Abstract

This document contains supplemental information for the Emulex Fibre Channel host bus adapters (HBAs) and Converged Network Adapters (CNAs) for ProLiant and Integrity servers.
Additional resources

HP maintains the SPOCK website as the primary source of detailed information about HP storage product configurations, including operating system, software, and firmware version support. For the latest information about storage array support, see the HP SPOCK website at http://www.hp.com/storage/spock. You must sign up for an HP Passport to enable access.

Product models

This section lists the HBAs and CNAs that are supported on ProLiant and Integrity servers. Although CNAs have FCoE, NIC, and iSCSI functionality, this document addresses FCoE functionality only.

Table 1 describes the CNAs and server LOMs (LAN on motherboard) supported on servers running Windows, Linux, VMware, and Citrix operating systems.

Table 1 Supported CNAs and server LOMs

<table>
<thead>
<tr>
<th>Model</th>
<th>Windows Server 2003/2008</th>
<th>Linux</th>
<th>VMware</th>
<th>Citrix</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HP StorageWorks CN1000E Dual Port Converged Network Adapter (AW520A)</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>HP NC551m Dual-port FlexFabric 10-Gb Converged Network Adapter (580151-B21)</td>
<td>•</td>
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</tr>
<tr>
<td>HP NC553m Dual-port FlexFabric 10-Gb Converged Network Adapter (613431-B21)</td>
<td>•</td>
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<td>•</td>
</tr>
<tr>
<td>Server LOM</td>
<td></td>
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</tr>
<tr>
<td>Embedded NC551i Dual-port FlexFabric 10-Gb Converged Network Adapter</td>
<td>•</td>
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<td>•</td>
</tr>
<tr>
<td>Embedded NC553i Dual Port FlexFabric 10-Gb Converged Network Adapter</td>
<td>•</td>
<td>•</td>
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<td>•</td>
</tr>
</tbody>
</table>

Legend: • = supported; — = not supported

1 Support is limited to Citrix XenServer 5.6 with lpfc driver 2.102.485 and 8.2.8.47.7p driver disk. For more information or to download the driver update, see the Citrix Knowledge Center website http://support.citrix.com/article/CTX128028.
Table 2 describes the 8-Gb and 4-Gb HBAs and mezzanine cards supported on servers running Windows, Linux, VMware, and Citrix operating systems.

**Table 2 Supported 8-Gb and 4-Gb HBAs and mezzanine cards**

<table>
<thead>
<tr>
<th>Model</th>
<th>Windows Server 2003/2008</th>
<th>Linux</th>
<th>VMware</th>
<th>Citrix</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>8-Gb HBAs and mezzanine cards</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HP StorageWorks LPe1205–HP 8-Gb FC Mezzanine Card HBA (456972–B21)³</td>
<td>•</td>
<td>²</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>HP StorageWorks 81E 8-Gb PCI-X HBA (AJ762A)²</td>
<td>•</td>
<td>•</td>
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<td>•</td>
</tr>
<tr>
<td>HP StorageWorks 82E 8-Gb PCI-X Dual Channel HBA (AJ763A)²</td>
<td>•</td>
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<td>•</td>
</tr>
<tr>
<td>HP PCIe 1-port 8-Gb Fibre Channel HBA (AH402A)</td>
<td>• ³</td>
<td>•</td>
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<td>•</td>
</tr>
<tr>
<td>HP PCIe 2-port 8-Gb Fibre Channel HBA (AH403A)</td>
<td>• ³</td>
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</tr>
<tr>
<td><strong>4-Gb HBAs and mezzanine cards</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>HP StorageWorks LPe1105–HP 4-Gb FC HBA for HP c-Class BladeSystem (40362-B21)</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>HP StorageWorks FC2142SR 4-Gb PCIe FC HBA (A8002A)⁴</td>
<td>•</td>
<td>•</td>
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<td>•</td>
</tr>
<tr>
<td>HP StorageWorks FC2242SR 4-Gb PCIe dual port FC HBA (A8003A)</td>
<td>•</td>
<td>•</td>
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<td>•</td>
</tr>
</tbody>
</table>

**Legend:** • = supported; — = not supported

³The LPe1205 is supported with most G6 and later ProLiant blade servers with the exception of BL465G6 and BL495G6.
²Not supported on Integrity servers.
³Supported on Integrity servers only.
⁴The FC2142 HBA is also supported on XW8400 and XW9300 workstations running Windows XP Professional (32-bit).
Table 3 describes the Legacy HBAs and mezzanine cards supported on servers running Windows, Linux, VMware, and Citrix operating systems.

