

HP FCoE Configuration for Broadcom-Based Adapters User Guide

Abstract

This document is for the person who installs, administers, and troubleshoots servers and storage systems. HP assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels.



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Introduction

Performing a local boot with an FCoE-enabled network adapter

This guide details FCoE configuration of Broadcom-based, HP FlexFabric and StoreFabric adapters to perform a local boot only.

Certain adapters might support both hardware-accelerated FCoE and hardware-accelerated iSCSI protocols on the adapter ports. For any setup and configuration requirements specific to an adapter, see the documentation for that adapter. To configure a boot from SAN for a remote boot, see the *HP Boot from SAN Configuration Guide* (<http://www.hp.com/go/sandesignguide>).

About Broadcom-based, multi-function device drivers

Broadcom-based, multi-function devices use a tiered driver model, and the driver components contain multiple drivers that support the device. The component version is the virtual bus driver version as contained in the component. The virtual bus driver is a system device listed under Device Manager. The network device is a separate driver that is also contained in the component. The network device version is different from the component version. NCU device properties display both driver versions, and the driver versions are also listed in Device Manager.

Downloading files

Adapters

1. Go to the HP website (<http://www.hp.com>).
2. Select **Support**, and then select **Download drivers**.
3. Type the adapter name in the **Find by product** box, and then click **Go**.
For example, type `HP FlexFabric 20Gb 2-port 630FLB`.
4. Select the adapter to open the product page.
5. From the product page, do one of the following:
 - o Select the OS to download drivers and firmware as needed.
 - o Select **Manuals** to download documentation.

CNAs

1. Go to the HP website (<http://www.hp.com/go/cna>).
2. Select the adapter.
3. Select **Technical Support/Manuals**, and then select **Drivers, Software & Firmware**.
4. Download the drivers and firmware as needed.

Configuration

Configuration overview

Install the software in the following order:

1. Set the storage personality (if required).
2. Install the drivers, and then configure the adapter to enable FCoE.
3. Download, and then update, the adapter firmware.
4. Install or configure multi-pathing software (if required).
5. (Optional) Install BACS management software.

