Lenovo

Broadcom® BES-53248 Switches

Second edition (March 2023)

Contents

Chapter 1. Overview of the Broadcom BES-53248 cluster switch

The BES-53248 cluster switches are designed to work in clusters ranging in size from two to 24 controllers in ONTAP 9.6 and later.

BES-53248 is a bare metal switch running on a Broadcom embedded OS known as Ethernet Fabric OS (EFOS).

Overview of airflow based on the two models offered:

- Port-side exhaust airflow (standard air): Cool air enters the chassis through the fan and power supply modules in the cold aisle and exhausts through the port end of the chassis in the hot aisle. Blue coloring indicates port-side exhaust airflow. This is the most common option.
- Port-side intake airflow (reverse air): Cool air enters the chassis through the port end in the cold aisle and exhausts through the fan and power supply modules in the hot aisle.

See the https://fod2.lenovo.com/lkms/angular/app/pages/index.htm#/welcome for details on adding additional port licenses.

For information on the relevant connectors and cable options to use along with their part numbers, see the https://lenovopress.com/.

For more information, see the *Cluster Network and Management Network Compatibility Matrix* available from the Broadcom BES-53248 switch download site: https://download.lenovo.com/storage/lenovo_storage_dm3kh_5kh_7kh_5kf_7kf_fw9.6p1_interop_matrix_v1.0.xlsx

Chapter 2. Setting up the Broadcom BES-53248 cluster switch

You can use the setup information to get your cluster switches ready to configure and customize them for your requirements.

Broadcom 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.

Broadcom BES-53248 cluster switch port assignments

You can use the Broadcom BES-53248 cluster switch port assignment table as a guide to configure your cluster.

Broadcom BES-53248 cluster switch port assignment table

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

Chapter 3. Required documentation for Broadcom BES-53248 cluster switches

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

Required documentation for Broadcom BES-53248 cluster switches

To set up the BES-53248 cluster switch, you need the following documents available from the Broadcom Support Site:

- https://www.broadcom.com/support/bes-switch
- https://www.broadcom.com/support

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

Required documentation for supported ONTAP systems

To set up an ONTAP system, you need the following documents from the Lenovo Support Site at https://datacentersupport.lenovo.com/:

Name	Description
Lenovo Press	Describes the power and site requirements for all Lenovo hardware, including system cabinets.
Controller-specific *Installation and Setup Instructions*	Describes how to install Lenovo hardware.
ONTAP 9.6	Provides detailed information about all aspects of the ONTAP 9.6 release.

Chapter 4. Configuring a new Broadcom 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 Broadcom BES-53248 cluster switch on systems running ONTAP 9.6 and later 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 details.

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

- The Lenovo 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 *controller1_clus1* and *controller1_clus2* for controller1, and *controller2_clus1* and *controller2_clus2* for controller2.
- The IPspace name is Cluster.
- The `cluster1::>` prompt indicates the name of the cluster.
- The cluster ports on each controller are named e0a and e0b.

  See the *Lenovo Press* for the actual cluster ports supported on your platform.

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

Initial installation of the Broadcom BES-53248 cluster switch

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

About this task

You can download the applicable Lenovo EFOS software for your cluster switches from the Lenovo Support Site at https://datacentersupport.lenovo.com/.

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:

Step 1. Connect the serial port to the host or serial port of your choice.

Step 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.

Step 3. At the console, set the host side serial settings:

- 115200 baud
- 8 data bits
- 1 stop bit
- parity: none
- flow control: none

Step 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.

Note: You need to change the initial password when you log in to the switch for the first time.

Example

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

Step 5. Change the switch name to cs2:

Example

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

Step 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.

Example

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

Step 7. Verify the results using the command:
`show serviceport`
The following example shows IP information provided by DHCP server.

Example

```
(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
```

Installing the EFOS software

You can use this procedure to install the EFOS software on the Broadcom BES-53248 cluster switch.

Step 1. Connect the BES-53248 cluster switch to the management network.

Step 2. Use the `ping` command to verify connectivity to the server hosting EFOS, licenses, and the RCF file.

Example

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.
```

Step 3. Back up the current active image on cs2:

```
show bootvar
```

Example

```
(cs2) # show bootvar

 Image Descriptions

 active :
 backup :


 Images currently available on Flash

--------------------------------------------------------------------
 unit      active      backup        current-active    next-active
--------------------------------------------------------------------

    1      3.4.3.1     Q.10.22.1     3.4.3.1           3.4.3.1

(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      3.4.3.1     3.4.3.1     3.4.3.1           3.4.3.1

(cs2) #
```

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

```
show version
```

Example

```
(cs2) # show version

Switch: 1

System Description..... Quanta IX8-B 48x25GB SFP 8x100GB QSFP, 3.4.3.1, 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..... 3.4.3.1
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
```

Step 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.

Example

```
(cs2) # copy sftp://root@172.19.2.1//tmp/EFOS-3.4.3.3.stk active
Remote Password:********

Mode..... SFTP
Set Server IP..... 172.19.2.1
Path..... //tmp/
Filename..... EFOS-3.4.3.3.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.
```

Step 6. Display the boot images for the active and backup configuration:
`show bootvar`

Example

```
(cs2) # show bootvar

Image Descriptions

 active :
 backup :


 Images currently available on Flash

--------------------------------------------------------------------
 unit      active      backup     current-active        next-active
```

```
----------------------------------------------------------------------

    1      3.4.3.1      3.4.3.1              3.4.3.1              3.4.3.3
```

Step 7. Reboot the switch:

```
reload
```

Example

```
(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!
```

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