**NOTE:**
The HBAs and mezzanine cards listed in Table 3 are supported; however, they are no longer available for purchase.

### Table 3 Supported legacy HBAs and mezzanine cards

<table>
<thead>
<tr>
<th>Model</th>
<th>Windows Server 2003/2008</th>
<th>Linux</th>
<th>VMware</th>
<th>Citrix</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>4-Gb HBAs</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>HP StorageWorks FC2143 4-Gb PCI-X FC HBA (AD167A)</td>
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</tr>
<tr>
<td>HP StorageWorks FC2243 4-Gb PCI-X dual port FC HBA (AD168A)</td>
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</tr>
<tr>
<td><strong>2-Gb HBAs and mezzanine cards</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HP StorageWorks 1050EX 2-Gb PCIe FC HBA (A7560A)</td>
<td>•</td>
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</tr>
<tr>
<td>HP StorageWorks A7388A 2-Gb PCI-X FC HBA (A7388A)</td>
<td>•</td>
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</tr>
<tr>
<td>HP StorageWorks A7387A 2-Gb PCI-X dual port FC HBA (A7387A)</td>
<td>•</td>
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</tr>
<tr>
<td>HP StorageWorks FCA2404DC 2-Gb PCI-X dual port FC HBA (323264-B21)</td>
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<tr>
<td>HP StorageWorks FCA2404 2-Gb PCI-X FC HBA (305573-B21)</td>
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<tr>
<td>HP Emulex-based BL20p 2-Gb PCI-X FC mezzanine card (394757-B21)</td>
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</tr>
<tr>
<td>HP Emulex-based BL25/30/35/45p PCI-X FC mezzanine card (394588-B21)</td>
<td>•</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>HP StorageWorks AB467A 2-Gb 1-port FC HBA</td>
<td>•</td>
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</tr>
<tr>
<td>HP StorageWorks AB466A 2-Gb 2-port FC HBA</td>
<td>•</td>
<td>—</td>
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<td>—</td>
</tr>
</tbody>
</table>

**Legend:** • = supported; — = not supported

1 Supported on Windows Server 2003 only
2 Supported on Windows Integrity servers only

### Devices supported

Emulex CNAs, HBAs, and LOMs are supported on HP servers that:

- Support the Linux, Windows, VMware, and Citrix operating systems listed on the HP website:  

- Support the servers listed on the HP website:  

For information about the supported servers for the CNAs, see the CNA QuickSpecs.

Update prerequisites

Before you perform CNA or HBA updates, you must do the following:
• Ensure that the system is running one of the operating system versions listed in HBA Software Support Matrices, available at the SPOCK website http://www.hp.com/storage/spock. You must sign up for an HP Passport to enable access.
• See the HP server PCI slot specifications to determine if your server is compatible with the CNA or HBA.
• If you are installing the Linux operating system for the first time, load the operating system before you download and install the Linux CNA/HBA/LOM driver from the HP website: http://welcome.hp.com/country/us/en/support.html

Adapter installation instructions

For information on installing CNAs, see the HP Converged Network Adapter Installation Guide. For information on installing HBAs, see the HP Emulex Fibre Channel Host Bus Adapter and Driver Installation Guide. To download either of these guides:
2. Click See support and troubleshooting information.
3. Using the HP model number as your guide, enter the adapter model number in the for product box, and then click >>.
4. Select Manuals.

IMPORTANT:
If you have both CNAs and Fibre Channel HBAs installed in your Linux system, you must install and use the CNA drivers.
If you have both CNAs and Fibre Channel HBAs installed in your Windows system, you must install the FCoE CNA driver and the Fibre Channel HBA driver.

Operating systems

This section describes how you can obtain the latest information about supported operating systems and software.

For the latest information about supported HBAs, CNAs, LOMs, and mezzanine cards listed by operating systems, see the HP SPOCK website at:

You must sign up for an HP Passport to enable access. From the web page, click HBA Software Support Matrix, and then select your operating system.
Linux support

This section contains information about CNA and HBA support for Linux.

