



Emulex Drivers for Solaris User Manual

**FC and FCoE version 2.70i
NIC version 4.1.369.1s**

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1. Introduction

This document provides the information needed to use the Emulex[®] Fibre Channel (FC) and Fibre Channel over Ethernet (FCoE) driver for Solaris StorEdge SAN Foundation Software (SFS), which is part of the SFS (Leadville) stack. The module name for the Emulex FC driver and FCoE driver for Solaris SFS is 'emlxs'. This document also provides information about the Emulex Network Interface Card (NIC) driver for Solaris which is used to operate the NIC function of the Emulex OneConnect[™] Universal Converged Network Adapter (UCNA). The module name for the NIC driver is "oce".

To work with the drivers for Solaris, the system administrators should be familiar with Solaris and have access to standard system information. For the FC/FCoE driver, familiarity with Oracle Storage SFS, FC and FCoE is essential. For the NIC driver, familiarity with the Emulex OneConnect UCNA and Ethernet networking is essential.

Abbreviations

ACK	acknowledgement
ADISC	Discover address
ALPA	arbitrated loop physical address
API	application programming interface
BIU	bus interface unit
ELS	extended link service
FC	Fibre Channel
FCA	Fibre Channel adapter
FCF	Fibre Channel fabric
FCIO	FC input/output
FC-IP	Fibre Channel over IP
FCoE	Fibre Channel over Ethernet
FCSP	Fibre Channel Security Protocol
FCT	Fibre Channel port provider (module in Oracle COMSTAR stack)
FCTL	Fibre Channel transport library
HBA	host bus adapter
IOCB	input/output control block
IOCTL	input/output control
LACP	Link Aggregation Control Protocol
LPFC	Light Pulse Fibre Channel
man	manual (e.g. man pages)
MBOX	mailbox
MTU	maximum transmission unit

NIC	network interface card (or controller)
NPIV	N_Port ID virtualization
PCI	peripheral component interconnect
PKT	packet
PLOGI	port login
POST	power-on self-test
PRLI	process login
RSCN	registered state change notification
RSS	receive-side scaling
SAN	storage area network
SCSI	small computer system interface
SFS	SAN Foundation Software
SLI	service level interface
SPARC	Scalable Processor Architecture
TXQ	transmit queue
UCNA	universal converged networking adapter
UI	user interface
UMC	universal multichannel

2. Important Considerations

- Supports FC/FCoE and NIC on Solaris 11.1
- Supports NIC for Crossbow vNIC, vSwitch, and vRouter on Solaris 11.1.
- OneConnect OCe11100 series NIC adapters support advanced mode with an increase in RSS capabilities.
- Supports NIC DLADM which provides Maximum Transmission Unit (MTU) size access and FMA enablement on Solaris 11.1.

Known Issues

See the product release notes for the latest information.

Driver Information (emlxs and oce)

Prerequisites

The drivers described in this document are distributed by Oracle as part of the following operating environments:

- Solaris 11.1 SPARC
- Solaris 11.1 x64

Compatibility

For a list of adapters that are compatible with the emlxs and oce driver, see the driver's Downloads page on the Emulex website. For compatible firmware versions, see the Downloads page for the specific adapter.

3. Installation

Installing the Driver

Downloading and Installing the Driver for Solaris 11.1 (SPARC, x64)

The Solaris SFS FCA (emlxs) driver and the Solaris OneConnect UCNA (oce) driver are distributed by Oracle as part of the Solaris 11.1 operating environment, with driver updates distributed as part of Solaris updates and packages. If the Solaris SFS FCA (emlxs) driver and the Solaris OneConnect UCNA NIC (oce) driver are not already installed, obtain and install the Solaris 11.1 package.

To obtain and install the Solaris packages:

1. Select and download the driver package from the Oracle website.
2. Select and download the readme file, and follow its instructions.

To finish the installation (or if the Solaris SFS FCA driver/the Solaris OneConnect UCNA NIC (oce) driver was already installed), install the driver by obtaining and installing individual packages:

1. From the Oracle website, download the following required packages:
 - For Solaris 11.1 x64 systems, NIC protocol: refer to the Oracle website
 - For Solaris 11.1 SPARC: NIC protocol: refer to the Oracle website
 - For Solaris 11.1 x64 systems, FC and FCoE protocols: refer to the Oracle website
 - For Solaris 11.1 SPARC: FC and FCoE protocols: refer to the Oracle website
2. Follow the instructions to install each package.

Uninstalling the Driver

FC/FCoE Driver and NIC Driver

For instructions on uninstalling the FC/FCoE (emlxs) driver and the C/FCoE (emlxs) driver, refer to the Oracle website.

Utilities

Emulex provides three utilities to facilitate the configuration and use of the drivers for Solaris.

- The OneCommand Manager application
- The `emlxadm` utility
- The `emlxdrv` utility

The OneCommand Manager Application

The OneCommand Manager application provides all the functions of the `emlxadm` utility and a number of additional ones, across multiple systems. It offers a choice of a graphical user interface and a scriptable command line interface. It is intended to be a direct user interface to the Fibre Channel input/output (FCIO) interface provided by the Oracle StorEdge SFS. The FCIO interface provides an Oracle common `ioctl` interface to the FCTL, which manages the FCA drivers for each FC and FCoE adapter attached to the host system. The OneCommand Manager application also directly interfaces with the Emulex OCE network driver, allowing you to manage the NIC function of Emulex UCNAs. Refer to the *OneCommand Manager Application User Manual* for more information.

The `emlxadm` Utility

The `emlxadm` utility is used to change driver parameters through a local interactive or command line interface. It can also be used for firmware updates on non-Oracle branded devices. For more information, see the *Solaris FCA Utilities User Manual*.

The `emlxdrv` Utility

The `emlxdrv` utility associates the Emulex `emlxs` Solaris SFS driver and the Solaris LPFC driver to the various models of Emulex FC and FCoE adapters. The `emlxdrv` utility is used for binding (associating) the Emulex drivers to the various models of Emulex FC adapters. If the driver binding configuration is changed, the host system must be rebooted in order for the new configuration to take effect. For more information, see the *Solaris FCA Utilities User Manual*.

Installing the FCA Utilities and the OneCommand Manager Application

The FCA utilities and the OneCommand Manager application are packaged together in one application kit tar file. The FCA utilities are comprised of the `emlxadm` utility and the `emlxdrv` utility.

- The `emlxadm` utility provides an interface to the FCIO interface provided by the Oracle Storage SFS.
- The `emlxdrv` utility temporarily associates or binds the Emulex `emlxs` Solaris SFS driver and the Solaris LPFC driver to the various models of Emulex FC

adapters during migration from the Solaris LPFC driver to the Solaris SFS driver.

Refer to the *Solaris FCA Utilities User Manual* and the *OneCommand Manager Application User Manual* for information on using these utilities.