```
show version
```

Example

```
(cs2) # show version

Switch: 1

System Description..... x86_64-quanta_common_rglbmc-r0, 3.4.3.3, Linux 4.4.117-ceeeb99d, 2016.05.00.04
Machine Type..... x86_64-quanta_common_rglbmc-r0
Machine Model..... BES-53248
Serial Number..... QTFCU38260014
Maintenance Level..... A
Manufacturer..... 0xbc00
Burned In MAC Address..... D8:C4:97:71:12:3D
Software Version..... 3.4.3.1
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
```

Installing licenses for Broadcom BES-53248 cluster switches

The Broadcom BES-53248 cluster switch base model is licensed for 16 10G or 25G ports and two 100G ports. New ports can be added by purchasing more licenses. Each license provides an extra eight 10G or 25G ports and two 40G or 100G ports.

Step 1. Connect the cluster switch to the management network.

Step 2. Use the `ping` command to verify connectivity to the server hosting EFOS, licenses, and the RCF file.

Example

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.
```

Step 3. Check the current license usage on switch cs2:
`show license`

Example

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

License Index  License Type     Status
-------------- ---------------- -----------

No license file found.
```

Step 4. Install the license file. The following example uses HTTP to copy a license file to a key index 1. Repeat this step to load more licenses and to use different key index numbers.

Example

```
(cs2) # copy http://172.19.2.1/tmp/efos/license1.dat nvram:license-key 1

Mode........................................... HTTP
Set Server IP.................................. 172.19.2.1
Path........................................... tmp/efos/
Filename....................................... license1.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.
```

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

Example

```
(cs2) # show license

Reboot needed..................................... Yes
Number of active licenses......................... 0


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

Step 6. Reboot the switch:
`reload`

Example

```
(cs2) # reload

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

Step 7. Display all licensed ports:
`show port all`
The ports from the additional license files are not displayed until after the switch is rebooted.

Example

```
(cs2) # show port all

                 Admin     Physical   Physical   Link   Link    LACP   Actor
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
```

Step 8. Check that the new license is active and note that the license has been applied:
`show license`

Example

```
(cs2) # show license

Reboot needed.................................. No
Number of active licenses..................... 1
Total Downlink Ports enabled.................. 8
Total Uplink Ports enabled..................... 2


License Index  License Type       Status
-------------- ----------------- -------------------
1              Port               License applied
```

Step 9. Check that all new ports are available:
`show port all`

Example

```
(cs2) # show port all

                 Admin     Physical   Physical   Link   Link    LACP   Actor
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
0/17            Disable   Auto                 Down   Enable  Enable long
0/18            Disable   Auto                 Down   Enable  Enable long
0/19            Disable   Auto                 Down   Enable  Enable long
0/20            Disable   Auto                 Down   Enable  Enable long
0/21            Disable   Auto                 Down   Enable  Enable long
0/22            Disable   Auto                 Down   Enable  Enable long
0/23            Disable   Auto                 Down   Enable  Enable long
0/24            Disable   Auto                 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
```

Step 10. To apply a configuration for the additional licensed ports, see “Installing the Reference Configuration File (RCF)” on page 14.

Installing the Reference Configuration File (RCF)

You can install the RCF after setting up the Broadcom BES-53248 cluster switch for the first time and after the new license or licenses have been applied.

Step 1. Connect the cluster switch to the management network.

Step 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.

Example

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.
```

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

Example

```
(cs2) # copy sftp://root@172.19.2.1//tmp/BES-53248_RCFv1.0.4.txt
Remote Password ********

Mode..................................... SFTP
Set Server IP.................................. 172.19.2.1
Path..................................... //tmp/
Filename..................................... BES-53248_RCFv1.0.4.txt
Data Type..................................... Config Script
Destination Filename.......................... BES-53248_RCFv1.0.4.scr

File with same name already exists.
WARNING:Continuing with this command will overwrite the existing file.


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


Validating configuration script...
[the script is now displayed line by line]

Configuration script validated.
File transfer operation completed successfully.
```

Note: 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.

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

Example

```
(cs2) # script list

Configuration Script Name     Size(Bytes)Date of Modification
----------------------------- -------------- ---------------------
BES-53248_RCF_v1.0.4.scr      771            2019 02 28 06:48:29

1 configuration script(s) found.
2047 Kbytes free.
```

Step 5. Apply the script to the switch.

The file `BES-53248_RCD_v1.0.4.scr` contains configuration information for a fully-loaded switch with all licenses installed. If your BES-53248 switch does not have any or all licenses installed, an error message is returned. You can safely ignore this error message.

Note: If your BES-53248 switch does not have any license installed, you see an error message starting with:

```
interface 0/17-0/24

Unrecognized command : interface 0/17-0/24
```

The following example shows the error message that is returned for a BES-53248 switch with one license installed.

Example

```
(cs2) # script apply BES-53248_RCF_v1.0.4.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!
[The script is now displayed line by line]...

interface 0/25-0/32

Unrecognized command : interface 0/25-0/32

Error! in configuration script file at line number 77.
CLI Command :: interface 0/25-0/32.
Aborting script.
Execution of configuration script 'BES-53248_RCF_v1.0.4.scr' could not be completed.

WARNING:
 The running configuration may not be the desired configuration. You might want to reload the saved configuration.
```

Step 6. Verify the ports for an additional license after the RCF is applied:
`show port all`

Example

```
(cs2) # show port all

                 Admin     Physical   Physical   Link   Link    LACP   Actor
Intf      Type   Mode      Mode       Status     Status Trap    Mode   Timeout
--------- ------ --------- ---------- ---------- ------ ------- ------ --------
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
0/17              Enable    Auto                  Down   Enable  Enable long
0/18              Enable    Auto                  Down   Enable  Enable long
0/19              Enable    Auto                  Down   Enable  Enable long
0/20              Enable    Auto                  Down   Enable  Enable long
0/21              Enable    Auto                  Down   Enable  Enable long
0/22              Enable    Auto                  Down   Enable  Enable long
0/23              Enable    Auto                  Down   Enable  Enable long
0/24              Enable    Auto                  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
```

