Emulex Driver for FreeBSD User Manual

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Supported Driver Versions

The following table lists the Emulex-supported Ethernet drivers that are applicable in this manual.

A checkmark "✓" indicates the type of driver distribution that is supported.

Driver Version	Driver Distribution: Out-of-Box	Operating System Version
Ethernet Drivers		
4.1.377.0	✓	FreeBSD 8.1
4.1.377.0	✓	FreeBSD 8.2

Table of Contents

1. Introduction

Overview

This *FreeBSD NIC Driver User Manual* provides installing, uninstalling, updating, and configuring procedures for an Emulex-supported FreeBSD NIC driver release.

Supported Versions and Adapters

This manual is applicable to several versions of FreeBSD NIC drivers, operating systems, firmware, and adapters.

- For a list of supported Emulex drivers for FreeBSD and their associated compatible operations systems, see "Supported Driver Versions" on page 3.
- For supported firmware versions and their latest release, see the "Downloads" page on the Emulex website for the specific adapter.

The FreeBSD operating system supports the Emulex OCe11102 converged network adapter (CNA). The driver and CNA support:

- PCI-e bus standard
- Statistics - Ethernet statistics provided for the number of packets received and sent, as well as, errors encountered.
- Jumbo Packets - Packets greater than 1500 bytes.
- VLAN - Virtual Local Area Network.
- Multicast - Packets sent from a source to a group of destinations.
- RSS - load balancing on Rx traffic across multiple Rx queues.
- TSO/LSO (TCP Segmentation Offload/Large Segment Offload) - off loads Tx traffic to hardware to improve performance.
- CSO - Check-sum computation offload to hardware.
- Bonding - Ethernet bonding across multiple ports for load balancing and fail-over.
- PXE - Preboot eXecution Environment for network boot.
- MSI-x - Message Signal Interrupts
- Promiscuous mode - Configuring an Ethernet interface to accept traffic from any destination.
- Debugging capability

Known Issues

Known issues are defined in the *Emulex Drivers for FreeBSD Release Notes*, which are available on the driver's "Downloads" page on the Emulex website.

2. Installing and Uninstalling

General Installation Requirements

Prior to driver installation, follow these requirements:

- Install a supported Emulex OneConnect CNA adapter in the system. Refer to the adapter's installation manual for specific hardware installation instructions.
- Install the FreeBSD NIC driver on a dual-core (or better) server with AMD-64 architecture and MSI-X support.
- Use a supported operating system:
  - FreeBSD 8.1
  - FreeBSD 8.2

Installing the FreeBSD Driver Kit

To install the FreeBSD driver kit:

1. Download the appropriate driver kit from the Emulex website.
2. Log on as "root" and type:
   ```
   pkg_add oce-<VERSION>-<ARCH>.tbz
   ```
   For example:
   ```
   pkg_add oce-4.1.86.0-amd64.tbz
   ```
3. Type:
   ```
   echo 'oce_load="YES"' >> /boot/loader.conf
   ```
4. Reboot the system.

Uninstalling the FreeBSD Driver Kit

To uninstall the FreeBSD driver kit:

1. Log on as "root".
2. Type:
   ```
   pkg_delete oce-<VERSION>-<ARCH>
   ```
   For example,
   ```
   pkg_delete oce-4.1.86.0-amd64
   ```
3. Type:
   ```
   remove 'oce_load="YES"' entry in /boot/loader.conf
   ```
4. Reboot the system.

Updating the FreeBSD Driver Kit

To update the FreeBSD driver:

1. Type:

   ```
   pkg_update oce-<VERSION>-<ARCH>.tbz
   ```

   For example,

   pkg_update oce-4.1.86.0-amd64.tbz

2. Reboot the system.

Loading and Unloading the Driver

To load the kernel module, type:

```
kldload oce.ko
```

To unload the kernel module, type:

```
kldunload oce.ko
```

3. Configuration

NIC Driver Configuration

Kernel Module Parameters

Table 3-1 Kernal Module Parameters

Parameter	Description
disable_msix	Default: 0 Allowed values: 1 kenv name: hw.oce.disable_msix sysctl name: not applicable “0” allows MSIx interrupts to be used, if available. “1” causes the INTx interrupt to be used even if MSIx is available. This parameter is not available via sysctl.
max_rsp_handled	Default:512 Allowed values: 1-1024 kenv name: hw.oce.max_rsp_handled sysctl name: dev.oceX.max_rsp_handled max_rsp_handled indicates the maximum number of received frames that are processed during a single receive frame interrupt.
enable_csum	Default: 1 Allowed values: 1 kenv name: hw.oce.enable_csum sysctl name: not applicable “1” reveals to the network layers above the driver that the adapter is capable of performing TCP, UDP and IP Checksum offload. “O” disables this parameter. This parameter is not available via sysctl.

Table 3-1 Kernal Module Parameters

Parameter	Description
trace_enable	Default: 0x00000001 Allowed values: 0-0xffffffff kenv name: hw.oce.trace_enable sysctl name: dev.oceX.trace_enable Each bit corresponds to a trace flag. Each trace flag turns on a separate set of trace messages. Bit 0 corresponds to ERROR, so it should always be enabled to show unexpected errors. Trace messages are displayed on the console and the /var/log/messages file. The following are different sets of trace messages: OCE_TRACE_ERROR 0x00000001 OCE_TRACE_ENTRY_EXIT 0x00000002 OCE_TRACE_IOCTL 0x00000004 OCE_TRACE_MAILBOX 0x00000008 OCE_TRACE_INIT 0x00000010 OCE_TRACE_INTR 0x00000020 OCE_TRACE_FAST_INTR 0x00000040 OCE_TRACE_TX 0x00000080 OCE_TRACE_RX 0x00000100 OCE_TRACE_PCI 0x00000200 OCE_TRACE_UNHANDLED 0x00000400 OCE_TRACE_IF 0x00000800 OCE_TRACE_RING_BUF 0x00001000 OCE_TRACE_FUNC 0x00002000 OCE_TRACE_STRUCT 0x00004000 OCE_TRACE_STATS 0x00008000 OCE_TRACE_HEXDUMPS 0x00010000 OCE_TRACE_FLAGS 0x00020000 OCE_TRACE_NONE 0x00000000 OCE_TRACE_ALL 0xFFFFFFFF

Viewing Device Driver Statistics

To view device driver statistics, type:

```
sysctl -a | grep oce
```

Updating the Firmware

To update the firmware:

1. Copy the code below to the makefile.

```
.KMOD=elxflash
FIRMWS=imagename.ufi:elxflash
.include <bsd.kmod.mk>
```

2. Replace "imagename" in the copied code with the actual firmware file name. The format is <filename>.ufi.
3. Copy this makefile and the firmware file to a temporary directory.
4. Execute a "make" command in the directory. This generates an elxflash.ko file.
5. Copy the elxflash.ko file to /lib/modules.
6. Execute the command:

```
sysctl dev.oce.<if_id>.fw_upgrade=elxflash
```

7. Reboot the machine.

One of the following errors codes will be displayed if the firmware update failed.

- Invalid BE3 firmware image
- Invalid Cookie. Firmware image corrupted?
- cmd to write to flash rom failed.