Procedure

To install the FCA Utilities and the OneCommand Manager application:

1. Copy the Solaris utility kit to a temporary directory on your system.
2. Untar the utility kit:

```
tar xvf elxocm-solaris-<version>.tar
```

3. Change to the newly created elxocm-solaris-<version> directory:

```
cd ./elxocm-solaris-<version>/
```

4. Run the install script to begin installation.

Note: If the HBAnyware utility, the OneCommand Manager Core Kit or the OneCommand Manager Enterprise applications or the Solaris driver utilities are already present on the system, the install script attempts to remove them first.

```
./install
```

5. When prompted, enter the type of management you want to use:

```
1  Local Mode   : HBA's on this Platform can be managed by
OneCommand clients on this Platform Only.
2  Managed Mode: HBA's on this Platform can be managed by local
or remote OneCommand clients.
3  Remote Mode  : Same as '2' plus OneCommand clients on this
Platform can manage local and remote HBA's.
```

6. If you answered <2> or <3> in step 5, you are asked if you want the OneCommand Manager application to operate in read-only mode. Read-only mode prevents users from performing certain operations such as resetting adapters, updating an adapter's firmware and changing adapter driver properties and bindings. It only affects the local OneCommand Manager application interface. These operations can still be performed using remote management. Enter <y> for yes to allow the user to perform these operations; enter <n> for no if read-only mode is desired.
7. You are prompted about allowing users to change the management mode after installation. Enter <y> for yes, or <n> for no.

This installs the OneCommand Manager application and eml_xu_kit.

Installing or Updating the FCA Utilities Using the eml_xu_install Script

Although it is possible to install eml_xu onto one or more clients from a server, that procedure is not covered in this document; refer to the Solaris documentation.

Note: If an earlier version of the emlxu utilities package is already installed on the system, the emlxu_install script removes the old version before installing the new one.

Prerequisites

Before installing the Emulex emlxu utilities package, you must completely install:

- The Emulex-Sun driver kit (SUNWemlxs) for Fibre Channel and Converged Network Adapters.

Procedure

To install the utilities kit using the emlxu_install script:

1. Untar the emlxu_kit-<version>-<platform>.tar file.

```
tar xvf emlxu_kit-<version>-<platform>.tar
```

The emlxu_install script is available.

2. Install the FCA utilities by typing

```
emlxu_install
```

The script prompts you to remove any earlier versions of the emlxu utilities package. (If an earlier package is not found, this fact is indicated; skip to step 6.) The following text is displayed:

```
<Removing old EMLXemlxu package>
```

3. If an old package is installed, you are prompted to remove it:

```
Do you want to remove this package? [y,n,?,q]
```

4. Enter <y>. The following message is displayed:

```
Removal of <EMLXemlxu> was successful.
```

The script expands the utilities kit.tar file and begins installing the new package. A message similar to the following is displayed:

```
<Expanding emlxu_kit-<version>-sparc.tar>
```

```
<Adding new package>
```

The script installs the emlxu utilities package. The package is prepared for installation and you are prompted for confirmation by the following message:

```
Do you want to continue with the installation of <EMLXemlxu>
[y,n,?]:
```

5. Enter <y>. The installation progress is indicated.
6. Examine the output for any errors or warnings. If the installation is successful, the following message is displayed near the end of the process:

```
Installation of <EMLXemlxu> was successful.
```

The script performs some cleanup and returns the following messages:

```
<Cleaning directory>
```

```
<emlxu_install complete>
```

```
<Execute "emlxu_remove" when ready to uninstall>
```

The script leaves a copy of the `emlxu_remove` script in the working directory with the original utilities kit tar file. You can remove this script, or leave it in the directory and use it to uninstall the `emlxu` utilities from your system in the future. See “Installing or Updating the Utilities Package Manually” on page 21 for more details.

The `emlxu` utilities installation is complete. The utility programs are located in the `/opt/EMLXemlxu/bin` directory.

You do not have to reboot the system to run a utility program, but you must either enter the program's full path name, or add the package's bin directory (`/opt/EMLXemlxu/bin`) to the system environment's search path. To use the man pages provided by the package, you must also add the package's man directory (`opt/EMLXemlxu/man`) to the system environment's man path.

For further information on installing and removing packages, refer the Solaris system administration documentation and the `pkgadd(1M)` and `pkgrm(1M)` manual pages.

Installing the OneCommand Manager Application with Web Launch

Prerequisites

In addition to the driver and the OneCommand Manager application, the following prerequisites must be met before you install the Web Launch feature:

Note: This information is also available online in the `/opt/HBAnyware/README_WEBLAUNCH.txt` file.

- Apache Web server must be installed and running on the server that is hosting the Web Launch Service software.
- The Java Web Start application must be installed and running on the browser host.
- The system on which you are installing the Web Launch Service package (the server) requires:
 - An HTTP server configured to handle the JNLP MIME file type. The following MIME file type/file extension must be added to your server configuration:
MIME type: `application/x-java-jnlp-file`
File Extension: `jnlp`
 - The HTTP server must be running.
- The system on which you are running the browser (the client) requires that Java be installed. The specific requirements are:
 - Oracle's 32-bit Java 6.0 or later for Intel based systems (IA64)
 - 32-bit Java 6.0 or later for x64 systems

Refer to the appropriate vendor documentation for detailed instructions about configuring MIME types, configuring and starting the HTTP server, and installing the JRE. See `/opt/HBAnyware/README_WEBLAUNCH.txt` for more setup information.

Procedure

To install the OneCommand Manager application Web Launch Interface:

1. Log on as 'root'.
2. Navigate to the OneCommand Manager application directory. Type

```
cd /opt/HBAnyware
```
3. Run the install script. Type

```
./wsinstall
```
4. When prompted, enter the Web server's document root directory. For example:

```
/var/apache/htdocs
```
5. You are provided with the IP address of the host and asked if that is the IP address that the Web server uses. Answer <y> or <n> as appropriate. If you answer <n>, you are prompted for the IP address you want to use.
6. You are asked if your web server is listening on the normal default HTTP port (80). Answer <y> or <n> as appropriate. If you answer <n>, you are prompted for the port you want to use.

Once you have entered the necessary information, you are notified when the installation of the OneCommand Manager application Web Launch package is complete. The Web Launch configuration files are created and Web Launch Service automatically starts.

7. To verify the installation, locate another client, open a Web browser window and enter this URL according to this format:

`http://IP_ADDR:PORT_NUM/ocmanager.jnlp`

where IP_ADDR is the IP address of the host on which you installed the OneCommand Manager application Web Launch service, and PORT_NUM is the TCP port number of the listening host's Web server. The standard OneCommand Manager application user interface is displayed.

Note: It is not necessary to enter a port number if the standard HTTP port was chosen during configuration.

Installing or Updating the Utilities Package Manually

Compatibility

See the Solaris driver pages of the Emulex website for compatibility between drivers and applications.

Prerequisites

- If an earlier version of the emlxu utilities package is already installed on the system and you want to install a different version, follow the instructions in "Uninstalling the Utilities Package Manually" on page 24, then return to this section to install the new utilities package.

