

Coraid® EtherDrive® HBA for Solaris

*Administration Guide*



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## Introduction

Thank you for purchasing a Coraid® EtherDrive® Host Bus Adapter (HBA).

You can get maximum performance from your AoE SAN with Coraid HBAs on Windows, Linux, VMWare, and Solaris operating systems. This guide explains how to install and configure your Coraid HBA with Oracle Solaris 10, Oracle Solaris 11 Express, and OpenIndiana Build 148.

The Coraid EtherDrive Host Bus Adapter (HBA) card and EtherDrive HBA software driver deliver AoE technology to your host for fast and affordable EtherDrive SAN performance. Enabling hosts to work natively with EtherDrive storage is a highly effective way to take full advantage of features including Solaris Containers (i.e., Zones), and ZFS.

The EtherDrive SAN is comprised of one or more LUNs providing shared storage. Installed in the host, the EtherDrive HBA presents the LUN as a locally attached disk. The software driver and EtherDrive HBA translate disk requests to AoE requests and transmits them to the EtherDrive SAN. As responses return from the EtherDrive SAN, the reverse translation occurs in the HBA software driver.

To use Coraid's EtherDrive SAN with your server, one or more Coraid EtherDrive HBA cards must be installed. The EtherDrive HBA's two network ports are dedicated specifically for communication with Coraid EtherDrive storage appliances. At least one port from the EtherDrive HBA must be connected to the SAN where the EtherDrive SAN is located.

The information in this guide assumes familiarity with common data storage and networking concepts and familiarity with data center operations. Terms specific to this product or to Coraid, Inc. are defined in this guide. Users unfamiliar with standard networking and storage terminology or standard Solaris commands such as `gzip(1)`, `tar(1)`, and `pkgadd(1M)` are encouraged to find definitions for unfamiliar terms using Web resources and the Solaris manual pages.

The EtherDrive HBA driver supports the following Solaris operating systems:

- Oracle Solaris 10
- Oracle Solaris 11 Express
- OpenIndiana Build 148

## Overview of Installation

Install your Coraid EtherDrive HBA and EtherDrive HBA driver in the following order:

- Configure the Coraid EtherDrive SAN.
- Install the EtherDrive HBA card in your host.
- Install the EtherDrive HBA software driver.
- Complete your storage configuration.

Detailed procedures are provided in the following sections.

## Requirements

- The Coraid EtherDrive HBA should only be used in conjunction with Coraid EtherDrive SAN appliances (SR/SRX).
- All Coraid EtherDrive SAN appliances should be upgraded to the latest CorOS version in order to operate correctly with the EtherDrive HBA. Check with Coraid Technical Assistance Center (TAC) for CorOS version information.
- The EtherDrive HBA requires a software driver. If you do not have the EtherDrive HBA driver for Solaris you can download it from:

<http://support.coraid.com/support/solhba/>

- Because the AoE protocol is not routable, the Coraid EtherDrive HBA and the Coraid EtherDrive SAN storage must be connected to the same network broadcast domain.
- The EtherDrive HBA requires a PCI Express (PCIe®) slot in the server and does not support PCI-X.
- SAN Ethernet ports—EtherDrive HBA cards are available in the following SAN port configurations. (Make sure you use high-quality cables when connecting to these ports.):
  - EtherDrive EHBA-2-E-RJ45— 2 x 1GbE UTP
  - EtherDrive EHBA-20-E-RJ45— 2 x 10GbE UTP
  - EtherDrive EHBA-20-E-CX4— 2 x 10GbE CX4
  - EtherDrive EHBA-20-E-SFP— 2 x 10GbE SFP+
- The EtherDrive HBA must be connected to a network switch that supports 802.3x (flow control) and jumbo frames with an MTU size of 9000.

**Note:** To dedicate your SAN exclusively for storage, isolate the SAN from other network traffic.

## Terminology

This guide uses terms which might be unfamiliar to you or are specific to Coraid products.

Term	Definition
AoE	ATA-over-Ethernet protocol.
AoE Target	The shelf and LUN combination used to identify a block storage device on the EtherDrive SAN.
CorOS	Operating system software that is embedded into—and distributed as an integral part of—the Coraid hardware storage solution.
LUN (Logical Unit Number)	A LUN is a grouping of uniquely numbered blocks of storage attached to a storage appliance by Ethernet SAN, in which each block contains 512 bytes of data. LUNs can be disk drives, disk partitions, or a RAID.  The terms “LUN” and “disk” can be used interchangeably.
HBA (Host Bus Adapter)	An HBA is used to connect a host system to network storage. Coraid offers a range of HBAs with support for a variety of operating systems. For more information see <a href="http://www.coraid.com">www.coraid.com</a> .