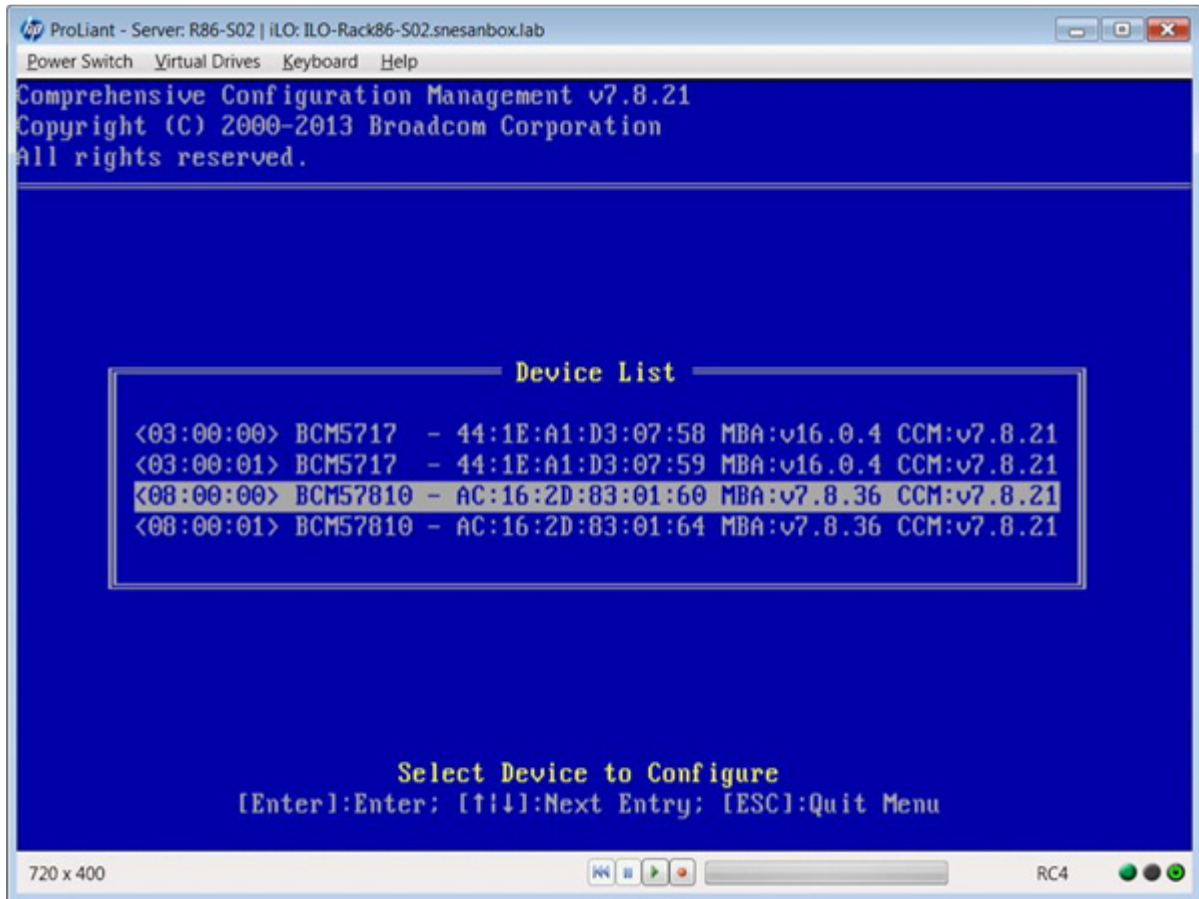
Setting the storage personality

HP Broadcom-based adapters are pre-configured with FCoE enabled on all ports by default. Hardware-accelerated iSCSI is also supported but is disabled by default. To change an adapter configured to enable iSCSI on either port, use the following procedure to change a port to FCoE. In a Virtual Connect environment, the storage personality is configured by Virtual Connect, and the following procedure is not required.

To set the storage personality on a port:

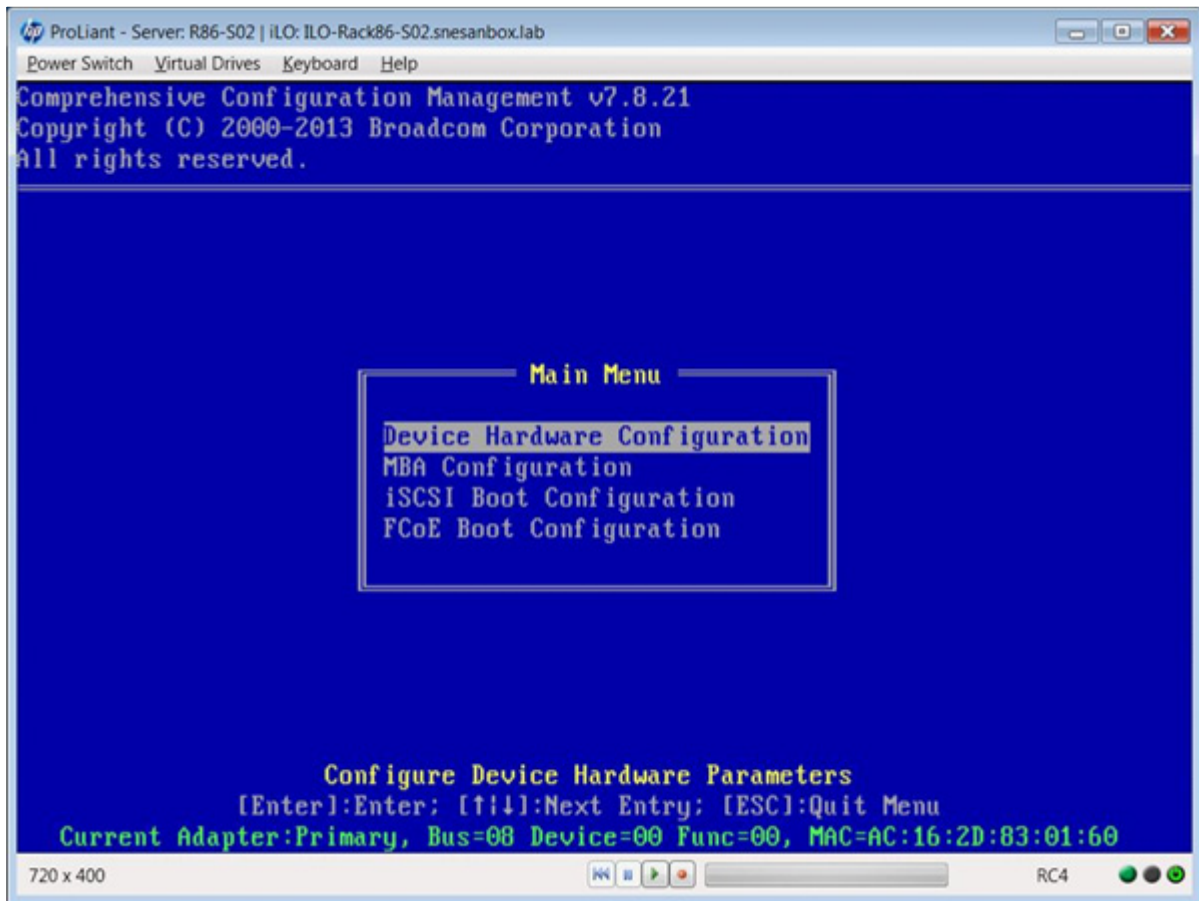
1. Power up the server.
2. Enter **Ctrl+S** when the Broadcom BIOS message appears to launch the CCM.

