Upgrade a switch in an NDO/NDU environment

ONTAP Systems Switches

NetApp
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Upgrade a BES-53248 cluster switch in an NDO/NDU environment

Upgrading BES-53248 cluster switches 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 nondisruptive 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 NetApp BES-53248 cluster switch:

- The cluster must be a fully functioning 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 `cluster ping-cluster -node node1` advanced privilege command must indicate that `larger than PMTU communication` 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 NetApp BES-53248 switches page for the supported EFOS, RCF, and ONTAP versions at: NetApp BES-53248 switches.

This procedure applies to a functioning cluster and allows for NDU and NDO. 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 cluster switches are ports 0/55 and 0/56.
- The node connections supported for the NetApp cluster 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.

- Repeat all procedures in this section to upgrade the EFOS software and RCF file on the other switch, **cs1**.

Prepare the controller for a cluster switch upgrade

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

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 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.

   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. Verify that the cluster ports are healthy and have a link using the command:

   `network port show -ipspace Cluster`

   The following example shows the type of output with all ports having a `Link` value of up and a `Health Status` of healthy:

```
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. Verify that the cluster LIFs are administratively and operationally up and reside on their home ports, using the command:

   network interface show -vserver Cluster

   In this example, the -vserver parameter displays information about the LIFs that are associated with cluster ports. Status Admin/Oper must be up and Is Home must be 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       169.254.217.125/16  node1          e0a
true
            node1_clus2
                           up/up       169.254.205.88/16   node1          e0b
true
            node2_clus1
                           up/up       169.254.252.125/16  node2          e0a
true
            node2_clus2
                           up/up       169.254.110.131/16  node2          e0b
true
```

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 channels 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.

> ℹ️ 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 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-1025G-LIC	Broadcom 16Port 10G25G License Key, X190005/R
EFOS 3.4.4.6 and later	SW-BES53248-24P-1025G-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

                 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
```

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

                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
0/49         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 are: `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.

> ℹ️ If you try to edit a previously installed RCF, the process might fail because there is an existing configuration for other areas in the RCF, see Edit a previously installed RCF file.

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.

Edit a previously installed RCF file

After you edit a previously installed RCF file and run the `script apply` command, you might get the following error message:

```
(CS1)# script apply BES-53248_RCF_v1.6-Cluster-HA.scr
Are you sure you want to apply the configuration script? (y/n) y
```

After you select **y**, you get the following error message:

```
config
 ...
 match cos 5
 Unrecognized command : match cos 5
 Error! in configuration script file at line number 40.
 CLI Command :: match cos 5.
 Aborting script.
```

To avoid or resolve this issue, you can choose one of the following options:

- To avoid the error, you can use following procedure:

    1. Create a second RCF containing only the new port configuration.

    2. Copy the second RCF to the switch.

    3. Apply the script to the switch using the command: `script apply`.

- To resolve the error, see the Knowledge Base article: Error! in configuration script file at line number XX when applying a new RCF

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.

Reset the Broadcom IP switch to factory defaults

Before installing a new switch software version and RCFs, you must erase the Broadcom switch settings and perform basic configuration.

About this task
- You must repeat these steps on each of the cluster switches.
- You must be connected to the switch using the serial console.
- This task resets the configuration of the management network.

Steps
1. Change to the elevated command prompt (#): `enable`

   ```
   (cs2)> enable
   (cs2)#
   ```

2. Erase the startup configuration and remove the banner

   a. Erase the startup configuration:

erase startup-config

```
(cs2)# erase startup-config
Are you sure you want to clear the configuration? (y/n) y
(cs2)#
```

This command does not erase the banner.

b. Remove the banner:

no set clibanner

```
(cs2)# configure
(cs2)(Config)# no set clibanner
(cs2)(Config)#
```

3. Reboot the switch: **(cs2) #reload**

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

ⓘ If the system asks whether to save the unsaved or changed configuration before reloading the switch, select **No**.

4. Wait for the switch to reload, and then log in to the switch.

The default user is "admin", and no password is set. A prompt similar to the following is displayed:

```
(Routing)>
```

5. Change to the elevated command prompt:

enable

```
Routing)> enable
(Routing)#
```

6. Set the service port protocol to `none`:

serviceport protocol none