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

```
show running-config
```

Example

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

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

```
write memory
```

Example

```
(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!
```

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

```
reload
```

Example

```
(cs2) # reload
```

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

System will now restart!
```

Installing 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.

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.

Step 1. Download the cluster switch health monitor configuration zip file based on the corresponding ONTAP release version. This file is available from the https://datacentersupport.lenovo.com/ page.

Step 2. Upload the applicable zip file to your internal web server where the IP address is X.X.X.X.

Example

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
```

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

Example

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

Step 4. Run the switch health monitor configure command `system cluster-switch configure-health-monitor -controller * -package-url X.X.X.X/location_to_download_zip_file`:

Example

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

Step 5. Verify that the command output contains the text string "downloaded package processed successfully". If an error occurs, contact Lenovo support.

Step 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".

Example

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

Note: 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.

Chapter 5. Upgrading a Broadcom BES-53248 cluster switch in an NDO/NDU environment

Upgrading Broadcom BES-53248 cluster switches on systems running ONTAP 9.6 and later, starts with preparing the controller for upgrade, installing the EFOS software, licenses, and reference configuration file (RCF). After the installation, you can restore the controller configuration in a nondistruptive upgrade (NDU) and nondisruptive operation (NDO) environment.

Before you begin

The following conditions must exist before you install the EFOS software, licenses, and the RCF file on an existing Lenovo Broadcom BES-53248 cluster switch:

- The cluster must be a completely cluster (no error log messages or other issues).
- The cluster must not contain any defective cluster network interface cards (NICs).
- All connected ports on both cluster switches must be functional.
- All cluster ports must be up.
- All cluster LIFs must be administratively and operationally up and on their home ports.
- The ONTAP `clustercluster – ping < controller >` advanced privilege command must indicate that `largerthanPMTUcommunication` is successful on all paths.
- There might be command dependencies between command syntax in the RCF and EFOS versions.

About this task

You must consult the switch compatibility table on the Lenovo Broadcom BES-53248 switches page for the supported EFOS, RCF, and ONTAP versions at: https://datacentersupport.lenovo.com/.

This procedure applies to a functioning cluster and allows for NDU and NDO. The examples in this procedure use the following switch and controller nomenclature:

- The Lenovo 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 *controller1_clus1* and *controller1_clus2* for controller1, and *controller2_clus1* and *controller2_clus2* for controller2 .
- The IPspace name is Cluster.
- The `cluster1 ::>` prompt indicates the name of the cluster.
- The cluster ports on each controller are named *e0a* and *e0b*.

  See the *Lenovo Press* for the actual cluster ports supported on your platform.

  https://lenovopress.com/
- The Inter-Switch Links (ISLs) supported for the Lenovo cluster switches are ports 0/55 and 0/56.
- The controller connections supported for the Lenovo cluster switches are ports 0/1 through 0/16 with default licensing.
- The examples in this procedure use two controllers, but you can have up to 24 controllers in a cluster.
- Repeat all procedures in this section to upgrade the EFOS software and RCF file on the other switch, **cs1**.

Preparing the controller for a cluster switch upgrade

You can use this procedure to prepare the controller for a Broadcom BES-53248 cluster switch upgrade.

Step 1. Connect the cluster switch to the management network.

Step 2. Use the `ping` command to verify connectivity to the server hosting EFOS, licenses, and the RCF. If this 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.

Example

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.
```

Step 3. Verify that the cluster ports are healthy and have a link using the command:
`network port show -ipspace Cluster`

Example

The following example shows the type of output with all ports having a **Link** value of up and a **HealthStatus** of healthy :

```
cluster1::> network port show -ipspace Cluster

Controller: controller1
                                                                        Ignore
                                                  Speed(Mbps) Health   Health
Port   IPspace      Broadcast Domain Link MTU  Admin/Oper  Status   Status
------ ------------ ---------------- ---- ---- ----------- -------- ------
e0a    Cluster      Cluster          up   9000  auto/10000 healthy  false
e0b    Cluster      Cluster          up   9000  auto/10000 healthy  false

Controller: controller2
                                                                        Ignore
                                                  Speed(Mbps) Health   Health
Port   IPspace      Broadcast Domain Link MTU  Admin/Oper  Status   Status
-----  ------------ ---------------- ---- ---- ----------- -------- ------
e0a    Cluster      Cluster          up   9000  auto/10000 healthy  false
e0b    Cluster      Cluster          up   9000  auto/10000 healthy  false

4 entries were displayed.
```

Step 4. Verify that the cluster LIFs are administratively and operationally up and reside on their home ports, using the command:
`network interface show -vserver Cluster`

Example

In this example, the -vserver parameter displays information about the LIFs that are associated with cluster ports. **StatusAdmin/Oper** must be up and **IsHome** must be true :

```
cluster1::>network interface show -vserver Cluster

          Logical      Status     Network              Current       Current Is
Vserver   Interface    Admin/Oper Address/Mask         Controller    Port    Home
--------- ----------   ---------- ------------------   ------------- ------- ----
Cluster
          controller1_clus1
                       up/up      169.254.217.125/16   controller1          e0a     true
          controller1_clus2
```

```
                    up/up       169.254.205.88/16   controller1          e0b     true
          controller2_clus1
                    up/up       169.254.252.125/16  controller2          e0a     true
          controller2_clus2
                    up/up       169.254.110.131/16  controller2          e0b     true