The CCM Device List shows every port of all Broadcom adapters in the system.



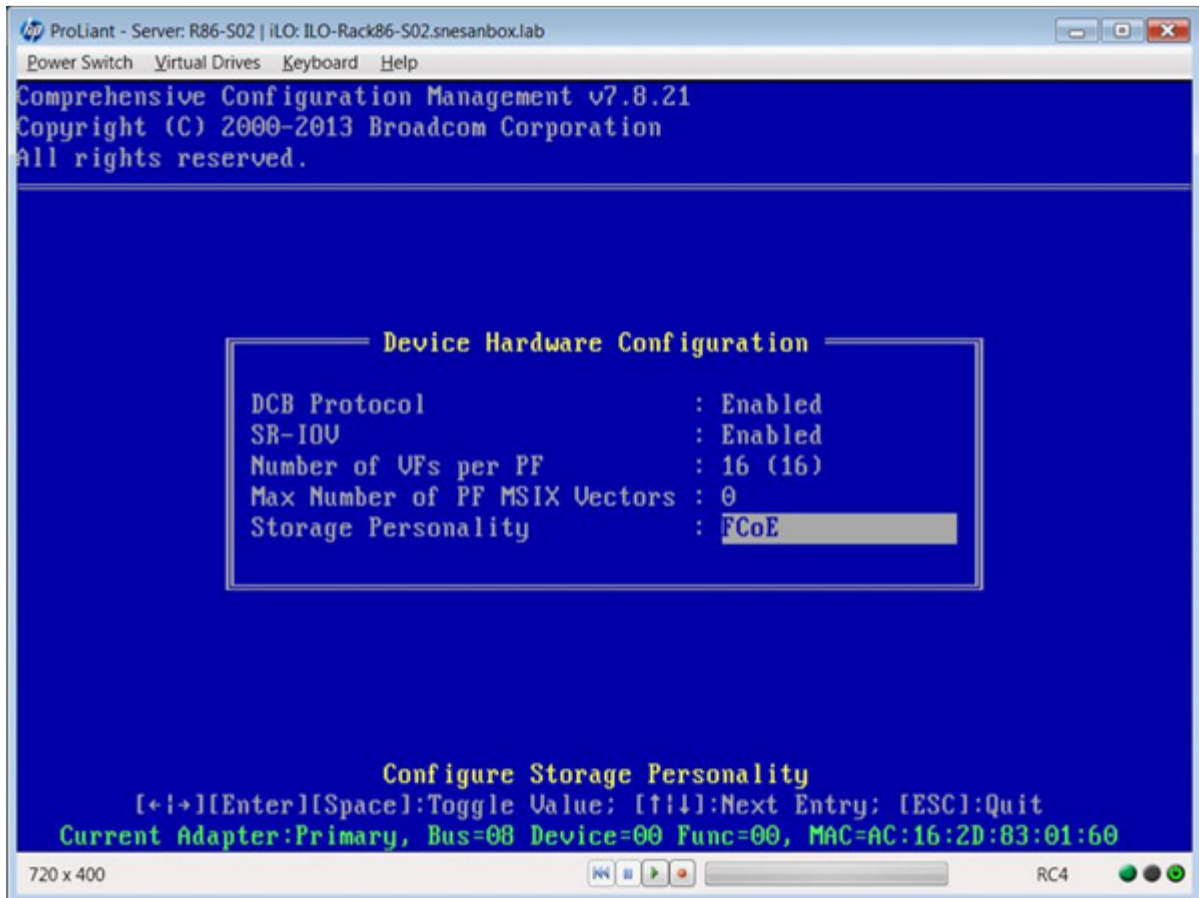
3. Select a port with the arrow keys, and then press **Enter**.

