defaults and the RCF files for the corresponding EFOS version to be (re)applied. This procedure requires access through the serial console port.
- Beginning with EFOS version 3.7.x.x or later, a non-FIPS compliant and a FIPS compliant version is available. Different steps apply when moving to from a non-FIPS compliant to a FIPS compliant version or vice versa. Changing EFOS from a non-FIPS compliant to a FIPS compliant version or vice versa will reset the switch to factory defaults. This procedure requires access through the serial console port.

Procedure	Current EFOS version	New EFOS version	High level steps
Steps to upgrade EFOS between two (non) FIPS compliant versions	3.4.x.x	3.4.x.x	Install the new EFOS image using method 1) The configuration and license information is retained
	3.4.4.6 (or later 3.4.x.x)	3.7.x.x or later non-FIPS compliant	Upgrade EFOS using method 1. Reset the switch to factory defaults and apply the RCF file for EFOS 3.7.x.x or later
	3.7.x.x or later non-FIPS compliant	3.4.4.6 (or later 3.4.x.x)	Downgrade EFOS using method 1. Reset the switch to factory defaults and apply the RCF file for EFOS 3.4.x.x
		3.7.x.x or later non-FIPS compliant	Install the new EFOS image using method 1. The configuration and license information is retained
	3.7.x.x or later FIPS compliant	3.7.x.x or later FIPS compliant	Install the new EFOS image using method 1. The configuration and license information is retained

Steps to upgrade to/from a FIPS compliant EFOS version	Non-FIPS compliant	FIPS compliant	Installation of the EFOS image using method 2. The switch configuration and license information will be lost.
	FIPS compliant	Non-FIPS compliant	



Note that after upgrading BES-53248 cluster switches from EFOS 3.3.x.x or 3.4.x.x to EFOS 3.7.0.4 or 3.8.0.2, Inter-Switch Links (ISLs) and port channel are marked in the **Down** state. See this [KB article](#) for further details.

## Steps

1. Connect the BES-53248 cluster switch to the management network.
2. Use the `ping` command to verify connectivity to the server hosting EFOS, licenses, and the RCF file.

This example verifies that the switch is connected to the server at IP address 172.19.2.1:

```
(cs2)# ping 172.19.2.1
Pinging 172.19.2.1 with 0 bytes of data:

Reply From 172.19.2.1: icmp_seq = 0. time= 5910 usec.
```

3. Back up the current active image on cs2:

```
show bootvar
```

```
(cs2)# show bootvar
```

Image Descriptions

active :

backup :

Images currently available on Flash

unit	active	backup	current-active	next-active
1	3.4.3.3	Q.10.22.1	3.4.3.3	3.4.3.3

```
(cs2)# copy active backup
```

Copying active to backup

Management access will be blocked for the duration of the operation

Copy operation successful

```
(cs2)# show bootvar
```

Image Descriptions

active :

backup :

Images currently available on Flash

unit	active	backup	current-active	next-active
1	3.4.3.3	3.4.3.3	3.4.3.3	3.4.3.3

```
(cs2)#
```

#### 4. Verify the running version of the EFOS software:

```
show version
```

```
(cs2)# show version
```

```
Switch: 1
```

```
System Description..... Quanta IX8-B 48x25GB SFP
8x100GB QSFP, 3.4.3.3, Linux 4.4.117-ceeeb99d, 2016.05.00.04
Machine Type..... Quanta IX8-B 48x25GB SFP
8x100GB QSFP
Machine Model..... IX8-B
Serial Number..... QTFCU38260014
Maintenance Level..... A
Manufacturer..... 0xbc00
Burned In MAC Address..... D8:C4:97:71:12:3D
Software Version..... 3.4.3.3
Operating System..... Linux 4.4.117-ceeeb99d
Network Processing Device..... BCM56873_A0
CPLD Version..... 0xff040c03

Additional Packages..... BGP-4
..... QOS
..... Multicast
..... IPv6
..... Routing
..... Data Center
..... OpEN API
..... Prototype Open API
```

##### 5. Download the image file to the switch.

Copying the image file to the active image means that when you reboot, that image establishes the running EFOS version. The previous image remains available as a backup.

```
(cs2)# copy sftp://root@172.19.2.1//tmp/EFOS-3.4.4.6.stk active
Remote Password:**

Mode..... SFTP
Set Server IP..... 172.19.2.1
Path..... //tmp/
Filename..... EFOS-3.4.4.6.stk
Data Type..... Code
Destination Filename..... active

Management access will be blocked for the duration of the transfer
Are you sure you want to start? (y/n) y
SFTP Code transfer starting...

File transfer operation completed successfully.
```

6. Display the boot images for the active and backup configuration:

```
show bootvar
```

```
(cs2)# show bootvar

Image Descriptions

active :
backup :

Images currently available on Flash
-----
unit      active      backup      current-active      next-active
-----
1         3.4.3.3      3.4.3.3      3.4.3.3             3.4.4.6
```

7. Reboot the switch:

```
reload
```

```
(cs2)# reload
```

The system has unsaved changes.