4 entries were displayed.
```

Installing the EFOS software

You can use this procedure to install the EFOS software on the Broadcom BES-53248 cluster switch.

Step 1. Connect the BES-53248 cluster switch to the management network.

Step 2. Use the `ping` command to verify connectivity to the server hosting EFOS, licenses, and the RCF file.

Example

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.
```

Step 3. Back up the current active image on cs2:

```
show bootvar
```

Example

```
(cs2) # show bootvar

 Image Descriptions

 active :
 backup :


 Images currently available on Flash

--------------------------------------------------------------------
 unit      active      backup        current-active    next-active
--------------------------------------------------------------------

    1      3.4.3.1     Q.10.22.1     3.4.3.1           3.4.3.1

(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       3.4.3.1       3.4.3.1       3.4.3.1              3.4.3.1

(cs2) #
```

Step 4. Verify the running version of the EFOS software:
`show version`

Example

```
(cs2) # show version

Switch: 1

System Description..... Quanta IX8-B 48x25GB SFP 8x100GB QSFP, 3.4.3.1, 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..... 3.4.3.1
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
```

Step 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.

Example

```
(cs2) # copy sftp://root@172.19.2.1//tmp/EFOS-3.4.3.3.stk active
Remote Password:********

Mode..... SFTP
Set Server IP..... 172.19.2.1
Path..... //tmp/
Filename..... EFOS-3.4.3.3.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.
```

Step 6. Display the boot images for the active and backup configuration:
`show bootvar`

Example

```
(cs2) # show bootvar

Image Descriptions
```

```
 active :
 backup :


 Images currently available on Flash

--------------------------------------------------------------------
 unit      active      backup     current-active         next-active
--------------------------------------------------------------------

    1     3.4.3.1     3.4.3.1             3.4.3.1             3.4.3.3
```

Step 7. Reboot the switch:

```
reload
```

Example

```
(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!
```

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

```
show version
```

Example

```
(cs2) # show version

Switch: 1

System Description.............................. x86_64-quanta_common_rglbmc-r0, 3.4.3.3, Linux 4.4.117-ceeeb99d, 2016.05.00.04
Machine Type.................................... x86_64-quanta_common_rglbmc-r0
Machine Model................................... BES-53248
Serial Number................................... QTFCU38260014
Maintenance Level............................... A
Manufacturer.................................... 0xbc00
Burned In MAC Address........................... D8:C4:97:71:12:3D
Software Version................................ 3.4.3.1
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
```

Installing licenses for Broadcom BES-53248 cluster switches

The Broadcom BES-53248 cluster switch base model is licensed for 16 10G or 25G ports and two 100G ports. New ports can be added by purchasing more licenses. Each license provides an extra eight 10G or 25G ports and two 40G or 100G ports.

Step 1. Connect the cluster switch to the management network.

Step 2. Use the `ping` command to verify connectivity to the server hosting EFOS, licenses, and the RCF file.

Example

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.
```

Step 3. Check the current license usage on switch cs2:
`show license`

Example

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

License Index  License Type     Status
-------------- ---------------- -----------

No license file found.
```

Step 4. Install the license file. The following example uses HTTP to copy a license file to a key index 1. Repeat this step to load more licenses and to use different key index numbers.

Example

```
(cs2) # copy http://172.19.2.1/tmp/efos/license1.dat nvram:license-key 1

Mode........................................... HTTP
Set Server IP.................................. 172.19.2.1
Path........................................... tmp/efos/
Filename....................................... license1.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.
```

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

Example

```
(cs2) # show license

Reboot needed..................................... Yes
Number of active licenses......................... 0


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

Step 6. Reboot the switch:
`reload`

Example

```
(cs2) # reload

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

Step 7. Display all licensed ports:
`show port all`
The ports from the additional license files are not displayed until after the switch is rebooted.

Example

```
(cs2) # show port all

                 Admin     Physical   Physical   Link   Link    LACP   Actor
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
```

Step 8. Check that the new license is active and note that the license has been applied:
`show license`

Example

```
(cs2) # show license

Reboot needed.................................. No
Number of active licenses..................... 1
Total Downlink Ports enabled.................. 8
Total Uplink Ports enabled..................... 2


License Index  License Type      Status
-------------- ----------------- --------------------
1              Port               License applied
```

Step 9. Check that all new ports are available:
`show port all`

Example

```
(cs2) # show port all

                 Admin     Physical   Physical   Link   Link    LACP   Actor
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
0/17            Disable   Auto                 Down   Enable  Enable long
0/18            Disable   Auto                 Down   Enable  Enable long
0/19            Disable   Auto                 Down   Enable  Enable long
0/20            Disable   Auto                 Down   Enable  Enable long
0/21            Disable   Auto                 Down   Enable  Enable long
0/22            Disable   Auto                 Down   Enable  Enable long
0/23            Disable   Auto                 Down   Enable  Enable long
0/24            Disable   Auto                 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
```

Step 10. To apply a configuration for the additional licensed ports, see “Installing the Reference Configuration File (RCF)” on page 26.

Installing the Reference Configuration File (RCF)

You can install the RCF after setting up the Broadcom BES-53248 cluster switch for the first time and after the new license or licenses have been applied.

Step 1. Connect the cluster switch to the management network.

Step 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.

Example

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.
```

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

Example

```
(cs2) # copy sftp://root@172.19.2.1//tmp/BES-53248_RCFv1.0.4.txt
Remote Password ********

Mode..................................... SFTP
Set Server IP.................................. 172.19.2.1
Path..................................... //tmp/
Filename..................................... BES-53248_RCFv1.0.4.txt
Data Type.................................... Config Script
Destination Filename......................... BES-53248_RCFv1.0.4.scr

File with same name already exists.
WARNING:Continuing with this command will overwrite the existing file.