## EtherDrive SAN Configuration

Before you can communicate with the EtherDrive SAN through your EtherDrive HBA for Solaris, you must create and place online one or more SR/SRX LUNs. You can optionally set up a mask ID for each configured LUN. For details, see the *Coraid EtherDrive SR/SRX Administration Guide* and the *Coraid EtherDrive SAN Manager Administration Guide* available online from:

<http://www.coraid.com/>

**Note:** RAID performance is suboptimal while the RAID on the LUN is being initialized. For optimal performance, wait until the RAID has finished initializing before using it.

## Installing an EtherDrive HBA Card

To use Coraid's EtherDrive SAN with a Solaris host, install one or more Coraid EtherDrive HBA cards in the Solaris host.

Insert the EtherDrive HBA card(s) into an available PCIe slot with the host powered off. After you install the EtherDrive HBA card, install the EtherDrive HBA driver (see [Installing the EtherDrive HBA Driver](#)).

### To install the EtherDrive HBA

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1. **Follow ESD (electrostatic discharge) and other safety precautions when handling the EtherDrive HBA.**



Static discharge can destroy the circuits etched in silicon microchips, or dramatically shorten their life span. To protect the EtherDrive HBA from damage, observe standard ESD precautions.

2. **Power off the host and disconnect the power cable.**
3. **Open the host chassis and locate an available PCIe slot.**
4. **Remove the slot cover (if any) by removing the screw or releasing the lever.**
5. **Seat the EtherDrive HBA firmly into the PCIe slot.**

You might need to remove and replace existing PCIe cards or other hardware to access an available slot.

6. **Attach the EtherDrive HBA retaining bracket using the existing screw or lever.**

**Note:** Depending on whether you are using a full height or half height slot, you might need to change the retaining bracket on your EtherDrive HBA. Your EtherDrive HBA includes both a half-height and a full-height retaining bracket. If you change the retaining bracket on your HBA, make sure you remove and replace the locking pin on each port carefully. Push the pin on one side at a time, alternating sides, until it comes loose or clicks back into place. The locking pin looks like this:



7. **Close the chassis, and then connect the power cable(s).**
8. **Connect cables from the HBA SAN ports on the host to the SAN via an Ethernet switch connected to the SAN. (For cable and switch requirements, see [Requirements](#).)**

Each EtherDrive HBA provides two ports for communication with Coraid EtherDrive storage appliances. At least one port must be connected to the SAN network where the EtherDrive SAN is located. Alternatively, you can connect directly to the ports on the SR/SRX appliance.

9. **Power on the host.**

## Installing the EtherDrive HBA Driver

After you install the EtherDrive HBA card in the host, install the EtherDrive HBA software driver. The host will not recognize the EtherDrive HBA until the software driver has been installed. The EtherDrive HBA translates disk commands to and from AoE commands. The translation is transparent to the host.

In the procedure below, substitute the actual file name of your driver installation archive for `etherdrive-hba-solaris-x.x.x.tar.gz`. You must have Solaris System V Release 4 packaging commands installed and be logged in as a super user.

### To install the EtherDrive HBA driver on your host

1. Export any pools currently in use:

```
# zpool export <pool>
```

2. Download the latest Solaris driver from:

<http://support.coraid.com/support/solhba/>

3. If applicable, uninstall any previously installed HBA drivers:

For HBA driver versions earlier than 5.0.0:	For HBA driver versions 5.0.0 and later:
<pre># pkgrm COReDrive # init 6</pre>	<pre># pkgrm CORDeHdrv # init 6</pre>

4. Unpack the driver to a temporary location (for example, `/var/tmp`):

```
# gzip -dc etherdrive-hba-solaris-x.x.x.x.tar.gz | tar xf -
```

5. Install the EtherDrive HBA driver:

```
# pkgadd -d . CORDeHdrv
```

6. Reboot the host:

```
# init 6
```

7. Import any pools that were exported in **step 1**.

```
# zpool import <pool>
```

## Complete your storage configuration

The Solaris host automatically presents online LUNs to the operating system. This section covers additional commands provided by the EtherDrive HBA driver which you can use to manage your storage. Before you use your storage, make sure you have completed the following:

- Configured the EtherDrive Storage appliance with at least one LUN.
- Installed the EtherDrive HBA card(s) in the host.
- Connected the EtherDrive HBA to a supported Ethernet switch or directly to the SR/SRX appliance.
- Installed the current EtherDrive HBA driver on the Solaris host and rebooted the host.

### Commands

The HBA driver is bundled with a single command line utility called `ethdrvadm` and is provided as a tool to manage Coraid EtherDrive Host Bus Adapters (HBAs) and storage appliances.