Would you like to save them now? (y/n) **y**

Config file 'startup-config' created successfully .

Configuration Saved!

System will now restart!

#### 8. Log in again and verify the new version of the EFOS software:

```
show version
```

```
(cs2)# show version
```

Switch: 1

```
System Description..... x86_64-
quanta_common_rglbmc-r0, 3.4.4.6, Linux 4.4.211-28a6fe76, 2016.05.00.04
Machine Type..... x86_64-
quanta_common_rglbmc-r0
Machine Model..... BES-53248
Serial Number..... QTFCU38260023
Maintenance Level..... A
Manufacturer..... 0xbc00
Burned In MAC Address..... D8:C4:97:71:0F:40
Software Version..... 3.4.4.6
Operating System..... Linux 4.4.211-28a6fe76
Network Processing Device..... BCM56873_A0
CPLD Version..... 0xff040c03

Additional Packages..... BGP-4
..... QOS
..... Multicast
..... IPv6
..... Routing
..... Data Center
..... OpEN API
..... Prototype Open API
```

### Upgrade EFOS using the ONIE OS installation

You can perform the following steps if one EFOS version is FIPS compliant and the other EFOS version is non-FIPS compliant. These steps can be used to install the non-FIPS or FIPS compliant EFOS 3.7.x.x image from ONIE if the switch fails to boot.



This functionality is only available for EFOS 3.7.x.x or later non-FIPS compliant.

## Steps

1. Boot the switch into ONIE installation mode.

During boot, select ONIE when the following screen appears:

```
+-----+
| EFOS                                     |
| *ONIE                                  |
|                                       |
|                                       |
|                                       |
|                                       |
|                                       |
|                                       |
|                                       |
|                                       |
|                                       |
|                                       |
+-----+
```

After selecting **ONIE**", the switch will then load and present you with the following choices:

```
+-----+
| *ONIE: Install OS                       |
| ONIE: Rescue                           |
| ONIE: Uninstall OS                     |
| ONIE: Update ONIE                      |
| ONIE: Embed ONIE                       |
| DIAG: Diagnostic Mode                   |
| DIAG: Burn-In Mode                     |
|                                       |
|                                       |
|                                       |
|                                       |
+-----+
```

The switch now will boot into ONIE installation mode.

2. Stop the ONIE discovery and configure the Ethernet interface.

Once the following message appears press <Enter> to invoke the ONIE console:

```
Please press Enter to activate this console. Info: eth0: Checking
link... up.
ONIE:/ #
```



The ONIE discovery will continue and messages will be printed to the console.

```
Stop the ONIE discovery
ONIE:/ # onie-discovery-stop
discover: installer mode detected.
Stopping: discover... done.
ONIE:/ #
```

3. Configure the Ethernet interface and add the route using `ifconfig eth0 <ipAddress> netmask <netmask> up` and `route add default gw <gatewayAddress>`

```
ONIE:/ # ifconfig eth0 10.10.10.10 netmask 255.255.255.0 up
ONIE:/ # route add default gw 10.10.10.1
```

4. Verify that the server hosting the ONIE installation file is reachable:

```
ONIE:/ # ping 50.50.50.50
PING 50.50.50.50 (50.50.50.50): 56 data bytes
64 bytes from 50.50.50.50: seq=0 ttl=255 time=0.429 ms
64 bytes from 50.50.50.50: seq=1 ttl=255 time=0.595 ms
64 bytes from 50.50.50.50: seq=2 ttl=255 time=0.369 ms
^C
--- 50.50.50.50 ping statistics ---
3 packets transmitted, 3 packets received, 0% packet loss
round-trip min/avg/max = 0.369/0.464/0.595 ms
ONIE:/ #
```

5. Install the new switch software:



```

ONIE:/ # onie-nos-install http:// 50.50.50.50/Software/onie-installer-
x86_64
discover: installer mode detected.
Stopping: discover... done.
Info: Fetching http:// 50.50.50.50/Software/onie-installer-3.7.0.4 ...
Connecting to 50.50.50.50 (50.50.50.50:80)
installer          100% |*****| 48841k
0:00:00 ETA
ONIE: Executing installer: http:// 50.50.50.50/Software/onie-installer-
3.7.0.4
Verifying image checksum ... OK.
Preparing image archive ... OK.

