HP StorageWorks

MultiPulse failover driver for Linux application notes

About this document

This document describes how to install and configure the Emulex MultiPulse driver for Linux® (MultiPulse).

MultiPulse provides failover functionality for storage targets discovered through Emulex Fibre Channel host bus adapters (HBAs). When a path to a device fails, MultiPulse reroutes the I/O to an alternative path to that same device without disrupting service.

This section describes the content reflected in this document, including:

Application notes information

These application notes contain the following major topics:

Intended audience

This document is intended for customers who purchased Emulex HBAs to use in a multipathing environment on Linux systems.

Accessing future product updates

HP strongly recommends that customers sign up online using the Subscriber's Choice website at http://www.hp.com/go/e-updates.

- Subscribing to this service provides you with e-mail updates on the latest product enhancements, newest versions of drivers, and firmware documentation updates, as well as instant access to numerous other product resources.
- After signing up, you can quickly locate your products by selecting **Business support** and then **Storage** under Product Category.

Other documentation

Additional documentation, including whitepapers and best-practices documents, is available on the HP website http://www.hp.com.

System requirements

Table 1 lists the supported operating systems, HBAs, and storage arrays.

Table 1 System requirements

Feature	Requirement
MultiPulse driver	• 2.1.9 for (RHEL) 4, Updates 3 and 4; (SLES) 9, SP3 • 2.2.12 for (SLES) 10
Emulex base driver	• 8.0.16.27 for (RHEL) 4, Updates 3 and 4; (SLES) 9, SP3 • 8.1.6.7 for (SLES) 10
Linux operating systems	• Red Hat®Enterprise Linux (RHEL) 4, Updates 3 and 4 • SUSE®Linux Enterprise Server (SLES) 9, SP3 • SUSE®Linux Enterprise Server SLES 10 (x64, x86_x64 only)
HBAs	FC2142 4Gb PCI Express 2.0, product number A8002A FC2242 4Gb PCI Express 2.0, product number A8003A FC2143 4Gb PCI-X 2.0, product number AD167A FC2243 4Gb PCI-X 2.0, product number AD168A HP Emulex LPe1105-HP 4Gb FC HBA for HP c-Class BladeSystem, product number 403621-B21 Emulex-based BL25/30/35/45p Fibre Channel Mezz, product number 394588-B21 Emulex-based BL20p G3 Fibre Channel Mezz, product number 394757-B21
Storage arrays	**Enterprise Virtual Array (EVA)**: EVA3000/5000 EVA4000/6000/8000 **XP Disk Array (XP)**: XP128/1024 XP10000/12000 **Modular Smart Array (MSA)**: MSA A-A
HBAnyware utility	• 2.1a35 for (SLES) 9 and (RHEL) 4 • 3.1a9 for (SLES) 10

Installing the driver

This section describes how to install the MultiPulse driver.

About the HP Emulex Linux driver kit

Use the driver kit to install the MultiPulse driver. The driver kit include two types of installations: single-path and multipath. For MultiPulse, you must use the multipath installation, which installs the following components:

• Base HBA driver
• MultiPulse driver
• `fibreutils` HBA utility

Prerequisites

Before you install the MultiPulse driver, ensure that your system meets the requirements described in "System requirements" on page 4.

Driver installation

To install the MultiPulse driver:

1. Enter the following command to untar `hp-lpfc-<date>.tar.gz`:

   `# tar zxvf hp-lpfc-<date>.tar.gz`

   The `<date>` is the release date of the `.gz` file.

2. Change to the newly created `hp-lpfc-<date>` directory:

   `# cd hp-lpfc-<date>`

3. Run the `INSTALL` script:

   `# ./INSTALL -m`

When the installation is complete, the following RPMs are installed:

- `hp-lpfc` – Base HBA driver
- `hp-multipulse` – MultiPulse driver
- `fibreutils` – Utility script

NOTE:

You must use the base driver in the `hp-lpfc` RPM.

Uninstalling the driver

Use one of the following methods to uninstall the driver:

- Specify the `-u` flag with the `INSTALL` command:

  `# ./INSTALL -u`

- Manually uninstall the kit by uninstalling the RPMs:

  `# rpm -e hp-multipulse`

  `# rpm -e hp-lpfc`

  `# rpm -e fibreutils`

NOTE:

To revert to the base HBA driver, uninstall only the `hp-multipulse` RPM:

`# rpm -e hp-multipulse`

Driver parameters

Table 2 lists the MultiPulse driver parameters.