The CCM Main Menu appears.



4. Select **Device Hardware Configuration**, and then press **Enter**.
The Device Hardware Configuration Menu appears.

5. Select the **Storage Personality** field with the arrow keys, press **Enter** or the space bar to toggle between options, and then select the FCoE storage personality.



6. Press **ESC** to exit the Device Hardware Configuration Menu and save the changes.
7. Press **ESC** to exit the CCM Main Menu.
8. Select another port for modification from the Device List, or press **ESC** to exit the CCM.
9. Reboot the server to reset the storage personality.

The selected storage controllers appear in the operating system.

Configuring an adapter to enable FCoE

Configure an adapter to enable FCoE for one of the following OS:

- Windows OS (on page 8)
- Linux OS (on page 9)
- VMware (on page 10)

Windows OS

To install drivers on Windows OS:

1. Obtain the latest Windows driver Smart Component kit for your configuration, and then copy it to the Windows server.

2. Double-click the Smart Component executable, and then click **Install**.
The Smart Component automatically installs the drivers without any user intervention.
3. Click **Finish** after the installation is finished, and then click **Reboot** to complete the installation.

Linux OS

To install the driver package:

1. Download the appropriate driver kit for your distribution.
2. Install the in-box FCoE prerequisites (Open-FCoE).
 - o For RHEL, the package is `fcoe-utils`.
 - o For SLES, the package is `open-fcoe`.

The packages and dependencies are located on the OS installation media.
For additional instructions on installing the RPM, see the included Read Me file.
3. Configure FCoE on the adapter.
For SLES, enter the following commands to turn on the FCoE and LLDAP services:


```
# chkconfig boot.lldpad on
# chkconfig boot.fcoe on
```
4. Reboot the server to be sure that the newly installed drivers are active.

To enable FCoE on the adapter:


1. Create configuration files for all FCoE `ethX` interfaces:


```
# cd /etc/fcoe
# cp cfg-ethx cfg-<ethX FCoE interface name>
```

Some distributions might have a different naming scheme for Ethernet devices, such as `pXpX` or `emX` instead of `ethX`.
2. Modify `/etc/fcoe/cfg-<interface>`:
Set `DCB_REQUIRED=yes` to `DCB_REQUIRED=no`.
3. Turn on all `ethX` interfaces:


```
# ifconfig <ethX> up
```
4. For SLES, to configure the Ethernet interfaces with YaST to automatically start at boot, do one of the following:
 - o Set a static IP address.
 - o Enable DHCP on the interface.
5. To disable LLDAP for Broadcom-based CNA interfaces, which is required because Broadcom utilizes an offloaded DCBX client:


```
# lldptool set-lldp -i <ethX> adminStatus=disabled
```

 **IMPORTANT:** In a FlexFabric environment, LLDAP must be disabled on all network adapters, and HBA ports must be associated with a given physical interface.