```

The software will install and then reboot the switch. Let the switch reboot normally into the new EFOS version.

6. Verify that the new switch software is installed: `show bootvar`

```

(cs2)# show bootvar
Image Descriptions
active :
backup :
Images currently available on Flash
----
unit      active      backup    current-active  next-active
----
1         3.7.0.4      3.7.0.4   3.7.0.4         3.7.0.4
(cs2) #

```

7. Complete the installation.

The switch will reboot with no configuration applied and reset to factory defaults.

## Related information

[Broadcom Ethernet Switch Support](#)

## Install licenses

### Install licenses for BES-53248 cluster switches

The BES-53248 cluster switch base model is licensed for 16 10GbE or 25GbE ports and two 100GbE ports. New ports can be added by purchasing more licenses.

The following licenses are available for use on the BES-53248 cluster switch:

License type	License details	Supported firmware version
SW-BES-53248A1-G1-8P-LIC	Broadcom 8P 10-25,2P40-100 License Key, X190005/R	EFOS 3.4.3.3 and later
SW-BES-53248A1-G1-16P-LIC	Broadcom 16P 10-25,4P40-100 License Key, X190005/R	EFOS 3.4.3.3 and later
SW-BES-53248A1-G1-24P-LIC	Broadcom 24P 10-25,6P40-100 License Key, X190005/R	EFOS 3.4.3.3 and later
SW-BES54248-40-100G-LIC	Broadcom 6Port 40G100G License Key, X190005/R	EFOS 3.4.4.6 and later
SW-BES53248-8P-10G25G-LIC	Broadcom 8Port 10G25G License Key, X190005/R	EFOS 3.4.4.6 and later
SW-BES53248-16P-10G25G-LIC	Broadcom 16Port 10G25G License Key, X190005/R	EFOS 3.4.4.6 and later
SW-BES53248-24P-10G25G-LIC	Broadcom 24Port 10G25G License Key, X190005/R	EFOS 3.4.4.6 and later

## Steps

1. Connect the cluster switch to the management network.
2. Use the `ping` command to verify connectivity to the server hosting EFOS, licenses, and the RCF file.

This example verifies that the switch is connected to the server at IP address 172.19.2.1:

```
(cs2)# ping 172.19.2.1
Pinging 172.19.2.1 with 0 bytes of data:

Reply From 172.19.2.1: icmp_seq = 0. time= 5910 usec.
```

3. Check the current license usage on switch cs2:

```
show license
```

```
(cs2)# show license
Reboot needed..... No
Number of active licenses..... 0

License Index   License Type      Status
-----
No license file found.
```

4. Install the license file. The following example uses SFTP to copy a license file to a key index 1.

Repeat this step to load more licenses and to use different key index numbers.

```
(cs2)# copy sftp://root@172.19.2.1/var/lib/tftpboot/license.dat
nvram:license-key 1
Remote Password:**

Mode..... SFTP
Set Server IP..... 172.19.2.1
Path..... /var/lib/tftpboot/
Filename..... license.dat
Data Type..... license

Management access will be blocked for the duration of the transfer
Are you sure you want to start? (y/n) y

File transfer in progress. Management access will be blocked for the
duration of the transfer. Please wait...

License Key transfer operation completed successfully. System reboot is
required.
```

5. Display all current license information and note the license status before switch cs2 is rebooted:

```
show license
```

```
(cs2)# show license
```

```
Reboot needed..... Yes
```

```
Number of active licenses..... 0
```

License Index	License Type	Status
1	Port	License valid but not applied

6. Display all licensed ports:

```
show port all | exclude Detach
```

The ports from the additional license files are not displayed until after the switch is rebooted.

```
(cs2)# show port all \! exclude Detach
```