**NOTE:**

Starting with RHEL 5 U3, SLES 10 SP3, and SLES 11; Fibre Channel HBAs and mezzanine cards are supported by Red Hat and Novell in-box drivers (included in the OS distribution), and multipath failover is handled by Device Mapper.

Starting with RHEL 5.5, CNAs are supported by Red Hat in-box drivers. However, SLES 10 and SLES 11 do not support CNAs with in-box drivers. CNA multipath failover is handled by Device Mapper.

For more information, see the readme.txt file packaged with the kit.

Determining the CNA/HBA driver and firmware versions in Linux

You can use OneCommand Manager or HBAnyware to view a list of CNA/HBA driver and firmware information.

**NOTE:**

Newer versions of the HBA driver use Emulex OneCommand software for HBA management and older versions of the driver use Emulex HBAnyware software. To determine the HBA management software needs for your configuration, see the HBA Software Support Matrix available on the HP SPOCK website at http://www.hp.com/storage/spock.

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Windows support

This section describes CNA/HBA support for Windows.

CNAs/HBAs/LOMs are supported on ProLiant servers with Enterprise, Standard, Storage Server, and Datacenter versions of the following:

- **CNAs/LOMs on Windows:**
  - Windows Server 2003 x86, x64 – R2 SP2
  - Windows Server 2008 W32 – SP2
  - Windows Server 2008 x64 – SP2, R2

- **HBAs on Windows:**
  - Windows Server 2003 x86 – SP1, R2, SP2 (32-bit) (STORport and SCSIport)
  - Windows Server 2003 x64 – SP1, R2, SP2 (64-bit) (STORport only)
  - Windows Server 2003, IA64 – SP1, SP2
  - Windows Server 2008 W32 – SP2
  - Windows Server 2008 x64 – SP2, R2
  - Windows Server 2008, IA64 – SP2, R2
VMware support

HP supports the use of Windows and Linux as a guest operating system on VMware ESX versions 2.5.x, 3.x, and 4.x. When running VMware, HBAs are supported by the in-box drivers supplied with ESX. CNAs are supported with certified drivers available from the VMware website at http://www.vmware.com. Windows and Linux Fibre Channel HBA drivers are not used on the virtual operating system.

To ensure that your HBA/CNA is supported by HP and VMware, see the VMware Compatibility Guide at:

http://www.vmware.com/resources/compatibility/search.php

**NOTE:**

VMware is not supported on the IA64 architecture.

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Boot from SAN on VMware

For information about BFS on VMware, see HP StorageWorks Fibre Channel Host Bus Adapters Software Guide for Linux, available at:

http://www.hp.com/go/SDGManuals

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Citrix operating system

HP supports the Citrix Hypervisor. For more information, see the HP Virtualization with Citrix website:

http://www.hp.com/go/citrix

**NOTE:**

HP does not currently support HP Emulex Fibre Channel or CNA FCoE products on Citrix XenServer 5.6 FP1. HP Emulex CNAs only support NIC functionality of Citrix XenServer 5.6 FP1. For more information, see the Citrix Knowledge Center article at http://support.citrix.com/article/CTX127573.

- Citrix is not supported on the IA64 architecture.
- Citrix does not support MSA1000 or MSA1500.

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Important notes and workarounds

This section describes restrictions, notes, and issue workarounds for Emulex CNA/HBA adapters.

General notes

The notes in this section apply to all operating systems.

C-series Converged Network Switch requirement

When using a C-series Converged Network Switch (HP Nexus 5000) with the HP Virtual Connect FlexFabric 10-Gb/24-port module, NPIV must be enabled on the C-series switch.
Boot from SAN

DL16x and DL18x Servers require extra time to boot from SAN.

When the CN1000E adapter is used as the boot device in a DL16x or DL18x server, the server can pause for approximately 90 seconds when it is expected to start booting from the hard disk. After this delay, the boot process resumes as expected.

Update DL/SL100-series BIOS before installing CN1000e

Before installing an HP CN1000e into a DL/SL100-series server, you must upgrade the server BIOS to 2010.02.04 or later. The BIOS is available for download from the HP Download Drivers and Software website:

http://www.hp.com/support/downloads

Compatibility/interoperability

HP recommends that you implement zoning by CNAs/HBAs, as described in the HP SAN Design Reference Guide, available at:

http://www.hp.com/go/sdqmanuals

FC2142SR and FC2242SR HBAs on ProLiant systems

HP ProLiant DL380 (G4) servers must have System ROMPaq firmware 4.05 P51-08/16/2005 or later to be compatible with the FC2142SR and FC2242SR. Failure to use this ROMPaq version can cause the HBAs to hang during the power-on self-test (POST). For more information, see the HP website:

http://h20000.www2.hp.com/bizsupport/TechSupport/SoftwareDescription.jsp?lang=en&cc=us&swItem=MTX-f8105bfcba8403f8b793e23f5&jumpid=reg_R1002_USEN

CNA/HBA Linux notes

This section provides information about Linux and CNAs/HBAs.