Also see the `ethdrv(7D)` and `ethdrvadm(1M)` manual pages for more information.

Command usage includes the following conventions:

- `[-a]`—Displays more detailed information.
- `[-?]`— Displays usage information

#### ■ `ethdrvadm list-devices [-a] [-?]`

The `ethdrvadm list-devices` command displays information about attached LUNs (includes driver name and instance, AoE target, size, and attached ports). These values can be used in conjunction with `iostat(1M)` to determine logical device names. For example:

```
# ethdrvadm list-devices
DEVICE      TARGET      SIZE          PORT
sd0         20.5        1000.204GB    0,1
sd1         20.6        1000.204GB    0,1
```

Appending `-a` displays more detailed information. For example:

```
# ethdrvadm list-devices -a
DEVICE      TARGET/     SIZE/         PORT
            PORT       ADDRESS
sd0         20.5       1000.204GB    0,1
            0         0030480000a
            1         0030480000b
sd1         20.6       1000.204GB    0,1
            0         0030480000a
            1         0030480000b
```

### ■ ethdrvadm list-ports [-?]

The `ethdrvadm list-ports` command displays information about attached ports (includes HBA model, Ethernet address, and link speed). For example:

```
# ethdrvadm list-ports
PORT  MODEL          ADDRESS          SPEED
0     EHBA-20-E-SFP  00100400000a    10000/10000
1     EHBA-20-E-SFP  00100400000b    10000/10000
```

## MultiPath

Every EtherDrive HBA has two ports. It is recommended that both ports be connected to the SAN. Having two connections to the SAN provides network redundancy and higher bandwidth capacity. Greater redundancy is achieved when the two ports of the EtherDrive HBA are connected to separate switches. Furthermore, more than one EtherDrive HBA may be installed to achieve further redundancy and throughput.

MultiPath is built into the EtherDrive HBA driver and requires no configuration. The EtherDrive HBA automatically detects all network paths to EtherDrive SAN and utilizes each path to load balance all data packets bound for EtherDrive SAN.

## Frequently Asked Questions

**Question:** The Coraid EtherDrive HBA looks like a standard Network Interface Card (NIC). Can I use the Coraid EtherDrive HBA for IP traffic?

**Answer:** No. The EtherDrive HBA is a dedicated storage device. Dedication allows the EtherDrive HBA to process storage commands at an exceptionally fast rate.

**Question:** What do I have to configure to use Multipath?

**Answer:** Nothing! The EtherDrive HBA driver automatically handles Multipath for all of the available EtherDrive HBA ports. Even if a single host has two EtherDrive HBA cards, the EtherDrive HBA driver will automatically use the ports on both devices.

**Question:** I understand that I need a Coraid EtherDrive HBA for my host in order to utilize my EtherDrive SAN storage appliances. Do I also need an EtherDrive HBA for each of my EtherDrive SAN appliances?

**Answer:** No. Only one EtherDrive HBA is required for each host. One EtherDrive HBA can communicate with any EtherDrive SAN appliance running a compatible version of the CorOS. You can add additional EtherDrive HBAs to your host if you have unusual security or bandwidth requirements or if your storage exceeds the limitations of your operating system.

## Coraid Policy Statements, Warranty and EULA

### Technical support

Do you have more questions? See the Coraid Support web site:

<http://www.coraid.com/support/>

Contact the Coraid Technical Assistance Center at:

[support@coraid.com](mailto:support@coraid.com)

To help the Technical Assistance Center diagnose your problem, send diagnostic output along with a description of your problem. To obtain diagnostic output, issue the **sos** command.

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**Contact Information.** If you have any questions about this EULA, or if you want to contact Coraid for any reason, please direct all correspondence to: Coraid, Inc., 255 Shoreline Drive, Suite #650, Redwood City, CA 94065 United States of America or email [info@Coraid.com](mailto:info@Coraid.com).

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## Additional Safety Information

**WARNING:** Read the installation instructions before connecting the system to the power source.

**ATTENTION:** Avant de brancher le système sur la source d'alimentation, consulter les directives d'installation.

**WARNUNG:** Vor dem Anschließen des Systems an die Stromquelle die Installationsanweisungen lesen.



### Lithium battery notice for service personnel

This product contains a lithium battery. Although the battery is not field-serviceable, observe the following warning:

**CAUTION:** Danger of explosion if battery is replaced with incorrect type. Replace only with the same type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

**ATTENTION:** Il y a danger d'explosion s'il a remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du meme type ou d'un type equivalent recommande par le constructeur. Mettre au rebut les batteries usages conformement aux instructions du fabricant.