Procedure

To install the emlxu utilities package manually:

1. Log on as 'root'.
2. Copy the utilities kit from the distribution medium into a directory, referred to here as <directory>. The utilities kit is a tar file named something similar to emlxu_kit-1.01c-sparc.tar.
3. Change to the directory where you put the kit tar file by typing

```
cd <directory>
```

4. Extract the installation images from the tar file by typing

```
tar xvf emlxu_kit-<version>-sparc.tar
```

5. Install the EMLXemlxu utilities package by typing

```
pkgadd -d . EMLXemlxu
```

The package is prepared for installation, and you are prompted to confirm the installation with the following message:

```
Do you want to continue with the installation of <EMLXemlxu>
[y,n,?]
```

6. Enter <y>. The installation progress is indicated.
7. Examine the output for any errors or warnings. If the installation is successful, the following message is displayed near the end of the process:

```
Installation of <EMLXemlxu> was successful.
```

The emlxu utilities installation is complete. The utility package's programs are located in the /opt/EMLXemlxu/bin directory.

You do not have to reboot the system to run a utility program, but you must either enter the program's full path name or add the package's bin directory (/opt/EMLXemlxu/bin) to the system environment's search path. To use the man pages provided by the package, you must also add the package's man directory (opt/EMLXemlxu/man) to the system environment's man path.

Uninstalling the FCA Utilities and the OneCommand Manager Application

Uninstalling the OneCommand Manager Application

Note: If you installed the OneCommand Manager application Web Launch Interface, you must uninstall it before uninstalling the OneCommand Manager application. See "Uninstalling the OneCommand Manager Application with Web Launch Only" on page 23.

1. Log on as 'root'.
2. Run the OneCommand Manager uninstall script:

```
/opt/HBAnyware/scripts/uninstall
```


Uninstalling the OneCommand Manager Application with Web Launch Only

1. Log on as 'root'.

Note: If you installed the OneCommand Manager application Web Launch Interface, you must uninstall it before uninstalling the OneCommand Manager application.

2. Run the uninstall script:

```
/opt/HBAnyware/wsuninstall
```

This script stops the OneCommand Manager application Web Launch Interface service daemons (if they are running) and removes all Web Launch related files from the host.

Uninstalling the Utilities Using the emlxu_remove Script

You can uninstall the utilities kit using the emlxu_remove script. If you do not have the emlxu_remove script and you do not have the original emlxu utilities kit tar file, you must uninstall the emlxu package manually; follow the instructions in "Uninstalling the Utilities Package Manually" on page 24. If you are updating the emlxu utilities to a newer version and you have the new utilities kit tar file, you do not need to use the emlxu_remove script. The emlxu_install script removes any old version as it installs the newer version; see "Installing or Updating the FCA Utilities Using the emlxu_install Script" on page 18 for more details.

To uninstall the utilities package (without updating them):

Note: All emlxu files are removed.

1. Go to the directory where the emlxu_remove script is located or to the directory where the original utilities kit tar file is located by typing
2. If you have the emlxu_remove script, skip to step 3. If you do not have the emlxu_remove script but you do have the original emlxu utilities kit tar file, extract the emlxu_remove script from the tar file by typing:

```
tar xf emlxu_kit-<version>-sparc.tar emlxu_remove
```

3. Remove the emlxu utilities package by typing

```
emlxu_remove
```

The script locates the EMLXemlxu utilities package, and the following message is displayed:

```
<Removing EMLXemlxu package>
```

Note: If no package is installed, the following message is displayed:

```
pkgmgr: ERROR: no package associated with <EMLXemlxu>
```

You are prompted to remove the package with the following message:

```
Do you want to remove this package? [y,n,?,q]
```

4. Enter **<y>**. The following message is displayed:

```
Removal of <EMLXemlxu> was successful.
```

The script performs some cleanup and displays the following message:

```
<Removing emlxu scripts>  
<emlxu_remove complete>
```

The utilities package is removed. If you want to install another version of the emlxu utilities package, do so now by following the instructions in one of the following sections:

- “Installing or Updating the FCA Utilities Using the emlxu_install Script” on page 18
- “Installing or Updating the Utilities Package Manually” on page 21

For additional information on installing and removing packages, refer to the Solaris system administration documentation and the pkgadd(1M) and pkgrm(1M) manual pages.

Uninstalling the Utilities Package Manually

To uninstall the emlxu utilities package:

1. Uninstall the EMLXemlxu utilities package by typing

```
pkgrm EMLXemlxu
```

You are prompted to confirm the removal by the following message:

```
Do you want to remove this package? [y,n,?,q]
```

2. Enter **<y>**. The package is prepared for removal, and you are prompted again for confirmation:

```
Do you want to remove this package? [y,n,?,q]
```

3. Enter **<y>**. The following message is displayed:

```
Removal of <EMLXemlxu> was successful.
```

For additional information on installing and uninstalling packages, refer to the Solaris system administration documentation and the pkgadd(1M) and pkgrm(1M) manual pages.

4. FC/FCoE Configuration

Introduction

'emlxs' is the module name for the Emulex SFS FCA driver. You can configure the Emulex SFS FCA driver properties by

- Editing the emlxs.conf file which is described in this section.
- Using the OneCommand Manager application. Refer to the *OneCommand Manager Application User Manual* for more information.
- Using the Emulex FCA utilities. Refer to the *Solaris FCA Utilities User Manual* for more information.

If the Emulex LPFC driver for Solaris is already installed, you can migrate to the emlxs driver either by customizing and running the unsupported sample scripts provided by Emulex, or by manually performing a set of procedures.

Changing Driver Properties Using the emlxs.conf File

The emlxs.conf file contains all the properties necessary to initialize the Emulex SFS FCA driver. The emlxs.conf driver properties are described in Table 5-1 on page 27.

In the emlxs.conf file, all adapter-specific properties have an emlxsX-prefix (where X is the driver instance number). For example, setting emlxs0-link-speed=4 makes 4 the default link speed setting for the zero instance of the driver. Changes to the emlxs.conf file require you to unload and reload the driver.

To change driver properties:

1. Open the emlxs.conf file in a text editor.
2. Change the properties you want.
3. Save the file.

See Table 5-1 on page 27 for activation requirements.

Enabling NPIV Support on Solaris 11.1

To enable NPIV support in the driver:

1. Log on as 'root'.
2. Set enable-npiv to 1 in the emlxs.conf file (this is set to 0 by default).
3. Reboot the system. If enable-npiv is already set, do not reboot.
4. Refer to Chapter 6 of the *Solaris SAN Configuration and Multipathing Guide*.

NPIV Configuration Limits

The following limitations apply to NPIV:

- There is no FC-IP support on virtual ports.

- You cannot delete a virtual port with a mounted file system.
- Due to the limitation of the Solaris Leadville stack, deleting a virtual port causes that virtual port to go offline.
- The Emulex LightPulse® LP11000 and LPe11000 family of adapters can support up to 100 virtual ports.
- The Emulex LightPulse LPe12000 family of adapters can support up to 255 virtual ports.