CNAs and fibreutils

The fibreutils utility is not currently supported on systems configured with CNAs.

SLES 10 SP3 CNA firmware download

Firmware download in SLES 10 SP3 can cause the system to hang.

When downloading firmware to the CN1000E adapters in SLES 10 SP3 using the OneCommand Manager or hbacmd, the download may complete but cause the system to become unresponsive or hang. Though the firmware download is successful, a hard reboot of the server may be required to enable the new firmware.
ReiserFS limitation

ReiserFS file systems can exhibit unexpected behavior under heavy loads. HP recommends that you use either the xfs or ext3 file system. For up-to-date recommendations, see the Novell website:

http://support.novell.com/

High availability recommendation


For information on the differences between ext2 and ext3, see the operating system documentation.

MSA2000 notes

For the MSA2000 family of disk arrays:

- The minimum required firmware is J200P24-01.
- Creating virtual disks (vdisks) online or offline without volumes during the virtual disk creation process is not supported. You must create at least one volume during the virtual disk creation.
- MultiPulse is not supported. For information about multipathing support, see the HP Device Mapper documentation.

MultiPulse notes

- The Emulex MultiPulse 2.2.22, 2.2.38, 2.2.39, and 2.2.44 drivers support active/active storage arrays only.
- If using MultiPulse 2.2.x, you can have a maximum of eight physical paths to a LUN. More than eight paths can cause a failure.
- MultiPulse can coexist with multipathing products such as the Emulex failover driver and Secure Path. However, MultiPulse works only with Emulex-based HBAs; it will not configure multiple paths for other HBAs in the system.

LUN discovery

Because the order in which a switch reports Fibre Channel ports to a name server can vary, the order in which LUNs are discovered can vary between system boots.

HP recommends that you use the udev utility to ensure that the name of a device does not change between system boots. For more information, see the udev website:


XP LUNs

XP LUNs presented to Linux hosts must start with LUN 0.

BFS zone targets

A maximum of 10 targets are supported in a BFS zone.
Call trace on sx2000

On an sx2000 system with the default logging level, a call trace may appear in the /var/log/messages file during failover events.

Running scsi_info on XP1024/128

When running the scsi_info command on older XP arrays, such as XP1024/128, you may see output similar to that shown in the following example. Ignore the error, and note that the WWN is not all zeros.

The XP array returns inquiry data that differs slightly from that returned by EVA or MSA arrays.

```
[root@coco ~]# scsi_info /dev/sdal
SCSI_ID="4,0,8,0":VENDOR="HP":MODEL="OPEN-E":FW_REV="5005":WWN="0000000000000000":LUN=
"5235303020303030-3130353930203030"
[root@coco ~]# scsi_info /dev/sdam
SCSI_ID="4,0,8,1":VENDOR="HP":MODEL="OPEN-E":FW_REV="5005":WWN="0000000000000000":LUN=
"5235303020303030-3130353930203030"
```

ProLiant Service Pack 7.91/2

Installing PSP 7.91/92 causes fibreutils to downgrade. Reinstall fibreutils rpm from the downloaded kit.

Example:

```
# rpm -fvr fibreutils.<version>.linux.<arch>.rpm
```

EVA4400 in a heterogeneous SAN

When an EVA4400 with embedded switch is configured in a heterogeneous SAN, HP recommends that you use a text editor to edit the HBA configuration file etc/modprobe.conf.

```
options lpfcmpl mpl_hbeat_tmo_busy=0
```

Save the file, and then run the make_initrd script.

```
# /opt/hp/hp-lpfc/make_initrd
```

Reboot your server with the correct initrd.
Dynamic LUN addition and removal

Dynamic LUN addition and removal are supported. However, the ability to dynamically add a new
LUN (or a LUN that has been previously removed) using the LUN number of a previously removed
LUN is not supported. Dynamic target addition, which is defined as adding a new Fibre Channel
target (such as adding a new storage array) to a SAN, is also not supported. The ability to present
the new target to a Fibre Channel HBA, and then prompt the operating system to do an online scan
(such as using the `hp_rescan` utility that comes with `fibreutils`) is not supported with the Emulex
failover driver (MultiPulse). If you add a new Fibre Channel target to a host server, you must reboot
that server.