Management access will be blocked for the duration of the transfer
```

```
Are you sure you want to start? (y/n) y


Validating configuration script...
[the script is now displayed line by line]

Configuration script validated.
File transfer operation completed successfully.
```

Note: 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.

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

Example

```
(cs2) # script list

Configuration Script Name     Size(Bytes)Date of Modification
----------------------------- -------------- ---------------------
BES-53248_RCF_v1.0.4.scr      771            2019 02 28 06:48:29

1 configuration script(s) found.
2047 Kbytes free.
```

Step 5. Apply the script to the switch.

The file `BES-53248_RCD_v1.0.4.scr` contains configuration information for a fully-loaded switch with all licenses installed. If your BES-53248 switch does not have any or all licenses installed, an error message is returned. You can safely ignore this error message.

Note: If your BES-53248 switch does not have any license installed, you see an error message starting with:

```
interface 0/17-0/24

Unrecognized command : interface 0/17-0/24
```

The following example shows the error message that is returned for a BES-53248 switch with one license installed.

Example

```
(cs2) # script apply BES-53248_RCF_v1.0.4.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!
[The script is now displayed line by line]...

interface 0/25-0/32

Unrecognized command : interface 0/25-0/32

Error! in configuration script file at line number 77.
CLI Command :: interface 0/25-0/32.
```

```
Aborting script.
Execution of configuration script 'BES-53248_RCF_v1.0.4.scr' could not be completed.

WARNING:
 The running configuration may not be the desired configuration. You might want to reload the saved configuration.
```

Step 6. Verify the ports for an additional license after the RCF is applied:
`show port all`

Example

```
(cs2) # show port all

                  Admin     Physical   Physical   Link   Link    LACP   Actor
Intf      Type    Mode      Mode       Status     Status Trap    Mode   Timeout
--------- ------ --------- ---------- ---------- ------ ------- ------ --------
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
0/17              Enable    Auto                  Down   Enable  Enable long
0/18              Enable    Auto                  Down   Enable  Enable long
0/19              Enable    Auto                  Down   Enable  Enable long
0/20              Enable    Auto                  Down   Enable  Enable long
0/21              Enable    Auto                  Down   Enable  Enable long
0/22              Enable    Auto                  Down   Enable  Enable long
0/23              Enable    Auto                  Down   Enable  Enable long
0/24              Enable    Auto                  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
```

Step 7. Verify on the switch that your changes have been made:
`show running-config`

Example

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

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

Example

```
(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!
```

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

Example

```
(cs2) # reload

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

System will now restart!
```

Verifying the configuration after a cluster switch upgrade

You can use the commands provided here to verify that all is operational after a BES-53248 cluster switch upgrade.

Step 1. Display information about the network ports on the cluster using the command:
`network port show -ipspace Cluster`
`Link` must have the value up and `HealthStatus` must be healthy .

Example

The following example shows the output from the command:

```
cluster1::> network port show -ipspace Cluster

Controller: controller1
                                                                        Ignore
                                                  Speed(Mbps) Health   Health
Port   IPspace      Broadcast Domain Link MTU  Admin/Oper  Status   Status
------ ------------ ---------------- ---- ---- ----------- -------- ------
e0a    Cluster      Cluster          up   9000  auto/10000 healthy  false
e0b    Cluster      Cluster          up   9000  auto/10000 healthy  false

Controller: controller2
                                                                        Ignore
                                                  Speed(Mbps) Health   Health
Port   IPspace      Broadcast Domain Link MTU  Admin/Oper  Status   Status
-----  ------------ ---------------- ---- ---- ----------- -------- ------
e0a    Cluster      Cluster          up   9000  auto/10000 healthy  false
e0b    Cluster      Cluster          up   9000  auto/10000 healthy  false

4 entries were displayed.
```

Step 2. Verify that for each LIF `IsHome` is true and `StatusAdmin/Oper` is up on both controllers using the command:
`network interface show -vserver Cluster`

Example

```
cluster1::> network interface show -vserver Cluster

            Logical    Status     Network            Current       Current Is
Vserver     Interface  Admin/Oper Address/Mask       Controller           Port    Home
----------- ---------- ---------- ------------------ ------------- ------- ----
Cluster
            controller1_clus1  up/up    169.254.217.125/16 controller1         e0a     true
            controller1_clus2  up/up    169.254.205.88/16  controller1         e0b     true
            controller2_clus1  up/up    169.254.252.125/16 controller2         e0a     true
            controller2_clus2  up/up    169.254.110.131/16 controller2         e0b     true

4 entries were displayed.
```

Step 3. Verify that the `HealthStatus` of each controller is true using the command:
`cluster show`

Example

```
cluster1::> cluster show

Controller                  Health  Eligibility   Epsilon
--------------------- ------- ------------  ------------
controller1                 true    true          false
controller2                 true    true          false