NPIV and OS Virtualization

Solaris has several OS virtualization solutions including Oracle VM for SPARC and containers. Devices configured to be seen on an Emulex Fibre Channel or Ethernet port (either a physical port or a virtual port) can be used with any of these OS Virtualization solutions. Emulex strongly recommends that you consult the latest document on these technologies to learn the best use of resources related to NPIV technology.

Using VPorts with Oracle VM Server for SPARC and Containers

Using NPIV with Oracle VM Server for SPARC (formerly Logical Domains) and Solaris containers user domains is simple:

1. Create virtual ports for the domains/containers to which you want to present dedicated storage.
2. Discover and attach the targets to virtual ports.
3. Assign the target (not the port) to the domain or container. The attachment runs through the virtual port which provides the path to the target.

Configuring Target Mode Support for Solaris 11.1

To configure target mode support for Solaris 11.1:

1. Log on as 'root'.
2. Set target-mode to "1" in the emlxs.conf file. You can also set individual paths to target mode:

```
emlxsX-target-mode=1;
```

Where X is the specific numeric path. For example, when emlxs1 is set to target mode, all other paths stay in initiator mode.

3. Uncomment the line:

```
ddi-forceattach=1.
```

4. Reboot the system.

To configure targets, refer to the Oracle COMSTAR Administration document.

5. Emulex SFS FCA Driver Properties

The emlxs.conf file contains all the properties necessary to initialize the Emulex SFS FCA driver.

Note: The OneCommand Manager application reflects the emlxs.conf driver properties. See the *OneCommand Manager Application User Manual* for more information about using the OneCommand Manager application with the Emulex SFS FCA driver.

Note: All properties are adapter-specific.

The Configuration File (emlxs.conf)

In the emlxs.conf file, all adapter-specific parameters have emlxsX-prefix (where X is the driver instance number); for example, setting emlxs0-link-speed=4 makes 4 Gb/s the default link speed.

WARNING: Changes to the emlxs.conf file require you to unload and reload the driver.

Note: If you want to override a driver parameter for a single driver-loading session, you can specify it as a parameter with the modload command.

For example:

```
# modload /kernel/drv/emlxs automap=0 (for 32-bit platforms)
```

or

```
# modload /kernel/drv/sparcv9/emlxs automap=0 (for 64-bit platforms).
```

Table 5-1 emlxs.conf Parameters

Property Name	Default	Min	Max	Activation	Comments
ack0	0	0	1	Adapter reset	Use ACK0 for class 2. If ACK0 is 1, the adapter tries to use ACK0 when running Class 2 traffic to a device. If the device doesn't support ACK0, then the adapter uses ACK1. If ACK0 is 0, only ACK1 is used when running Class 2 traffic.
adisc-support	1	0	2	Dynamic	Sets the level of driver support for the FC ADISC login I/O recovery method. <ul style="list-style-type: none"> 1= Partial support. Flush I/Os for non-FCP2 target devices at link down. 0 = No support. Flush active I/Os for all FCP target devices at link down. 2 = Full support. Hold active I/Os for all devices at link down.

Table 5-1 emlxs.conf Parameters (Continued)

Property Name	Default	Min	Max	Activation	Comments
assign-alpa	0x00	0x00	0xef	Link reset	This property is only valid if topology is set to loop. A 0x00 setting means no preference. If multiple adapter instances on the same host are on the same loop, set this value differently for each adapter.
console-notices	0x00000000	0x00000000	0xFFFFFFFF	Dynamic	Verbose mask for notice messages to the console.
console-warnings	0x00000000	0x00000000	0xFFFFFFFF	Dynamic	Verbose mask for warning messages to the console.
console-errors	0x00000000	0x00000000	0xFFFFFFFF	Dynamic	Verbose mask for error messages to the console.
cr-count	1	1	255	Link reset	This property specifies a count of I/O completions after which an interrupt response is generated. This feature is disabled if cr-delay is set to 0.
cr-delay	0	0	63	Link reset	This property specifies a count of milliseconds after which an interrupt response generated if the cr-count has not been satisfied. This value is set to 0 to disable the Coalesce Response feature as default.
enable-auth	0	0	63	Link reset	Enables DHCHAP support in the driver. [0=Disabled, 1=Enabled]
enable-npiv	0	0	1	Adapter reset	This property enables NPIV support in the driver.
fct-queue-depth	0	0	4096	Reboot	Queue depth of target mode port. [0=max determined by type of HBA]
link-speed	Auto-Detect	Auto-Detect, 1 Gb/s, 2 Gb/s, 4 Gb/s, 8 Gb/s		Link reset	This property sets link speed for initializing FC connection.
linkup-delay	10	0	60	Adapter reset	This property sets the linkup delay period (seconds) after adapter initialization.
log-notices	0xFFFFFFFF	0x00000000	0xFFFFFFFF	Dynamic	Verbose mask for notice messages to the messages file.
log-warnings	0xFFFFFFFF	0x00000000	0xFFFFFFFF	Dynamic	Verbose mask for warning messages to the messages file.
log-errors	0xFFFFFFFF	0x00000000	0xFFFFFFFF	Dynamic	Verbose mask for error messages to the messages file.

Table 5-1 emlxs.conf Parameters (Continued)

Property Name	Default	Min	Max	Activation	Comments
max-xfer-size	339968	131072	1388544	Reboot	<p>This property sets the maximum SCSI transfer size in bytes per I/O. This property is only used by the driver on i386 platforms. The driver does not limit transfer size on SPARC platforms. This property determines the scatter gather list buffer size. A pool of buffers is reallocated by the driver during boot. A larger transfer size requires a larger memory allocation.</p> <p>Memory_model/max-xfer-size Small/131072-339968 Medium/339969-688128 Large/688129-1388544</p>
network-on	0	0	1	Reboot	Enables/disables IP networking support in the driver.
num-iocbs	1024	128	10240	Adapter reset	This property indicates the number of Input/Output Control Block (IOCB) buffers to allocate.
num-nodes	0	0	4096	Adapter reset	The number of FC nodes (NPorts) the driver supports.
pci-max-read	2048	512	4096	Adapter reset	This property sets the PCI-X max memory read byte count [512, 1024, 2048, or 4096]
pm-support	0	0	1	Reboot	<p>This property enables and disables power management support in the driver.</p> <p>0 = Disables power management support in the driver.</p> <p>1 = Enables power management support in the driver.</p>
target_depth	512	0	2048	Link reset	Sets remote FCP target queue depth. [0=no_limit, N=maximum active I/Os]
target-mode	0	0	1	Reboot	<p>This property enables and disables COMSTAR target mode support. If target mode is enabled for that port, then SFS initiator mode is disabled for that port.</p>

Table 5-1 emlxs.conf Parameters (Continued)

Property Name	Default	Min	Max	Activation	Comments
topology	0	0 =loop, then P2P 2 =P2P only 4 =loop only 6 =P2P, then loop		Link reset	This property sets point-to-point mode if you want to run as an N_Port. Set to loop mode if you want to run as an NL_Port.
ub-bufs	1000	40	16320	Reboot	This property sets the number of unsolicited buffers to be allocated.
vport-restrict-login	1	0	1	Link reset	<p>This property sets the virtual port's behavior when discovering targets in the SAN. Setting this property to 1 prevents the VPort from logging into other initiator ports on the SAN. Also rejects log ins from other ports in the SAN because it assumes that all ports that send a PLOGI are Initiators. When this parameter is turned off (0) the driver attempts to log in to every port that it can access in the SAN and accept log ins from all ports.</p> <p>Note: In a SAN where there are other initiators, this feature greatly reduces the hardware resources the driver uses.</p>

6. Configuring the NIC Driver

The driver exports certain parameters that can be configured by editing the `oce.conf` file. If the `oce.conf` file is not present on the system, create the `oce.conf` file in the `/kernel/drv/` directory.