Actor		Admin	Physical	Physical	Link	Link	LACP
Intf	Type	Mode	Mode	Status	Status	Trap	Mode
Timeout							
-----	-----	-----	-----	-----	-----	-----	-----
0/1		Disable	Auto		Down	Enable	Enable
long							
0/2		Disable	Auto		Down	Enable	Enable
long							
0/3		Disable	Auto		Down	Enable	Enable
long							
0/4		Disable	Auto		Down	Enable	Enable
long							
0/5		Disable	Auto		Down	Enable	Enable
long							
0/6		Disable	Auto		Down	Enable	Enable
long							
0/7		Disable	Auto		Down	Enable	Enable
long							
0/8		Disable	Auto		Down	Enable	Enable
long							
0/9		Disable	Auto		Down	Enable	Enable
long							
0/10		Disable	Auto		Down	Enable	Enable
long							
0/11		Disable	Auto		Down	Enable	Enable
long							
0/12		Disable	Auto		Down	Enable	Enable
long							
0/13		Disable	Auto		Down	Enable	Enable
long							
0/14		Disable	Auto		Down	Enable	Enable
long							
0/15		Disable	Auto		Down	Enable	Enable
long							
0/16		Disable	Auto		Down	Enable	Enable
long							
0/55		Disable	Auto		Down	Enable	Enable
long							
0/56		Disable	Auto		Down	Enable	Enable
long							

## 7. Reboot the switch:

```
reload
```

```
(cs2)# reload
```

```
The system has unsaved changes.
```

```
Would you like to save them now? (y/n) y
```

```
Config file 'startup-config' created successfully .
```

```
Configuration Saved!
```

```
Are you sure you would like to reset the system? (y/n) y
```

## 8. Check that the new license is active and note that the license has been applied:

```
show license
```

```
(cs2)# show license
```

```
Reboot needed..... No
```

```
Number of installed licenses..... 1
```

```
Total Downlink Ports enabled..... 16
```

```
Total Uplink Ports enabled..... 8
```

License Index	License Type	Status
1	Port	License applied

## 9. Check that all new ports are available:

```
show port all | exclude Detach
```

```
(cs2)# show port all \| exclude Detach
```

Actor	Intf	Type	Admin	Physical	Physical	Link	Link	LACP
			Mode	Mode	Status	Status	Trap	Mode
	0/1		Disable	Auto		Down	Enable	Enable
	long							
	0/2		Disable	Auto		Down	Enable	Enable

long						
0/3	Disable	Auto		Down	Enable	Enable
long						
0/4	Disable	Auto		Down	Enable	Enable
long						
0/5	Disable	Auto		Down	Enable	Enable
long						
0/6	Disable	Auto		Down	Enable	Enable
long						
0/7	Disable	Auto		Down	Enable	Enable
long						
0/8	Disable	Auto		Down	Enable	Enable
long						
0/9	Disable	Auto		Down	Enable	Enable
long						
0/10	Disable	Auto		Down	Enable	Enable
long						
0/11	Disable	Auto		Down	Enable	Enable
long						
0/12	Disable	Auto		Down	Enable	Enable
long						
0/13	Disable	Auto		Down	Enable	Enable
long						
0/14	Disable	Auto		Down	Enable	Enable
long						
0/15	Disable	Auto		Down	Enable	Enable
long						
0/16	Disable	Auto		Down	Enable	Enable
long						
0/49	Disable	100G Full		Down	Enable	Enable
long						
0/50	Disable	100G Full		Down	Enable	Enable
long						
0/51	Disable	100G Full		Down	Enable	Enable
long						
0/52	Disable	100G Full		Down	Enable	Enable
long						
0/53	Disable	100G Full		Down	Enable	Enable
long						
0/54	Disable	100G Full		Down	Enable	Enable
long						
0/55	Disable	100G Full		Down	Enable	Enable
long						
0/56	Disable	100G Full		Down	Enable	Enable
long						



When installing additional licenses, you must configure the new interfaces manually. Re-applying an RCF to an existing working production switch is not advisable.

## Restrictions and limitations

Where problems arise when installing a license, the following debug commands should be run before running the `copy` command again to install the license.

Debug commands to use: `debug transfer` and `debug license`

```
(cs2)# debug transfer
Debug transfer output is enabled.
(cs2)# debug license
Enabled capability licensing debugging.
```