CNA/HBA with Windows notes

This section describes information about using Windows and CNAs/HBAs.

Required hotfix for Windows Server 2008 using DSM

976748 to be installed before installing Microsoft Device Specific Module (MS DSM) as a multipath
solution. For more information, see the Microsoft Support website:

[http://support.microsoft.com/?id=976748](http://support.microsoft.com/?id=976748)

HP EVA MPIO BFS with Windows 2003

HP EVA MPIO DSM 4.00.00 prevents BFS on systems running Windows 2003 if there are three or
more paths enabled.

Windows driver fails to log back in

Windows driver fails to log back into the Cisco Nexus 5000 switch after switch reboot.
On Windows 2003 and Windows 2008, the link is not reestablished when a Cisco Nexus 5000
switch is rebooted. The workaround is to use the Nexus Shutdown and No Shutdown CLI commands
to bring the port back online.

STORport miniport driver installation restrictions

If you are upgrading to the STORport miniport driver, consider the following:

- The STORport miniport driver is supported on Windows 2003 SP1 and later.
- Microsoft hotfix KB932755 must be installed before installing Multipath software.
- If you are running Secure Path for Windows, you must upgrade to Secure Path 4.0c SP2 or later
  for Windows. STORport is not supported with earlier versions of Secure Path.

WS2003 restriction for Integrity servers

Integrity servers running WS2003 support Windows STORport driver 2.10x1 or earlier.

2-Gb HBA/mezzanine card restriction

Emulex 2-Gb HBAs and mezzanine cards are not supported with WS2008 R2.
Smart Component notes

The following Smart Component issues may be observed during driver installation:

• When using the Smart Component to install drivers, if the following message appears during reboot, ignore it and continue with the reboot procedure. No known issues have been observed in connection with the display of this message.

The application failed to initialize because the windows station is shutting down.

• Downgrading to Version 2.0 or later STORport driver does not work when initiated via the Smart Component. To downgrade an HP-branded Emulex HBA:
  1. Run the Smart Component containing the desired driver and extract the contents to a folder.
  2. Run the STORport driver installer from the extracted folder using the default values. For example:

     storportminiportcorekit_2-01a4

     This will remove the current driver before downgrading to the specified driver version.

• When using the Smart Component to install drivers, the following message may appear during reboot:

     There was a problem installing this hardware. This device is not working properly because Windows cannot load the drivers required for this device. (Code 31)

     Uninstall and then reinstall your device.

     If the above message appears, click Finish and continue with the reboot procedure. Do not reply to Microsoft. No known issues have been observed in connection with the display of this message.

Windows BFS notes

• In a direct connect environment, BFS fails after a second path is added to an EVA4000/6000/8000 running firmware 6.110.

• BFS on c-Class blade servers fails on an active/passive MSA1000/1500 running firmware 5.20.

• In BFS configurations where there are more than two Emulex HBAs in the same zone as the boot HBA, a crash-dump may not be generated due to a timeout condition when the boot HBA interacts with the non-boot HBAs. A workaround is to reconfigure the zoning such that the boot instance (for each path) is in its own zone separate from the other non-boot HBAs. In some cases, this also results in faster boot-up times.

• When installing the OS to attached storage of the 403621-B21 LPe1105 mezzanine card in a VC environment through a Brocade switch, neither the target LUN nor the WWN for the boot controller are visible in the zone via the switch administrative tool. The workaround is to take note of the mezzanine card WWN when installing it into the system, or retrieve it from the VC manager or EFI utility. Then manually enter the WWN into the desired zone on the switch when configuring the zone. Scan for targets and continue with normal installation steps to boot from the mezzanine card.

• In a BFS configuration, the installed HBAs can display different names when viewed through the device manager. This is a cosmetic condition, not a functional issue.

• When you select the Load Driver option during the operating system build of a Windows 2008 server in a BFS configuration, a multiple entry of the Emulex driver is displayed. If multiple types of HBAs are displayed, select the first entry before proceeding.