2 entries were displayed.
```

Chapter 6. Migrating to a two-node switched cluster with Broadcom-supported BES-53248 cluster switches

If you have a two-node switchless cluster, you can migrate, non-disruptively, to a two-node switched cluster that includes Broadcom-supported BES-53248 cluster switches. The procedure you use depends on whether you have two dedicated cluster-network ports on each controller or a single cluster port on each controller. The process documented works for all nodes using optical or twinax ports but is not supported on this switch if nodes are using onboard 10Gb BASE-T RJ45 ports for the cluster-network ports.

Most systems require two dedicated cluster-network ports on each controller.

Ensure that the BES-53248 cluster switch is set up as described in the previous chapters before starting this migration process. See Chapter 2 “Setting up the Broadcom BES-53248 cluster switch” on page 3.

Note: After your migration completes, you might need to install the required configuration file to support the Cluster Switch Health Monitor (CSHM) for BES-53248 cluster switches. See “Installing the Cluster Switch Health Monitor (CSHM) configuration file” on page 17.

Migrating to a switched Lenovo cluster environment using Broadcom-supported BES-53248 cluster switches

If you have an existing two-node switchless cluster environment, you can migrate to a two-node switched cluster environment using Broadcom-supported BES-53248 cluster switches to enable you to scale beyond two nodes in the cluster.

Two-node switchless configuration:

- The two-node switchless configuration must be properly set up and functioning.
- The nodes must be running ONTAP 9.6 and later.
- All cluster ports must be in the up state.
- All cluster logical interfaces (LIFs) must be in the up state and on their home ports.

Broadcom-supported BES-53248 cluster switch configuration:

- The BES-53248 cluster switch must be fully functional on both switches.
- Both switches must have management network connectivity.
- There must be console access to the cluster switches.
- BES-53248 node-to-node switch and switch-to-switch connections must use twinax or fiber cables.

  The *Lenovo Press* contains more information about cabling.

  Lenovo Press - Switches
- Inter-Switch Link (ISL) cables must be connected to ports 0/55 and 0/56 on both BES-53248 switches.
- Initial customization of both the BES-53248 switches must be completed. So that the:
  - BES-53248 switches are running the latest version of software
  - BES-53248 switches have optional licenses installed, if purchased
  - Reference Configuration Files (RCFs) have been applied to the switches

  Any site customization, such as SMTP, SNMP, and SSH must be configured on the new switches.

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

- The names of the BES-53248 switches are *cs1* and *cs2*.
- The names of the cluster SVMs are *node1* and *node2*.
- The names of the LIFs are *node1_clus*1 and *node1_clus2* on node 1, and *node2_clus1* and *node2_clus2* on node 2 respectively.
- The `cluster1::*>` prompt indicates the name of the cluster.
- The cluster ports used in this procedure are *e0a* and *e0b*.

  The switch ports used in this procedure are port 1 and port 2.

  The *Lenovo Press* contains the latest information about the actual cluster ports for your platforms.

  Lenovo press

Step 1. Change the privilege level to advanced, entering **y** when prompted to continue: `set -privilege advanced`
The advanced prompt (`*>`) appears.

Step 2. If AutoSupport is enabled on this cluster, suppress automatic case creation by invoking an AutoSupport message: `system node autosupport invoke -node * -type all -message MAINT=`*x*`h` where *x* is the duration of the maintenance window in hours.

Note: The AutoSupport message notifies technical support of this maintenance task so that automatic case creation is suppressed during the maintenance window.

The following command suppresses automatic case creation for two hours:

```
cluster1::*> system node autosupport invoke -node * -type all -message MAINT=2h
```

Step 3. Disable all node-facing ports (not ISL ports) on both the new cluster switches cs1 and cs2.

Note: You must not disable the ISL ports.

The following example shows that node-facing ports 1 through 2 are disabled on switch cs1:

```
(cs1)# configure
(cs1)(Config)#    interface 0/1-0/2
(cs1)(Interface 0/1-0/2)# shutdown
(cs1)(Interface 0/1-0/2)# exit
(cs1)(Config)# exit
```

Step 4. Verify that the ISL and the physical ports on the ISL between the two BES-53248 switches cs1 and cs2 are up : `show port-channel`

The following example shows that the ISL ports are up on switch cs1:

```
(cs1)# show port-channel 1/1
Local Interface................................ 1/1
Channel Name................................... Cluster-ISL
Link State..................................... Up
Admin Mode..................................... Enabled
Type........................................... Dynamic
Port channel Min-links......................... 1
Load Balance Option............................ 7
(Enhanced hashing mode)

Mbr    Device/       Port        Port
Ports  Timeout       Speed       Active
------ ------------- ---------   -------
```

```
0/55   actor/long    100G Full  True
       partner/long
0/56   actor/long    100G Full  True
       partner/long
(cs1) #
```

The following example shows that the ISL ports are up on switch cs2 :

```
(cs2)# show port-channel 1/1
Local Interface................................ 1/1
Channel Name.................................. Cluster-ISL
Link State.................................... Up
Admin Mode.................................... Enabled
Type.......................................... Dynamic
Port channel Min-links........................ 1
Load Balance Option........................... 7
(Enhanced hashing mode)

Mbr    Device/       Port       Port
Ports  Timeout       Speed      Active
------ ------------- ---------  -------
0/55   actor/long    100G Full  True
       partner/long
0/56   actor/long    100G Full  True
       partner/long
(cs2) #
```

Step 5. Display the list of neighboring devices: `show isdp neighbors` This command provides information about the devices that are connected to the system.

The following example lists the neighboring devices on switch cs1:

```
(cs1)# show isdp neighbors

Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge,
                  S - Switch, H - Host, I - IGMP, r - Repeater
Device ID      Intf     Holdtime  Capability   Platform    Port ID
-------------- -------- --------- ------------ ----------- ---------
cs2            0/55     176       R            BES-53248   0/55
cs2            0/56     176       R            BES-53248   0/56
```

The following example lists the neighboring devices on switch cs2:

```
(cs2)# show isdp neighbors

Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge,
                  S - Switch, H - Host, I - IGMP, r - Repeater
Device ID      Intf     Holdtime  Capability   Platform    Port ID
-------------- -------- --------- ------------ ----------- ---------
cs2            0/55     176       R            BES-53248   0/55
cs2            0/56     176       R            BES-53248   0/56
```

Step 6. Verify that all cluster ports are up : `network port show -ipspace Cluster` Each port should display up for **Link** and healthy for **HealthStatus**.