Table 2 MultiPulse driver parameters

Parameter	Description
`lpfc_nodev_tmo`	Time, in seconds, that the driver holds I/O for a device that is no longer accessible. The default value is 30 seconds for single-path configurations. The MultiPulse installation changes this value to 10 seconds so that path failure notification occurs more quickly.
`lpfc_lun_queue_depth`	Queue depth per LUN. The default value is 16. The installation does not change the default value.
`lpfc_discovery_threads`	Number of kernel threads that are created during device discovery. The default value is 32. This value ensures that the discovery process occurs serially (one by one) in the order in which the name server in the fabric returns world wide names (WWNs). The installation does not change the default value.

Important information

Tape discovery issues

The installation procedures for the Emulex Fibre Channel driver kits and the associated Linux `fibreutils` utility have changed for Enterprise Backup Solution (EBS) configurations. The MultiPulse driver (and `fibreutils`) release contains a fix for intermittent device discovery issues with SCSI-2 automated tape libraries.

To implement the fix:

1. Install the HBA driver and `fibreutils` package using one of the following procedures:
   - Run the `INSTALL` script included in the driver kit.
   - Install the driver, optional multipath software, and `fibreutils` RPMs.

2. Enter the following commands to run the `pbl` script in the `fibreutils` directory:

```
# cd /opt/hp/hp_fibreutils/pbl
# ./pbl_inst.sh -i
```

3. Reboot the server to complete the installation.

Note the following:

- Running the `pbl` script installs the `probe-luns` utility, which runs `probe-luns` as part of the boot cycle.
- Running the fix procedure (steps 1 through 3) eliminates the need to run `hp_rescan -a` in the `/etc/rc.local` directory for tape device discovery. If you previously added `hp_rescan -a` to `rc.local` (or another startup script), remove it from the `rc.local`.

Manual rescan

When a server configured with MultiPulse first boots, MultiPulse automatically recognizes up to four physical paths and associates them with the same virtual device. However, after the initial configuration, MultiPulse does not recognize a new physical path that comes online to an already configured LUN.

To enable MultiPulse to recognize the new physical path, you must perform a manual rescan using the `hp_rescan` utility.

To manually rescan:

1. Ensure that the `fibreutils` RPM is installed on your system.
2. Enter the following command:

   ```
   hp_rescan -a
   ```

New default per LUN queue depth

For new installations, the default per LUN queue depth for Emulex HBAs on Linux systems has been changed to 16. Note that this affects new installations only, and does not affect upgrades. For upgrades, the current setting for queue depth is retained.

Restrictions

This section describes MultiPulse restrictions.

- MultiPulse does not support older firmware on HP storage arrays. These storage arrays are known as active-passive storage arrays since not all paths are active on the fabric at the same time. These arrays include:
  - MSA1000 and MSA1500 running 4.x or 5.x firmware
  - EVA3000 and EVA5000 running VCS 3.x
- If using MultiPulse 2.1.x, you can have a maximum of four physical paths to a LUN. More than four paths can cause improper failure.
- If using MultiPulse 2.2.x, you can have a maximum of eight physical paths to a LUN. More than eight paths can cause improper failure.
- MultiPulse can coexist with multipathing products such as QLogic® failover driver, Secure Path, or Device Mapper. However, note that MultiPulse only works with Emulex-based HBAs; it will not configure multiple paths for other HBAs in the system.
- When using MultiPulse with SUSE Linux systems in Boot from SAN configurations, HP recommends that you use the `Udev` utility to ensure that your system successfully boots. For detailed information about this procedure, see "Using the Udev utility with SUSE Linux systems" in the *Booting Itanium Linux systems from a storage area network application notes*, available on the website http://h18006.www1.hp.com/storage/saninfrastructure.html.
- XP LUNs presented to Linux hosts must start with LUN 0.
- HP recommends that you implement zoning with HBA, as described in the *HP StorageWorks SAN design reference guide*, available on the website http://h18006.www1.hp.com/products/storageworks/san/documentation.html
- HBAnyware:
  - Emulex HBAs may not appear in HBAnyware due to a conflict between library entries in `/etc/hba.conf`. After installing HBAnyware, run the following script from the HP driver kit to correct the problem:

    ```
    /opt/hp/hp-lpfc/remove_lpfc_hbaconf_entry.sh
    ```