```
(Routing)# serviceport protocol none
Changing protocol mode will reset ip configuration.
Are you sure you want to continue? (y/n) y
(Routing) #
```

7. Assign the IP address to the service port:

```
serviceport ip ip-address netmask gateway
```

The following example shows a service port assigned IP address "10.10.10.10" with subnet "255.255.255.0" and gateway "10.10.10.1":

```
(Routing)# serviceport ip 10.10.10.10 255.255.255.0 10.10.10.1
```

8. Verify that the service port is correctly configured:

```
show serviceport
```

The following example shows that the port is up and the correct addresses have been assigned:

```
(Routing)# show serviceport
Interface Status............................... Up
IP Address..................................... 10.10.10.10
Subnet Mask.................................... 255.255.255.0
Default Gateway................................ 10.10.10.1
IPv6 Administrative Mode....................... Enabled
IPv6 Prefix is ................................
fe80::dac4:97ff:fe56:87d7/64
IPv6 Default Router............................ fe80::222:bdff:fef8:19ff
Configured IPv4 Protocol....................... None
Configured IPv6 Protocol....................... None
IPv6 AutoConfig Mode........................... Disabled
Burned In MAC Address.......................... D8:C4:97:56:87:D7
(Routing) #
```

9. If desired, configure the SSH server.

> ⓘ The RCF file disables the Telnet protocol. If you do not configure the SSH server, you can
>   only access the bridge using the serial port connection.

a. Generate RSA keys.

```
(Routing)# configure
(Routing) (Config)# crypto key generate rsa
```

b. Generate DSA keys (optional)

```
(Routing)# configure
(Routing) (Config)# crypto key generate dsa
```

c. If you are using the FIPS compliant version of EFOS, generate the ECDSA keys. The following example creates the keys with a length of 256. Valid values are 256, 384 or 521.

```
(Routing)# configure
(Routing) (Config)# crypto key generate ecdsa 256
```

d. Enable the SSH server.

If necessary, exit the configuration context.

```
(Routing) (Config)# end
(Routing)# ip ssh server enable
```

(i)   If keys already exist, then you might be asked to overwrite them.

10. If desired, configure the domain and name server:

```
configure
```

The following example shows the `ip domain` and `ip name server` commands:

```
(Routing)# configure
(Routing) (Config)# ip domain name lab.netapp.com
(Routing) (Config)# ip name server 10.99.99.1 10.99.99.2
(Routing) (Config)# exit
```

11. If desired, configure the time zone and time synchronization (SNTP).

The following example shows the `sntp` commands, specifying the IP address of the SNTP server and the relative time zone.

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

12. Configure the switch name:

```
hostname cs2
```

The switch prompt will display the new name:

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

13. Save the configuration:

```
write memory
```

You receive prompts and output similar to the following 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!
```

Install the Reference Configuration File (RCF)

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


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

                  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						
0/49	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!
```

> (i) Once the RCF is installed on the first switch, repeat these steps to install the RCF on the second cluster switch.

> (!) See this KB for further information when installing an RCF for MetroCluster.

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.

What you'll need

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.

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. 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 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!
```

2. Verify that SSH is enabled:

show ip ssh

```
(switch)# show ip ssh                                                37

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
```

3. 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::*>
```

4. 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.

Verify the configuration after a BES-53248 cluster switch upgrade

You can use the commands provided here to verify that all is operational after a BES-

53248 cluster switch upgrade.

Steps

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 `Health Status` must be `healthy`.

    The following example shows the output from the command:

    ```
    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
    ```

2. Verify that for each LIF `Is Home` is `true` and `Status Admin/Oper` is `up` on both nodes using the command:

    `network interface show -vserver Cluster`

```
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      169.254.217.125/16 node1            e0a
true
          node1_clus2  up/up      169.254.205.88/16  node1            e0b
true
          node2_clus1  up/up      169.254.252.125/16 node2            e0a
true
          node2_clus2  up/up      169.254.110.131/16 node2            e0b
true
```

3. Verify that the `Health Status` of each node is `true` using the command: `cluster show`

```
cluster1::> cluster show

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