To edit the `oce.conf` file:

1. Open the file in a text editor.
2. Make the relevant changes and save the file.

The format of a single line in the file is as follows:

```
<variable> = <value>;
```

For example: `oce_default_mtu = 9000;`

Comment lines must start with a “#” character.

3. If the driver is already loaded, unload the driver and re-load it for the changes to take effect. See “Uninstalling the Drivers” on page 16 for more information.

The following parameters are configurable through the `oce.conf` file:

- `oce_default_mtu` – The default MTU. The Emulex UCNA supports 1500 and 9000 byte MTU sizes. By default it is set to 1500.
- `oce_fm_capability` – Sets the driver's fault management capability to one of the values defined for Solaris FM capability. It is a bitmap of one or more of the following values:

<code>DDI_FM_NOT_CAPABLE</code>	<code>0x00000000</code>
<code>DDI_FM_EREPOR_T_CAPABLE</code>	<code>0x00000001</code>
<code>DDI_FM_ACCCHK_CAPABLE</code>	<code>0x00000002</code>
<code>DDI_FM_DMA_CHK_CAPABLE</code>	<code>0x00000004</code>
<code>DDI_FM_ERRCB_CAPABLE</code>	<code>0x00000008</code>

By default this value is set to 7. See Solaris FMA documentation for more information.

- `oce_log_level` – Sets the driver's verbosity level in messages logged in `/var/adm/messages`. A higher verbosity level is intended for field logs and affects hardware performance. By default, verbosity is set to 0 which is the least verbose.

This value is of the form `(MOD_MASK | SEVERITY)` where

`MOD_MASK`:

<code>MOD_CONFIG</code>	<code>0x0001</code>	Messages in the device configuration path are logged.
<code>MOD_TX</code>	<code>0x0002</code>	Messages in the transmit data path are logged.
<code>MOD_RX</code>	<code>0x0004</code>	Messages in the receive data path are logged.
<code>MOD_ISR</code>	<code>0x0008</code>	Messages in the interrupt path are logged.

`SEVERITY`:

<code>CE_CONT</code>	<code>0</code>	Continuation
----------------------	----------------	--------------

CE_NOTE	1	Information
CE_WARN	2	Warning
CE_PANIC	3	Causes the OS to panic
CE_IGNORE	4	No action

The severity is one of the listed severity levels. For a set level of severity, only messages of that level and higher are logged. For example, if severity is set to CE_WARN, then messages with CE_CONT and CE_NOTE are not logged.

The default value is severity of CE_WARN and MOD_MASK comprising of all modules.

- **flow_control** - Sets the Ethernet flow control. flow_control cannot be disabled on NIC/FCoE. Allowed values:
 - 1- Transmit only
 - 2 - Receive only
 - 3 - Both receive and transmit
- **max_tx_rings** - Sets the maximum number of transmit queues. Allowed value:
 - 1 (OCe10102)
 - 1-8 (OCe11102, OCe15100)
- **max_rx_rings** - Sets the maximum number of receive queues. Allowed value:
 - 1-5 (OCe10102)
 - 1-8 (OCe11102, OCe15100)

Note: The actual number of tx/rx queues created depends on the number of vectors allocated. The actual number can be checked using `dladm(1m)` command.

Configuring the NIC Interface

Prerequisites

The NIC interface must be created. You can verify that the driver is loaded on the system and the NIC interface is created with the following command:

```
dladm show-phys
```

If the driver is not loaded on the system, use the one of the following commands to load the driver:

For a OneConnect OCE10102 UCNA:

```
add_drv -i '"pciex19a2,700"' oce
```

For a OneConnect OCE11102 UCNA:

```
add_drv -i '"pciex19a2,710"' oce
```

For a OneConnect OCE15100 UCNA:

```
add_drv -i '"pciex10df,e220"' oce
```

Procedure

To configure the NIC interface(s):

1. Plumb the interface.

```
#ifconfig net<X> plumb
```

where 'X' is the interface number.

To see the interfaces created, run `$> dladm show-link`. This command lists all the interfaces in the system.

2. Assign an IP address.

```
#ifconfig net<X> <IP_Address> netmask <NetMask> up
```

3. Edit the `/etc/hosts` file (a symlink to `/etc/inet/hosts`) and add the IP address and hostname that you wish to assign to the given NIC interface. Refer `hosts(4)` for more information.
4. Edit the `/etc/inet/ipnodes` file and add an entry for the IP address and hostname for the given interface. The `/etc/inet/ipnodes` file is primarily for IPv6 only but this step is necessary for the IP address change to take effect.
5. Edit the `/etc/netmasks` file and add an entry with the IP address and desired subnet mask for the given interface. Refer `netmasks(4)` for more information.
6. Restart the network service. Use:

```
$> svcadm restart network/physical
```

or

```
Reboot the system.
```

To remove the interface:

1. Perform the steps detailed in configuring the NIC interface in reverse order.
2. Remove all the entries in the files, and unplumb the interface, using the following command:

```
#ifconfig net<X> down unplumb
```

Alternatively, use `sysconfig(1M)` to delete the configurations of IP address, netmask, hostname, nfs mounts, ldap etc. on the host. The `sysconfig` utility reboots the system and clear all existing IP configuration, so you must enter all the information again, even for the existing NICs already configured in the system. The `sysconfig` utility must be executed from a console. On reboot, you are presented with a set of UI based data entry forms that facilitate the required change in configuration.

dladm Support on Solaris 11.1

To configure the interface on Solaris 11.1:

Use `dladm` to configure the interface and also perform a runtime update of the following driver parameters:

- MTU - to change the MTU in Solaris 11.1, unplumb the interface and execute:

```
$> dladm set-linkprop -p mtu=9000 <interface>
```

where 'interface' is `net<0,1,2...>`.

To see the plumbed interfaces, execute: `$> ifconfig -a`.

- `_tx_bcopy_limit` - this can be changed at runtime by executing:

```
$> dladm set-linkprop -p _tx_bcopy_limit=<value in bytes>
<interface>
```

Note: `_tx_bcopy_limit` is the same as the `oce_bcopy_limit` parameter in the `oce.conf` file.