When you run the `copy` command with the `debug transfer` and `debug license` options enabled, the following log output is returned:



```

transfer.c(3083):Transfer process  key or certificate file type = 43
transfer.c(3229):Transfer process  key/certificate cmd = cp
/mnt/download//license.dat.1 /mnt/fastpath/ >/dev/null 2>&1CAPABILITY
LICENSING :
Fri Sep 11 13:41:32 2020: License file with index 1 added.
CAPABILITY LICENSING : Fri Sep 11 13:41:32 2020: Validating hash value
29de5e9a8af3e510f1f16764a13e8273922d3537d3f13c9c3d445c72a180a2e6.
CAPABILITY LICENSING : Fri Sep 11 13:41:32 2020: Parsing JSON buffer {
  "license": {
    "header": {
      "version": "1.0",
      "license-key": "964B-2D37-4E52-BA14",
      "serial-number": "QTFCU38290012",
      "model": "BES-53248"
    },
    "description": "",
    "ports": "0+6"
  }
}.
CAPABILITY LICENSING : Fri Sep 11 13:41:32 2020: License data does not
contain 'features' field.
CAPABILITY LICENSING : Fri Sep 11 13:41:32 2020: Serial number
QTFCU38290012 matched.
CAPABILITY LICENSING : Fri Sep 11 13:41:32 2020: Model BES-53248 matched.
CAPABILITY LICENSING : Fri Sep 11 13:41:32 2020: Feature not found in
license file with index = 1.
CAPABILITY LICENSING : Fri Sep 11 13:41:32 2020: Applying license file 1.

```

Check for the following in the debug output:

- Check that the Serial number matches: Serial number QTFCU38290012 matched.
- Check that the switch Model matches: Model BES-53248 matched.
- Check that the specified license index was not used previously. Where a license index is already used, the following error is returned: License file /mnt/download//license.dat.1 already exists.
- A port license is not a feature license. Therefore, the following statement is expected: Feature not found in license file with index = 1.

Use the `copy` command to backup port licenses to the server:

```

(cs2)# copy nvram:license-key 1
scp://<UserName>@<IP_address>/saved_license_1.dat

```

See [Installing licenses for BES-53248 cluster switches](#) for details of the firmware versions supported for available licenses.



If you need to downgrade the switch software from version 3.4.4.6, the licenses are removed. This is expected behavior.

You must install an appropriate older license before reverting to an older version of the software.

### Edit the Reference Configuration File (RCF)

In order to activate newly licensed ports, you need to edit the latest version of the RCF and uncomment the applicable port details. The default license activates ports 0/1 to 0/16 and 0/55 to 0/56 while the newly licensed ports will be between ports 0/17 to 0/54 depending on the type and number of licenses available.

For details of the available license types for use on the BES-53248 cluster switch, see [Installing licenses for BES-53248 cluster switches](#).

For example to activate the SW-BES54248-40-100G-LIC license, you must uncomment the following section in the RCF:

```
.
.
!
! 2-port or 6-port 40/100GbE node port license block
!
interface 0/49
no shutdown
description "40/100GbE Node Port"
!speed 100G full-duplex
speed 40G full-duplex
service-policy in WRED_100G
spanning-tree edgeport
mtu 9216
switchport mode trunk
datacenter-bridging
priority-flow-control mode on
priority-flow-control priority 5 no-drop
exit
exit
!
interface 0/50
no shutdown
description "40/100GbE Node Port"
!speed 100G full-duplex
speed 40G full-duplex
service-policy in WRED_100G
spanning-tree edgeport
mtu 9216
switchport mode trunk
```

```
datacenter-bridging
priority-flow-control mode on
priority-flow-control priority 5 no-drop
exit
exit
!
interface 0/51
no shutdown
description "40/100GbE Node Port"
speed 100G full-duplex
!speed 40G full-duplex
service-policy in WRED_100G
spanning-tree edgeport
mtu 9216
switchport mode trunk
datacenter-bridging
priority-flow-control mode on
priority-flow-control priority 5 no-drop
exit
exit
!
interface 0/52
no shutdown
description "40/100GbE Node Port"
speed 100G full-duplex
!speed 40G full-duplex
service-policy in WRED_100G
spanning-tree edgeport
mtu 9216
switchport mode trunk
datacenter-bridging
priority-flow-control mode on
priority-flow-control priority 5 no-drop
exit
exit
!
interface 0/53
no shutdown
description "40/100GbE Node Port"
speed 100G full-duplex
!speed 40G full-duplex
service-policy in WRED_100G
spanning-tree edgeport
mtu 9216
switchport mode trunk
datacenter-bridging
```

```

priority-flow-control mode on
priority-flow-control priority 5 no-drop
exit
exit
!
interface 0/54
no shutdown
description "40/100GbE Node Port"
speed 100G full-duplex
!speed 40G full-duplex
service-policy in WRED_100G
spanning-tree edgeport
mtu 9216
switchport mode trunk
datacenter-bridging
priority-flow-control mode on
priority-flow-control priority 5 no-drop
exit
exit
!
.
.

```



For high-speed ports between 0/49 to 0/54 inclusive, uncomment each port but only uncomment one **speed** line in the RCF for each of these ports, either:

- speed 100G full-duplex
- speed 40G full-duplex

as shown in the example.