```
cluster1::*> network port show -ipspace Cluster

Node: node1

                                                  Speed(Mbps) Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
--------- ------------ ---------------- ---- ---- ----------- --------
e0a       Cluster      Cluster          up   9000  auto/10000 healthy
```

```
e0b       Cluster      Cluster          up   9000  auto/10000 healthy

Node: node2

                                                  Speed(Mbps) Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
--------- ------------ ---------------- ---- ---- ----------- --------
e0a       Cluster      Cluster          up   9000  auto/10000 healthy
e0b       Cluster      Cluster          up   9000  auto/10000 healthy

4 entries were displayed.
```

Step 7. Verify that all cluster LIFs are up and operational: `network interface show -vserver Cluster` Each cluster LIF should display true for **`IsHome`** and have a **`StatusAdmin/Oper`** of up/up

```
cluster1::*> network interface show -vserver Cluster

            Logical    Status     Network            Current       Current Is
Vserver     Interface  Admin/Oper Address/Mask       Node          Port    Home
----------- ---------- ---------- ------------------ ------------- ------- -----
Cluster
            node1_clus1  up/up    169.254.209.69/16  node1         e0a     true
            node1_clus2  up/up    169.254.49.125/16  node1         e0b     true
            node2_clus1  up/up    169.254.47.194/16  node2         e0a     true
            node2_clus2  up/up    169.254.19.183/16  node2         e0b     true
4 entries were displayed.
```

Step 8. Verify that `auto-revert` is enabled on all cluster LIFs: `network interface show -vserver Cluster -fields auto-revert`

```
cluster1::*> network interface show -vserver Cluster -fields auto-revert

          Logical
Vserver   Interface     Auto-revert
--------- ------------- ------------
Cluster
          node1_clus1   true
          node1_clus2   true
          node2_clus1   true
          node2_clus2   true

4 entries were displayed.
```

Step 9. Disconnect the cable from cluster port e0a on node1, and then connect e0a to port 1 on cluster switch cs1, using the appropriate cabling supported by the BES-53248 switches. The *Lenovo Press* contains more information about cabling.

Lenovo Press - Switches

Step 10. Disconnect the cable from cluster port e0a on node2, and then connect e0a to port 2 on cluster switch cs1, using the appropriate cabling supported by the BES-53248 switches.

Step 11. Enable all node-facing ports on cluster switch cs1.

The following example shows that ports 1 through 2 are enabled on switch cs1:

```
(cs1)#  configure
(cs1)(Config)#  interface 0/1-0/2
(cs1)(Interface 0/1-0/2)# no shutdown
(cs1)(Interface 0/1-0/2)# exit
(cs1)(Config)# exit
```

Step 12. Verify that all cluster LIFs are up , operational, and display as true for **`IsHome`**: `network interface show -vserver Cluster`

The following example shows that all of the LIFs are up on node1 and node2 and that **`IsHome`** results are true :

```
cluster1::*> network interface show -vserver Cluster

         Logical      Status     Network            Current     Current Is
Vserver  Interface    Admin/Oper Address/Mask       Node        Port    Home
-------- ------------ ---------- ------------------ ----------- ------- ----
Cluster
         node1_clus1  up/up      169.254.209.69/16  node1       e0a     true
         node1_clus2  up/up      169.254.49.125/16  node1       e0b     true
         node2_clus1  up/up      169.254.47.194/16  node2       e0a     true
         node2_clus2  up/up      169.254.19.183/16  node2       e0b     true

4 entries were displayed.
```

Step 13. Display information about the status of the nodes in the cluster: `cluster show`

The following example displays information about the health and eligibility of the nodes in the cluster. In this example, the **Health** results true and the **Epsilon** results are false.

```
cluster1::*> cluster show

Node                 Health  Eligibility   Epsilon
-------------------- ------- ------------  ------------
node1                true    true          false
node2                true    true          false

2 entries were displayed.
```

Verify that each node has one connection to each switch: `show isdp neighbors`

```
(cs1) #show isdp neighbors

Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge,
                  S - Switch, H - Host, I - IGMP, r - Repeater

Device ID      Intf      Holdtime  Capability Platform         Port ID
---------------------- --------- --------- ---------- ---------------- ---------
node1          0/1       175       H          FAS2750          e0a
node2          0/2       157       H          FAS2750          e0a
cs2            0/55      178       R          BES-53248        0/56
cs2            0/56      178       R          BES-53248        0/55

(cs2) #show isdp neighbors

Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge,
                  S - Switch, H - Host, I - IGMP, r - Repeater

Device ID      Intf      Holdtime  Capability Platform         Port ID
---------------------- --------- --------- ---------- ---------------- ---------
cs1            0/55      175       R          BES-53248        0/56
cs1            0/56      175       R          BES-53248        0/55
```

Step 14. Disconnect the cable from cluster port e0b on node1, and then connect e0b to port 1 on cluster switch cs2, using the appropriate cabling supported by the BES-53248 switches.

Step 15. Disconnect the cable from cluster port e0b on node2, and then connect e0b to port 2 on cluster switch cs2, using the appropriate cabling supported by the BES-53248 switches.

Step 16. Enable all node-facing ports on cluster switch cs2.

The following example shows that ports 1 through 2 are enabled on switch cs2:

```
(cs2)# configure
(cs2)(Config)#  interface 0/1-0/2
```

```
(cs2)(Interface 0/1-0/2)# no shutdown
(cs2)(Interface 0/1-0/2)# exit
(cs2)(Config)# exit
```

Step 17. Verify that all cluster ports are up : `network port show -ipspace Cluster`

The following example shows that all of the cluster ports are up on node1 and node2:

```
cluster1::*> network port show -ipspace Cluster

Node: node1
                                                                        Ignore
                                                  Speed(Mbps) Health   Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status   Status
--------- ------------ ---------------- ---- ---- ----------- -------- ------
e0a       Cluster      Cluster          up   9000  auto/10000 healthy  false
e0b       Cluster      Cluster          up   9000  auto/10000 healthy  false

Node: node2
                                                                        Ignore
                                                  Speed(Mbps) Health   Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status   Status
--------- ------------ ---------------- ---- ---- ----------- -------- ------
e0a       Cluster      Cluster          up   9000  auto/10000 healthy  false
e0b       Cluster      Cluster          up   9000  auto/10000 healthy  false

4 entries were displayed.
```

Step 18. Verify that all interfaces display true for **IsHome**: `network interface show -vserver Cluster`

Note: This might take several minutes to complete.

The following example shows that all LIFs are up on node1 and node2 and that **IsHome** results are true :

```
cluster1::*> network interface show -vserver Cluster

          Logical      Status     Network            Current    Current Is
Vserver   Interface    Admin/Oper Address/Mask       Node       Port    Home
--------- ------------ ---------- ------------------ ---------- ------- ----
Cluster
          node1_clus1  up/up      169.254.209.69/16  node1      e0a     true
          node1_clus2  up/up      169.254.49.125/16  node1      e0b     true
          node2_clus1  up/up      169.254.47.194/16  node2      e0a     true
          node2_clus2  up/up      169.254.19.183/16  node2      e0b     true

4 entries were displayed.
```

Step 19. Verify that both nodes each have one connection to each switch: `show isdp neighbors`

The following example shows the appropriate results for both switches:

```
(cs1)# show isdp neighbors

Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge,
                  S - Switch, H - Host, I - IGMP, r - Repeater
Device ID      Intf         Holdtime  Capability   Platform -- Port ID
-------------- ------------ --------- ------------ ---------- ----------
node1          0/1          175       H            FAS2750     e0a
node2          0/2          157       H            FAS2750     e0a
cs2            0/55         178       R            BES-53248   0/55
cs2            0/56         178       R            BES-53248   0/56
```

```
(cs2)# show isdp neighbors

Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge,
                  S - Switch, H - Host, I - IGMP, r - Repeater
Device ID      Intf          Holdtime  Capability   Platform    Port ID
-------------- ------------ --------- ------------ ----------- ------------
node1           0/1           137       H            FAS2750     e0b
node2           0/2           179       H            FAS2750     e0b
cs1             0/55          175       R            BES-53248   0/55
cs1             0/56          175       R            BES-53248   0/56
```

Step 20. Display information about the discovered network devices in your cluster: `network device-discovery show -protocol cdp`

```
cluster1::*> network device-discovery show -protocol cdp
Node/       Local  Discovered
Protocol    Port   Device (LLDP: ChassisID)  Interface         Platform
----------- ------ ------------------------- ----------------  ----------------
node2      /cdp
            e0a    cs1                       0/2               BES-53248
            e0b    cs2                       0/2               BES-53248
node1      /cdp
            e0a    cs1                       0/1               BES-53248
            e0b    cs2                       0/1               BES-53248

4 entries were displayed.
```

Step 21. Verify that the settings are disabled: `network options switchless-cluster show`

Note: It might take several minutes for the command to complete. Wait for the '3 minute lifetime to expire' announcement.

The `false` output in the following example shows that the configuration settings are disabled:

```
cluster1::*> network options switchless-cluster show
Enable Switchless Cluster: false
```

Step 22. Verify the status of the node members in the cluster: `cluster show`

The following example shows information about the health and eligibility of the nodes in the cluster:

```
cluster1::*> cluster show

Node                 Health  Eligibility   Epsilon
-------------------- ------- ------------  --------
node1                true    true          false
node2                true    true          false
```

Step 23. Ensure that the cluster network has full connectivity using the command: `cluster ping-cluster -node` *node-name*

```
cluster1::*> cluster ping-cluster -node local

Host is node2
Getting addresses from network interface table...
Cluster node1_clus1 192.168.168.26 node1 e0a
Cluster node1_clus2 192.168.168.27 node1 e0b
Cluster node2_clus1 192.168.168.28 node2 e0a
Cluster node2_clus2 192.168.168.29 node2 e0b
Local = 192.168.168.28 192.168.168.29
Remote = 192.168.168.26 192.168.168.27
Cluster Vserver Id = 4294967293
Ping status:
....
Basic connectivity succeeds on 4 path(s)
Basic connectivity fails on 0 path(s)
................
```

```
Detected 1500 byte MTU on 4 path(s):
    Local 192.168.168.28 to Remote 192.168.168.26
    Local 192.168.168.28 to Remote 192.168.168.27
    Local 192.168.168.29 to Remote 192.168.168.26
    Local 192.168.168.29 to Remote 192.168.168.27
Larger than PMTU communication succeeds on 4 path(s)
RPC status:
2 paths up, 0 paths down (tcp check)
2 paths up, 0 paths down (udp check)
```

Step 24. Save the running configuration for each switch so that it becomes the startup configuration when you reboot the switch by running the following command from switch cs1 and cs2: `write memory`

```
(cs1) # 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!
(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!
```

Step 25. If you suppressed automatic case creation, reenable it by invoking an AutoSupport message: `system node autosupport invoke -node * -type all -message MAINT=END`

```
cluster1::*> system node autosupport invoke -node * -type all -message MAINT=END
```

Step 26. Change the privilege level back to admin: `set -privilege admin`

Appendix A. Contacting Support

You can contact Support to obtain help for your issue.

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