Using `dladm`, the following tunable driver parameters are provided along with their usage:

- `tx ring size`:

```
$> dladm set-linkprop -p _tx_ring_size=<values between 256 and
2048> <interface>
```

or

```
$> dladm set-linkprop -p _tx_ring_size=<values less than
tx_ring_size> <interface>
```

- `rx bcopy limit`

```
$> dladm set-linkprop -p _rx_bcopy_limit=<value in bytes>
<interface>
```

- `log_level`

```
$> dladm set-linkprop -p _log_level=<value> <interface>
```

Use `dladm` to show the current value of the private or unlisted driver parameters.

```
$> dladm show-linkprop -p <property name> <interface>
```

The following are private parameters provided by the driver:

- `tx_rings`
- `tx_ring_size`
- `tx_bcopy_limit`
- `tx_reclaim_threshold`
- `rx_rings`
- `rx_rings_per_group`
- `rx_ring_size`
- `rx_bcopy_limit`
- `log_level`

Creating a Virtual NIC

To create a virtual NIC (vNIC), use the `dladm` utility with the `create-vnic` option. For example:

```
$ dladm create-vnic -l net0 vnic1
```

Once a vNIC is created, it can be assigned to a zone using the “`zonecfg`” utility. For example:

```
$ zonecfg -z zone1
```

```
zonecfg:zone1: No such zone configured
zonecfg:zone1> create
zonecfg:zone1> set zonepath=/export/zone1
zonecfg:zone1> create
zonecfg:zone1> add net
zonecfg:zone1> set physical=vnic1
zonecfg:zone1> set address=192.168.1.100
zonecfg:zone1> verify
zonecfg:zone1> commit
```

Up to 63 VLANs can be used with each universal multichannel (UMC) virtual channel. For information on configuring UMC, refer to the *Emulex Universal Multichannel Reference Guide*.

Considerations:

- UMC can be configured using the OCM application CLI. For more information, refer to the *OneCommand Manager Command Line Interface User Manual*.
- You cannot run Link Aggregation Control Protocol (LACP) when UMC is enabled.
- Using UMC in a hypervisor environment is not advised if the UMC interface is going to be part of the hypervisor virtual switch. This configuration may cause performance issues.

7. Solaris emlxs and Solaris LPFC Driver Properties Cross-Reference Table

The cross-reference information listed in the table below refers to the driver for Solaris LPFC version 6.30.

Table 7-1 Solaris emlxs and Solaris LPFC Driver Property Cross-Reference

Solaris emlxs /OneCommand Property	Solaris emlxs/OneCommand Min/Max, Defaults, and Description	Related LPFC Property	LPFC Min/Max, Default, and Description	Comments
ack0	0 = The driver uses ACK1 for class 2 acknowledgement. 1 = The driver uses ACK0 for class 2 acknowledgement. Range: Min:0 Max:1 Default:0 Description: Determines if ACK0 is used instead of ACK1 for class 2 acknowledgement.	ack0	0 = The driver uses ACK1 for class 2 acknowledgement. 1 = The driver uses ACK0 for class 2 acknowledgement. Range: Min:0 Max:1 Default:0 Description: Determines if ACK0 is used instead of ACK1 for class 2 acknowledgement.	
adisc-support	0 = No support. Flushes active I/Os for all FCP target devices at link down. 1 = Partial support. Flushes I/Os for non-FCP2 target devices at link down. 2 = Full support. Holds active I/Os for all devices at link down. Default: 1 Description: Sets the level of driver support for the FC ADISC login I/O recovery method.	use-adisc	0 = Off 1 = On Default: 0 Description: Controls the ELS command used for address authentication during rediscovery upon link-up. The driver always uses ADISC for FCP-2 devices and re-discovery due to an registered state change notification (RSCN).	If there are tape devices on the SAN that support FCP2, set the use-adisc property to 1 and the adisc-support property to 1 (partial support) or 2 (full support).
assign-alpa	Min:0x00 Max:0xef Default:0x00 (valid ALPA's only) Description: This is only valid if the topology is loop. A zero setting means no preference. If multiple adapter instances on the same host are on the same loop, set this value differently for each adapter.	assign-alpa	Description: Sets a preferred ALPA for the adapter. This parameter is only valid if the topology is loop.	

Table 7-1 Solaris emlxs and Solaris LPFC Driver Property Cross-Reference (Continued)

Solaris emlxs /OneCommand Property	Solaris emlxs/OneCommand Min/Max, Defaults, and Description	Related LPFC Property	LPFC Min/Max, Default, and Description	Comments
console-notice	Min: 0x00000000 Max: 0xFFFFFFFF Default: 0x00000000 Verbose mask for notice messages to the console.	log-verbose	Min: 0x0 Max: 0xffff Default: 0x0 (bit mask) When set to nonzero this variable causes LPFC to generate additional messages concerning the state of the driver and the I/O operations it carries out. These messages may go to the system console. Log-only for lpfc.conf file.	
console-warnings	Min: 0x00000000 Max: 0xFFFFFFFF Default: 0x00000000 Verbose mask for warning messages to the console.	log-verbose	Min: 0x0 Max: 0xffff Default: 0x0 (bit mask) When set to nonzero this variable causes LPFC to generate additional messages concerning the state of the driver and the I/O operations it carries out. These messages may go to the system console. Log-only for lpfc.conf file.	
console-errors	Min: 0x00000000 Max: 0xFFFFFFFF Default: 0x00000000 Verbose mask for error messages to the console.	log-verbose	Min: 0x0 Max: 0xffff Default: 0x0 (bit mask) When set to nonzero this variable causes LPFC to generate additional messages concerning the state of the driver and the I/O operations it carries out. These messages may go to the system console. Log-only for lpfc.conf file.	

Table 7-1 Solaris emlxs and Solaris LPFC Driver Property Cross-Reference (Continued)

Solaris emlxs /OneCommand Property	Solaris emlxs/OneCommand Min/Max, Defaults, and Description	Related LPFC Property	LPFC Min/Max, Default, and Description	Comments
cr-delay	Min:0 Max:63 Default:0 Description: Specifies a count of milliseconds after which an interrupt response is generated if the cr-count has not been satisfied. This value is set to 0 to disable the Coalesce Response feature as default.	cr-delay	Min:0 Max:63 Default:0 Description: Specifies a count of milliseconds after which an interrupt response is generated if the cr-count has not been satisfied. This value is set to 0 to disable the Coalesce Response feature as default.	Setting this value can minimize CPU utilization by reducing the number of interrupts that the driver generates to the operating system.
cr-count	Min:1 Max:255 Default:1 Description: Specifies a count of I/O completions after which an interrupt response is generated. This feature is disabled if cr-delay is set to 0.	cr-count	Min:1 Max:255 Default:1 Description: Specifies a count of I/O completions after which an interrupt response is generated. This feature is disabled if cr-delay is set to 0.	This property is often determined by your OEM. This property sets the number of I/Os to be queued in the operating system's driver before an interrupt is initiated. The driver default settings are roughly a 1:1 I/O to interrupt ratio. If you change this property, performance varies per application.
link-speed	0 = auto select 1 = 1 Gb/s 2 = 2 Gb/s 4 = 4 Gb/s 8 = 8 Gb/s Range: 0-8 Default: 0 Description: Sets the link speed setting for initializing the FC connection.	link-speed	0 = auto select 1 = 1 Gb/s 2 = 2 Gb/s 4 = 4 Gb/s 8 = 8 Gb/s Range: 0-8 Default: 0 Description: Sets link speed.	This property can be changed to a specific link speed to optimize the link initialization process for a specific environment.