For low-speed ports between 0/17 to 0/48 inclusive, uncomment the entire 8-port section when an appropriate license has been activated.

## Install the Reference Configuration File (RCF)

You can install the RCF after setting up the BES-53248 cluster switch for the first time and after the new license or licenses have been applied. If you are upgrading an RCF from an older version, you must reset the Broadcom switch settings and perform basic configuration to re-apply the RCF. You must perform this operation every time you want to upgrade or change an RCF. See the following [KB article](#) for details.

### Steps

1. Connect the cluster switch to the management network.
2. Use the `ping` command to verify connectivity to the server hosting EFOS, licenses, and the RCF.

If connectivity is an issue, use a nonrouted network and configure the service port using IP address

192.168.x or 172.19.x. You can reconfigure the service port to the production management IP address later.

This example verifies that the switch is connected to the server at IP address 172.19.2.1:

```
(cs2)# ping 172.19.2.1
Pinging 172.19.2.1 with 0 bytes of data:

Reply From 172.19.2.1: icmp_seq = 0. time= 5910 usec.
```

3. Install the RCF on the BES-53248 cluster switch using the `copy` command.

```
(cs2)# copy sftp://172.19.2.1/tmp/BES-53248_RCF_v1.6-Cluster-HA.txt
nvram:script BES-53248_RCF_v1.6-Cluster-HA.scr

Remote Password:**

Mode..... SFTP
Set Server IP..... 172.19.2.1
Path..... //tmp/
Filename..... BES-53248_RCF_v1.6-Cluster-HA.txt
Data Type..... Config Script
Destination Filename..... BES-53248_RCF_v1.6-Cluster-HA.scr

Management access will be blocked for the duration of the transfer
Are you sure you want to start? (y/n) y
SFTP Code transfer starting...

File transfer operation completed successfully.
```



Depending on your environment, you might need to use a double slash in the `copy` command, for example: `copy sftp://172.19.2.1//tmp/BES-53248_RCF_v1.6-Cluster-HA.txt nvram:script BES-53248_RCF_v1.6-Cluster-HA.scr`.



The `.scr` extension must be set as part of the file name before invoking the script. This extension is the extension for the EFOS operating system. The switch validates the script automatically when it is downloaded to the switch, and the output goes to the console. Also, you can change the name of the `.scr` to fit your console screen for easier readability, for example: `copy sftp://172.19.2.1/tmp/BES-53248_RCF_v1.6-Cluster-HA.txt nvram:script RCF_v1.6-Cluster-HA.scr`.



The file name must not include the symbols `\ / : * ? " < > |` and the maximum length allowed is 32 chars.

4. Verify that the script was downloaded and saved to the file name you gave it:

```
script list
```

```
(cs2)# script list
```

Configuration Script Name Modification	Size(Bytes)	Date of
BES-53248_RCF_v1.6-Cluster-HA.scr 05:41:00	2241	2020 09 30

```
1 configuration script(s) found.
```

5. Apply the script to the switch.

```
script apply
```

```
(cs2)# script apply BES-53248_RCF_v1.6-Cluster-HA.scr
```

```
Are you sure you want to apply the configuration script? (y/n) y
```

```
The system has unsaved changes.
```

```
Would you like to save them now? (y/n) y
```

```
Config file 'startup-config' created successfully .
```

```
Configuration Saved!
```

```
Configuration script 'BES-53248_RCF_v1.6-Cluster-HA.scr' applied.
```

6. Verify the ports for an additional license after the RCF is applied:

```
show port all | exclude Detach
```

```
(cs2)# show port all \| exclude Detach
```

Actor	Admin	Physical	Physical	Link	Link	LACP
Intf	Type	Mode	Mode	Status	Status	Trap
Timeout						Mode
0/1	Enable	Auto		Down	Enable	Enable
long						
0/2	Enable	Auto		Down	Enable	Enable