**WARNUNG:** Bei Einsetzen einer falschen Batterie besteht Explosionsgefahr. Ersetzen Sie die Batterie nur durch den gleichen oder vom Hersteller empfohlenen Batterietyp. Entsorgen Sie die benutzten Batterien nach den Anweisungen des Herstellers.



### Dual power supply notice

**WARNING:** This unit has more than one power supply connection; all connections must be removed to remove all power from the unit.

**WARNUNG:** Diese Einheit verfügt über mehr als einen Stromanschluß; um Strom gänzlich von der Einheit fernzuhalten, müssen alle Stromzufuhren abgetrennt sein.

**ATTENTION:** Cette unité est équipée de plusieurs raccordements d'alimentation. Pour supprimer tout courant électrique de l'unité, tous les cordons d'alimentation doivent être débranchés.



**WARNING:** This product relies on the building's installation for shortcircuit (over current) protection. Ensure that a fuse or circuit breaker no larger than 120 VAC, 15 A U.S. (240 VAC, 10 A international) is used on the phase conductors (all current carrying conductors).

**ATTENTION:** Pour ce qui est de la protection contre les courts-circuits (surtension), ce produit dépend de l'installation électrique du local. Vérifier qu'un fusible ou qu'un disjoncteur de 120 V alt., 15 A U.S. maximum (240 V alt., 10 A international) est utilisé sur les conducteurs de phase (conducteurs de charge).

**WARNUNG:** Dieses Produkt ist darauf angewiesen, daß im Gebäude ein Kurzschluß- bzw. Überstromschutz installiert ist. Stellen Sie sicher, daß eine Sicherung oder ein Unterbrecher von nicht mehr als 240 V Wechselstrom, 10 A (bzw. in den USA 120 V Wechselstrom, 15 A) an den Phasenleitern (allen stromführenden Leitern) verwendet wird.



### Laser warning

**WARNING:** Class 1 Laser product.

**ATTENTION:** Produit laser de classe 1

**WARNUNG:** Laserprodukt der Klasse 1

EtherDrive equipment is intended for installation in restricted access areas.



## Mounting the unit

**WARNING:** To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. These guidelines are provided to ensure your safety:

- This unit should be mounted at the bottom of the rack if it is the only unit in the rack.
- When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
- If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.

**ATTENTION:** Pour éviter toute blessure corporelle pendant les opérations de montage ou de réparation de cette unité en casier, il convient de prendre des précautions spéciales afin de maintenir la stabilité du système. Les directives ci-dessous sont destinées à assurer la protection du personnel.

- Si cette unité constitue la seule unité montée en casier, elle doit être placée dans le bas.
- Si cette unité est montée dans un casier partiellement rempli, charger le casier de bas en haut en plaçant l'élément le plus lourd dans le bas.
- Si le casier est équipé de dispositifs stabilisateurs, installer les stabilisateurs avant de monter ou de réparer l'unité en casier.

**WARNUNG:** Zur Vermeidung von Körperverletzung beim Anbringen oder Warten dieser Einheit in einem Gestell müssen Sie besondere Vorkehrungen treffen, um sicherzustellen, daß das System stabil bleibt. Die folgenden Richtlinien sollen zur Gewährleistung Ihrer Sicherheit dienen:

- Wenn diese Einheit die einzige im Gestell ist, sollte sie unten im Gestell angebracht werden.
- Bei Anbringung dieser Einheit in einem zum Teil gefüllten Gestell ist das Gestell von unten nach oben zu laden, wobei das schwerste Bauteil unten im Gestell anzubringen ist.
- Wird das Gestell mit Stabilisierungszubehör geliefert, sind zuerst die Stabilisatoren zu installieren, bevor Sie die Einheit im Gestell anbringen oder sie warten.

## Regulatory certifications

### United States FCC statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

### Canada compliance statement (Industry Canada)

This Class [A] digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe [A] respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

## Safety standards

- UL 60950-1: 2007
- CAN/CSA C22.2 No. 60950-1-07
- EN60950-1: 2006 +A11: 2009
- Emissions Standards: FCC Part 15B Class A
- EN 55022: 2006 plus A1:2007
- EN 61000-3-2: 2006
- EN 61000-3-3: 2008
- EN 55024: 1998 plus A1:2001 & A2:2003
- Australian/New Zealand Standard AS/NZS CISPR 22: 2009

## European Union (CE) Statement

This product is in conformity with the essential requirements of the following EU directives:

- 2004/108/EC--- Electromagnetic Compatibility Directive (EMC)
- 2006/95/EC---- Low Voltage Directive (LVD)