Table 7-1 Solaris emlx and Solaris LPFC Driver Property Cross-Reference (Continued)

Solaris emlx /OneCommand Property	Solaris emlx/OneCommand Min/Max, Defaults, and Description	Related LPFC Property	LPFC Min/Max, Default, and Description	Comments
log-notice	Min: 0x00000000 Max: 0xFFFFFFFF Default: 0x00000000 Verbose mask for notice messages to the messages file.	log-verbose	Min: 0x0 Max: 0xffff Default: 0x0 (bit mask) When set to nonzero this property causes LPFC to generate additional messages concerning the state of the driver and the I/O operations it carries out. These messages may go to the system log file, /var/adm/messages.	
log-warnings	Min: 0x00000000 Max: 0xFFFFFFFF Default: 0x00000000 Verbose mask for warning messages to the messages file.	log-verbose	Min: 0x0 Max: 0xffff Default: 0x0 (bit mask) When set to nonzero this property causes LPFC to generate additional messages concerning the state of the driver and the I/O operations it carries out. These messages may go to the system log file, /var/adm/messages.	
log-errors	Min: 0x00000000 Max: 0xFFFFFFFF Default: 0x00000000 Verbose mask for error messages to the messages file.	log-verbose	Min: 0x0 Max: 0xffff Default: 0x0 (bit mask) When set to nonzero this property causes LPFC to generate additional messages concerning the state of the driver and the I/O operations it carries out. These messages may go to the system log file, /var/adm/messages.	

Table 7-1 Solaris emlxs and Solaris LPFC Driver Property Cross-Reference (Continued)

Solaris emlxs /OneCommand Property	Solaris emlxs/OneCommand Min/Max, Defaults, and Description	Related LPFC Property	LPFC Min/Max, Default, and Description	Comments
max-xfer-size	Min: 131072 Max: 1388544 Default: 339968 Determines the scatter gather list buffer size. A pool of buffers is reallocated by the driver during boot. A larger transfer size requires a larger memory allocation.	N/A		
network-on	Min: 0 (Disables) Max: 1 (Enables) Default: 1 Description: Enables or disables IP networking support in the driver.	network-on	Min: 0 (Disables) Max: 1 (Enables) Default: 0 Description: Controls whether LPFC provides IP networking functionality over FC. This property is Boolean: when zero, IP networking is disabled. When non-zero, IP networking is enabled. This variable is set during the installation of the driver via pkgadd.	

Table 7-1 Solaris emlxs and Solaris LPFC Driver Property Cross-Reference (Continued)

Solaris emlxs /OneCommand Property	Solaris emlxs/OneCommand Min/Max, Defaults, and Description	Related LPFC Property	LPFC Min/Max, Default, and Description	Comments
num-iocbs	Min: 128 Max: 10240 Default = 1024 Description: Sets the number of iocb buffers to allocate.	num-iocbs	Min: 128 Max: 10240 Default = 256 Description: Specifies the number of command buffers to allocate. These buffers are used for Fibre Channel Extended Link Services (ELS) and one for each FCP command issued in SLI-2 mode. To queue lots of FCP commands to the adapter, increase num-bufs for better performance. These buffers consume physical memory and are used by the device driver to process loop initialization and rediscovery activities. Important: The driver must always be configured with at least several dozen ELS command buffers; Emulex recommends at least 128.	
num-nodes	Min: 2 Max: 512 Default: 512 Description: Number of FC nodes (NPorts) the driver supports.	N/A	N/A	
pci-max-read	Min: 512 Max: 4092 Default: 2048 Description: Sets the PCI-X max memory read byte count [512, 1024, 2048, or 4096].	N/A	N/A	

Table 7-1 Solaris emlxs and Solaris LPFC Driver Property Cross-Reference (Continued)

Solaris emlxs /OneCommand Property	Solaris emlxs/OneCommand Min/Max, Defaults, and Description	Related LPFC Property	LPFC Min/Max, Default, and Description	Comments
pm-support	0 = Disables power management support in the driver. 1 = Enables power management support in the driver. Default: 0 Description: Enable and disables power management support in the driver.	N/A	N/A	
topology	0 = loop, if it fails attempt pt-to-pt 2 = pt-to-pt only 4 = loop only 6 = pt-to-pt, if it fails attempt loop Default: 0 Description: Link topology for initializing the FC connection. Set to pt-to-pt if you want to run as an N_Port. Set to loop if you want to run as an NL_Port.	topology	0x0 = loop, if it fails attempt pt-to-pt 0x2 = pt-to-pt only 0x4 = loop only Default: 0 Description: Controls the FC topology expected by LPFC at boot time. FC offers pt-to-pt, fabric and arbitrated loop. For the adapter to operate as an N_Port, select pt-to-pt mode (for N_Port to F_Port and N_Port to N_Port connections). For the adapter to operate as an NL_Port, select loop mode (for private loop and public loop topologies). The driver rejects an attempt to set the topology to a value not in the above list. The auto-topology settings 0 and 6 do not work unless the adapter is using firmware version 3.20 or higher.	The topology property controls the protocol (not physical) topology attempted by the driver.
ub-bufs	Min:40 Max:16320 Default:1000 Description: Sets the number of unsolicited buffers to be allocated.	N/A	N/A	

8. emlxs Logs

General Situations

If an FC link fails to come up, verify that an 8 Gb/s adapter is not attempting to connect to a 1 Gb/s device. Only 2 Gb/s, 4 Gb/s, and 8 Gb/s devices are supported on 8 Gb/s adapters.

Messages

This section describes the type of console and log messages you may see. Security levels and an extensive listing of message IDs and descriptions are also provided. Log messages are logged to the `/var/adm/messages` system file.

Table 8-1 lists the types of notices, warnings and error logging levels you may see.

Table 8-1 Notice, Warnings, and Error Types

Driver Property	Default/Min /Max	Effect of Changing Default	Related lpfc Driver Property
console-notices	0	Sets the verbose level for driver notices to the console.	log-only (when set to 0, log messages are logged to the system log file and also printed on the console.) Default = Disabled
console-warnings	0	Sets the verbose level for driver warnings to the console.	
console-errors	0	Sets the verbose level for driver errors to the console.	
log-notices	0xffffffff;	Sets the verbose level for driver notices to the system log file.	log-verbose (when set to non-zero, verbose messages are generated.) Default = Disabled
log-warnings	0xffffffff;	Sets the verbose level for driver warnings to the system log file.	
log-errors	0xffffffff;	Sets the verbose level for driver errors to the system log file.	