6. Check that `/var/lib/lldpad/lldpad.conf` is created, and then do one of the following:
 - o Check that each `<ethX>` block does not specify `adminStatus`.
 - o If `adminStatus` is specified, be sure the setting is 0 (`adminStatus=0`) for all interfaces, including interfaces not enabled for FCoE:

```

lldp :
{
eth5 :
{
tlvid00000001 :
{
info = "04BC305B017B73";
};
tlvid00000002 :
{
info = "03BC305B017B73";
};
};
};

```

7. Restart the LLDPAD service to apply new settings:
 - o For RHEL: # service lldpad restart
 - o For SLES11: # rclldpad restart
8. Restart the FCoE service to apply new settings:
 - o For RHEL: # service fcoe restart
 - o For SLES11: # rcfcoe restart
9. Verify that the driver installed correctly, and then verify that the host port is seen by the switch.
 - a. Confirm proper DCB sync and operational DCB through BACS, BACScLi, or the directly connected switch interface.
Correct FCoE operation requires proper DCB connectivity.
 - b. Run `fcoeadm -i` to check all created FCoE interfaces and status.
If an FCoE interface is not present, check that the operating system is configured to automatically enable the required network interfaces.

VMware

To install drivers on VMware:

1. Download the appropriate driver kit for your distribution.
2. To install the driver, follow the instructions in the Read Me file included in the driver kit.
3. Reboot the system, and then enable FCoE on VMware.

To enable FCoE hardware offload on the adapter:

1. Access the host machine through SSH.
2. To determine which ports are FCoE capable, enter the following command:

```
# esxcli fcoe nic list
```

The following example shows a common output:

```

vmnic4
User Priority: 3
Source MAC: FF:FF:FF:FF:FF:FF
Active: false
Priority Settable: false

```

Source MAC Settable: false

VLAN Range Settable: false

3. Enable the FCoE interface:

```
# esxcli fcoe nic discover -n vmnicX
```

where X is the interface number gained from `esxcli fcoe nic list`.

4. Verify that the FCoE interface is working:

```
# esxcli fcoe adapter list
```

5. Check that the output of the `# esxcli fcoe adapter list` command shows valid values for the following parameters:

- o FCF MAC
- o VN-Port MAC
- o Priority
- o VLAN ID for the fabric that is connected to the adapter

(Optional) To verify that the interface is working:

1. Enter the command:

```
#esxcfg-scsidevs -a
```

2. Check that the output of the `#esxcfg-scsidevs -a` command looks similar to the following example:

```
vmhba34 bnx2fc link-up fcoe.1000<mac address>:2000<mac address> () Software FCoE
```

```
vmhba35 bnx2fc link-up fcoe.1000<mac address>:2000<mac address> () Software FCoE
```

The label Software FCoE is a VMware term used to describe initiators that depend on the in-box FCoE libraries and utilities. The Broadcom FCoE solution is a fully state-connection-based hardware offload solution designed to significantly reduce the CPU burden encumbered by a non-offload software initiator.

The command output example is from an ESXi 5.0 system. The command output on an ESXi 5.1 system replaces the term Software FCoE with Broadcom Corporation FCoE Adapter.

3. To verify that the driver installed correctly, and to verify that the host port is seen by the switch, check that the host WWPN shows in the switch FLOGI database:

- o For Cisco FCF: `show flogi database`
- o For Brocade FCF: `fcoe --loginshow`

Installing multi-pathing software

Multi-pathing software is optional.

To install multi-pathing software, do one of the following:

- For Windows, locate the MPIO DSM specific to the arrays and operating system version and download it to your server.
- For Linux, see the *Native Linux Device-Mapper Multipath for HP StorageWorks Arrays Reference Guide* on the SPOCK website (<http://www.hp.com/storage/spock>).

An HP Passport is required for access.

Installing BACS

For more information about BACS, see the *Broadcom BACS for HP FlexFabric and StoreFabric Adapters User Guide* (http://www.hp.com/support/HP_BACS_UG_en) and the documentation available with the BACS download.

Troubleshooting

Linux installation and configuration known issues

The following issues are known for Linux installation and configuration.

Memory considerations for Linux OS

The Broadcom bnx2x driver uses virtual memory for DMA operations. Normally, the driver requires a virtual memory size of 8264 kB per physical function at the probe stage. At the open stage, the driver requires more than 256 kB of virtual memory per physical function. On architectures that the default `vmalloc` size is relatively small and not sufficient to load many interfaces, use `vmalloc=<size>` during the boot to increase the size.

A 32-bit Linux operating system has a limited amount of memory space available for kernel data structures. To decrease the amount of memory pre-allocated by the driver to use the Broadcom bnx2x driver on the platform, do one of the following:

- Limit the number of RX queues with the `num_queues` driver parameter.
- Limit the number of RX buffers for each queue with the `ethtool -G` option.