long						
0/3	Enable	Auto		Down	Enable	Enable
long						
0/4	Enable	Auto		Down	Enable	Enable
long						
0/5	Enable	Auto		Down	Enable	Enable
long						
0/6	Enable	Auto		Down	Enable	Enable
long						
0/7	Enable	Auto		Down	Enable	Enable
long						
0/8	Enable	Auto		Down	Enable	Enable
long						
0/9	Enable	Auto		Down	Enable	Enable
long						
0/10	Enable	Auto		Down	Enable	Enable
long						
0/11	Enable	Auto		Down	Enable	Enable
long						
0/12	Enable	Auto		Down	Enable	Enable
long						
0/13	Enable	Auto		Down	Enable	Enable
long						
0/14	Enable	Auto		Down	Enable	Enable
long						
0/15	Enable	Auto		Down	Enable	Enable
long						
0/16	Enable	Auto		Down	Enable	Enable
long						
0/49	Enable	40G Full		Down	Enable	Enable
long						
0/50	Enable	40G Full		Down	Enable	Enable
long						
0/51	Enable	100G Full		Down	Enable	Enable
long						
0/52	Enable	100G Full		Down	Enable	Enable
long						
0/53	Enable	100G Full		Down	Enable	Enable
long						
0/54	Enable	100G Full		Down	Enable	Enable
long						
0/55	Enable	100G Full		Down	Enable	Enable
long						
0/56	Enable	100G Full		Down	Enable	Enable
long						

7. Verify on the switch that your changes have been made:

```
show running-config
```

```
(cs2)# show running-config
```

8. Save the running configuration so that it becomes the startup configuration when you reboot the switch:

```
write memory
```

```
(cs2)# write memory
```

This operation may take a few minutes.

Management interfaces will not be available during this time.

Are you sure you want to save? (y/n) **y**

Config file 'startup-config' created successfully.

Configuration Saved!

9. Reboot the switch and verify that the running configuration is correct:

```
reload
```

```
(cs2)# reload
```

Are you sure you would like to reset the system? (y/n) **y**

System will now restart!

## Install the Cluster Switch Health Monitor (CSHM) configuration file

You can use this procedure to install the applicable configuration file for cluster switch health monitoring of BES-53248 cluster switches. In ONTAP releases 9.5P7 and earlier and 9.6P2 and earlier, you must download the cluster switch health monitor configuration file separately. In ONTAP releases 9.5P8 and later, 9.6P3 and later, and 9.7 and later, the cluster switch health monitor configuration file is bundled with ONTAP.

### Before you begin

Before you setup the switch health monitor for BES-53248 cluster switches, you must ensure that the ONTAP cluster is up and running.



It is advisable to enable SSH in order to use all features available in CSHM.



## Steps

1. Download the cluster switch health monitor configuration zip file based on the corresponding ONTAP release version. This file is available from the page: [NetApp Software download](#)
  - a. On the Software download page, select **Switch Health Monitor Configuration Files**
  - b. Select Platform = **ONTAP** and click **Go!**
  - c. On the Switch Health Monitor Configuration Files for ONTAP page, click **View & Download**
  - d. On the Switch Health Monitor Configuration Files for ONTAP - Description page, click **Download** for the applicable cluster switch model, for example: **Broadcom-supported BES-53248**
  - e. On the End User License Agreement page, click **Accept**
  - f. On the Switch Health Monitor Configuration Files for ONTAP - Download page, select the applicable configuration file, for example, **Broadcom\_BES-53248.zip**
2. Upload the applicable zip file to your internal web server where the IP address is X.X.X.X.

For an internal web server IP address of 192.168.2.20 and assuming a /usr/download directory exists, you can upload your zip file to your web server using scp:

```
% scp Broadcom_BES-53248.zip
admin@192.168.2.20:/usr/download/Broadcom_BES-53248.zip
```

3. Access the advanced mode setting from one of the ONTAP systems in the cluster, using the command `set -privilege advanced`:

```
cluster1::> set -privilege advanced
```

4. Run the switch health monitor configure command `system cluster-switch configure-health-monitor -node * -package-url http://server/file-location`:

```
cluster1::> system cluster-switch configure-health-monitor -node *
-package-url
http://192.168.2.20/usr/download/Broadcom_BES-53248.zip
```

5. Verify that the command output contains the text string "downloaded package processed successfully". If an error occurs, contact NetApp support.
6. Run the command `system cluster-switch show` on the ONTAP system and ensure that the cluster switches are discovered with the monitored field set to "True".

```
cluster1::> system cluster-switch show
```



If at any time you revert to an earlier version of ONTAP, you will need to install the CSHM configuration file again to enable switch health monitoring of BES-53248 cluster switches.

## Enable SSH on BES-53248 cluster switches

SSH is a requirement when using the Cluster Switch Health Monitor (CSHM) and log collection features. To enable SSH on BES-53248 cluster switches, you generate the SSH keys first and then enable SSH.