During the installation of a 32-bit Linux operating system, HP recommends setting `bnx2x.num_queues=1` in the kernel command line when the system boots up from the installation media to install the OS. The `bnx2x.num_queues=1` setting avoids potential out-of-memory issues.

Multipath configuration for Linux OS

HP recommends the guidelines in *Native Linux Device-Mapper Multipath for HP Storage Disk Arrays Reference Guide* to configure multipath on Linux systems. For more information, search *Native Linux Device-Mapper Multipath for HP Storage Disk Arrays Reference Guide* on the HP SPOCK website (<http://www.hp.com/storage/spock>). For Broadcom CNAs, HP also recommends a `fast_io_fail_tmo` value of 25 in `multipath.conf` for each storage array. Add the line `fast_io_fail_tmo 25` to any array that does not already have the value defined. The adjustment avoids a race condition that can result in unexpected target and LUN loss.

Boot from SAN on RHEL 6 for Linux OS

Certain RHEL 6 configurations might experience boot-time IO errors when configured to boot from SAN. To avoid a potential problem, when the RHEL 6 installer prompts for the initial reboot after installation, press **Ctrl-Alt-F2** to enter a shell. Edit `/mnt/sysimage/boot/grub/menu.lst`, and then enter `bnx2x.disable_tpa=1` in the default kernel command line.

VMware installation and configuration known issues

The following issues are known for VMware installation and configuration.

Boot from SAN is not supported on ESXi 5.0.x for VMware

Boot from SAN is not supported on ESXi 5.0.x for VMware.

Multipath configuration for VMware

To set up multipath on an ESXi 5.x host, add a default FCoE transport SATP rule. For instructions, search for the article 2045934 on the VMware Knowledge Base website (<http://kb.vmware.com>).

Support and other resources

Before you contact HP

Be sure to have the following information available before you call HP:

- Active Health System log (HP ProLiant Gen8 or later products)
Download and have available an Active Health System log for 3 days before the failure was detected. For more information, see the *HP iLO 4 User Guide* or *HP Intelligent Provisioning User Guide* on the HP website (<http://www.hp.com/go/ilo/docs>).
- Onboard Administrator SHOW ALL report (for HP BladeSystem products only)
For more information on obtaining the Onboard Administrator SHOW ALL report, see the HP website (<http://www.hp.com/go/OAlog>).
- Technical support registration number (if applicable)
- Product serial number
- Product model name and number
- Product identification number
- Applicable error messages
- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level

HP contact information

For United States and worldwide contact information, see the Contact HP website (<http://www.hp.com/go/assistance>).

In the United States:

- To contact HP by phone, call 1-800-334-5144. For continuous quality improvement, calls may be recorded or monitored.
- If you have purchased a Care Pack (service upgrade), see the Support & Drivers website (<http://www8.hp.com/us/en/support-drivers.html>). If the problem cannot be resolved at the website, call 1-800-633-3600. For more information about Care Packs, see the HP website (<http://pro-aq-sama.houston.hp.com/services/cache/10950-0-0-225-121.html>).

Acronyms and abbreviations

BACS

Broadcom Advanced Control Suite

BACSLI

Broadcom Advanced Control Suite command line interface

CNA

Converged Network Adaptor

DCB

Datacenter Bridging Capability

DCBX

Datacenter Bridging Capability Exchange protocol

DHCP

Dynamic Host Configuration Protocol

DMA

direct memory access

DSM

Distributed State Machine

FCF

Fibre Channel Forwarder

FCoE

Fibre Channel over Ethernet

FLOGI

fabric login (Fibre Channel)

HBA

host bus adapter

ID

identification

LLDPAD

Link Layer Discovery Protocol Agent Daemon

LUN

logical unit number

MAC

Media Access Control

MPIO

multipath I/O

RHEL

Red Hat Enterprise Linux

RX

receive

SATP

Storage Array Type Plug-in

SLES

SUSE Linux Enterprise Server

SPOCK

Single Point of Connectivity Knowledge

SSH

Secure Shell

VLAN

virtual local-area network

VN

virtual node

WWPN

worldwide port name

YaST

Yet another Setup Tool

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