### Steps

1. Generate the SSH keys:

```
crypto key generate
```

```
(switch)# show ip ssh
```

#### SSH Configuration

```
Administrative Mode: ..... Disabled
SSH Port: ..... 22
Protocol Level: ..... Version 2
SSH Sessions Currently Active: ..... 0
Max SSH Sessions Allowed: ..... 5
SSH Timeout (mins): ..... 5
Keys Present: ..... DSA(1024) RSA(1024)
ECDSA(521)
Key Generation In Progress: ..... None
SCP server Administrative Mode: ..... Disabled
```

```
(switch)# config
```

```
(switch) (Config)# crypto key generate rsa
```

```
Do you want to overwrite the existing RSA keys? (y/n): y
```

```
(switch) (Config)# crypto key generate dsa
```

```
Do you want to overwrite the existing DSA keys? (y/n): y
```

```
(switch) (Config)# crypto key generate ecdsa 521
```

```
Do you want to overwrite the existing ECDSA keys? (y/n): y
```

```
(switch) (Config)# aaa authorization commands "noCmdAuthList" none
```

```
(switch) (Config)# exit
```

```
(switch)# ip ssh server enable
```

```
(switch)# ip ssh pubkey-auth
```

```
(switch)# ip scp server enable
```

```
(switch)# write mem
```

This operation may take a few minutes.

Management interfaces will not be available during this time.

Are you sure you want to save? (y/n) **y**

Config file 'startup-config' created successfully .

Configuration Saved!

2. Verify that SSH is enabled:

```
show ip ssh
```

```
(switch)# show ip ssh

SSH Configuration

Administrative Mode: ..... Enabled
SSH Port: ..... 22
Protocol Level: ..... Version 2
SSH Sessions Currently Active: ..... 0
Max SSH Sessions Allowed: ..... 5
SSH Timeout (mins): ..... 5
Keys Present: ..... DSA(1024) RSA(1024)
ECDSA(521)
Key Generation In Progress: ..... None
SCP server Administrative Mode: ..... Disabled
```

## Configure the cluster switch log collection feature

The cluster switch health monitor log collection feature is used to collect switch-related log files in ONTAP. You must make sure that you have set up your environment using the BES-53248 cluster switch CLI as detailed here.

### Steps

1. For ONTAP 9.8 and later, enable the cluster switch health monitor log collection feature for collecting switch-related log files, using the commands:

```
system switch ethernet log setup-password and system switch ethernet log enable-
collection
```

Enter: system switch ethernet log setup-password

```
cluster1::*> system switch ethernet log setup-password
```

```
Enter the switch name: <return>
```

```
The switch name entered is not recognized.
```

```
Choose from the following list:
```

```
cs1
```

```
cs2
```

```
cluster1::*> system switch ethernet log setup-password
```

```
Enter the switch name: cs1
```

```
RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
```

```
Do you want to continue? {y|n}::[n] y
```

```
Enter the password: <enter switch password>
```

```
Enter the password again: <enter switch password>
```

```
cluster1::*> system switch ethernet log setup-password
```

```
Enter the switch name: cs2
```

```
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
```

```
Do you want to continue? {y|n}:: [n] y
```

```
Enter the password: <enter switch password>
```

```
Enter the password again: <enter switch password>
```

Followed by: `system switch ethernet log enable-collection`

```
cluster1::*> system switch ethernet log enable-collection
```

```
Do you want to enable cluster log collection for all nodes in the  
cluster?
```

```
{y|n}: [n] y
```

```
Enabling cluster switch log collection.
```

```
cluster1::*>
```

2. For ONTAP 9.5P15, 9.6P11, 9.7P8 and later patch releases, enable the cluster switch health monitor log collection feature for collecting switch-related log files, using the commands:

```
system cluster-switch log setup-password and system cluster-switch log enable-  
collection
```

Enter: `system cluster-switch log setup-password`

```

cluster1::*> system cluster-switch log setup-password
Enter the switch name: <return>
The switch name entered is not recognized.
Choose from the following list:
cs1
cs2

cluster1::*> system cluster-switch log setup-password

Enter the switch name: cs1
RSA key fingerprint is e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
Do you want to continue? {y|n}::[n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system cluster-switch log setup-password

Enter the switch name: cs2
RSA key fingerprint is 57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
Do you want to continue? {y|n}:: [n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

```

Followed by: `system cluster-switch log enable-collection`

```

cluster1::*> system cluster-switch log enable-collection

Do you want to enable cluster log collection for all nodes in the
cluster?
{y|n}: [n] y

Enabling cluster switch log collection.

```



The log collect command is not available at this time. See [Bug 1225042](#) for further details.



If any of these commands return an error, contact NetApp support.

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