Table 8-2 lists the types of log messages that can be logged to the system file.

Table 8-2 Log Message Types

LOG Message Verbose flags	Verbose Bit	Verbose Description
MSG_DISABLED	0x00000000	Always off
MSG_MISC	0x00000001	Miscellaneous events
MSG_DRIVER	0x00000002	Driver attach and detach events

Table 8-2 Log Message Types (Continued)

LOG Message Verbose flags	Verbose Bit	Verbose Description
MSG_INIT	0x00000004	HBA initialization events
MSG_MEM	0x00000008	Memory management events
MSG_SLI	0x00000010	Service Level Interface (SLI) events
MSG_MBOX	0x00000020	Mailbox events
MSG_NODE	0x00000040	Node events
MSG_LINK	0x00000080	Link events
MSG_ELS	0x00000100	ELS events
MSG_PKT	0x00000200	General I/O packet events
MSG_FCP	0x00000400	FCP traffic events
MSG_FCT	0x00000800	FCP target mode events
MSG_IP	0x00001000	IP traffic events
MSG_SFS	0x00002000	Solaris SFS events
MSG_IOCTL	0x00004000	IOCTL events
MSG_FIRMWARE	0x00008000	Firmware download events
MSG_CT	0x00010000	CT events
MSG_FCSP	0x00020000	FCSP events
MSG_FCF	0x00040000	FCF events
MSG_RESV19	0x00080000	
MSG_RESV20	0x00100000	
MSG_RESV21	0x00200000	
MSG_FCT_API	0x00400000	FCP Target Mode API trace
MSG_FCT_DETAIL	0x00800000	Detailed FCT events
MSG_FCSP_DETAIL	0x01000000	Detailed FCSP events
MSG_NODE_DETAIL	0x02000000	Detailed node events
MSG_IOCTL_DETAIL	0x04000000	Detailed IOCTL events
MSG_IP_DETAIL	0x08000000	Detailed IP events
MSG_FIRMWARE_DETAIL	0x10000000	Detailed Firmware events
MSG_SFS_DETAIL	0x20000000	Detailed Solaris SFS events
MSG_MBOX_DETAIL	0x40000000	Detailed Mailbox events
MSG_SLI_DETAIL	0x80000000	Detailed HBA SLI events
MSG_ALL_MSG	0xFFFFFFFF	Detailed Node events

Severity Levels

Table 8-3 Severity Levels

Level	Message Description
DEBUG (Informational)	This message provides engineering debug information.
NOTICE (Informational)	This message provides a general purpose information.
WARNING	This message provides a general purpose warning.
ERROR	This message indicates that a driver error has occurred.
PANIC (Severe)	This message indicates that the driver has forced a system panic to occur.

Message Log Example

The following is an example of a message on the system console.

```
[5.0336]emlxs0: NOTICE: 720: Link up. (1Gb, fabric)
```

The following is an example of the same message in the system message log (/var/adm/messages) file.

```
Jan 19 14:45:36 sunv240 emlxs: [ID 349649 kern.info] [5.0336]emlxs0:  
NOTICE: 720: Link up. (1Gb, fabric)
```

In the above system log message:

- Jan 19 14:45:36 identifies the date and time when the error or event occurred.
- sunv240 identifies the name of the host machine.
- emlxs identifies the message that came from the Emulex emlxs driver.
- [ID 349649 kern.info] identifies a Solaris-specific message ID and kernel message level. This changes from one driver message to another.
- [5.0336] identifies the emlxs driver message context tag. This may change from one driver version to another.
- emlxs0 identifies that the message is coming from the emlxs driver instance zero. This changes from one driver instance to another.
- NOTICE identifies the emlxs message severity level. This may change from one driver version to another.
- 720 identifies the emlxs drive message id. This does not change from one driver version to another.
- Link up identifies the actual error or event message. This does not change from one driver version to another.
- (1 Gb/s, fabric) identifies additional information specific to the error or event message. This information is normally intended for technical support / engineering use. This may change from one driver version to another.

Miscellaneous Events

MSG_ID: 0001 DEBUG:

VERBOSE_MASK: LOG_MISC (0x00000001)

DESCRIPTION: This is a general purpose informational message.

SEVERITY LEVEL: Debug

MESSAGE: None

ACTION: No action needed.

MSG_ID: 0002 NOTICE:

VERBOSE_MASK: LOG_MISC (0x00000001)

DESCRIPTION: This is a general purpose informational message.

SEVERITY LEVEL: Notice

MESSAGE: None

ACTION: No action needed.

MSG_ID: 0003 WARNING:

VERBOSE_MASK: LOG_MISC (0x00000001)

DESCRIPTION: This is a general purpose warning message.

SEVERITY LEVEL: Warning

MESSAGE: None

ACTION: No action needed.

MSG_ID: 0004 ERROR:

VERBOSE_MASK: LOG_MISC (0x00000001)

DESCRIPTION: This is a general purpose error message.

SEVERITY LEVEL: Error

MESSAGE: None

ACTION: No action needed.

MSG_ID: 0005 PANIC:

VERBOSE_MASK: LOG_MISC (0x00000001)

DESCRIPTION: This is a general purpose panic message.

SEVERITY LEVEL: Panic (Severe)

MESSAGE: None

ACTION: Contact Emulex technical support.

MSG_ID: 0010 DEBUG: Event.

VERBOSE_MASK: LOG_MISC (0x00000001)

DESCRIPTION: This is debug information about a driver event.

SEVERITY LEVEL: Debug

MESSAGE: Event.

ACTION: No action needed.

MSG_ID: 0011 DEBUG: Event queued.

VERBOSE_MASK: LOG_MISC (0x00000001)

DESCRIPTION: A driver event is being queued.

SEVERITY LEVEL: Debug

MESSAGE: Event queued.

ACTION: No action needed.

MSG_ID: 0012 DEBUG: Event dequeued.

VERBOSE_MASK: LOG_MISC (0x00000001)

DESCRIPTION: A driver event is being dequeued.

SEVERITY LEVEL: Debug

MESSAGE: Event dequeued.

ACTION: No action needed.

Driver Events

MSG_ID: 0100 NOTICE: Driver attach.

VERBOSE_MASK: LOG_DRIVER (0x00000002)

DESCRIPTION: The driver is performing an attach operation.

SEVERITY LEVEL: Notice

MESSAGE: Driver attach.

ACTION: No action needed.

MSG_ID: 0101 ERROR: Driver attach failed.

VERBOSE_MASK: LOG_DRIVER (0x00000002)

DESCRIPTION: The driver was unable to attach due to some issue.

SEVERITY LEVEL: Error

MESSAGE: Driver attach failed.

ACTION: Check your hardware and software configuration. If problems persist, report these errors to Emulex technical support.

MSG_ID: 0102 DEBUG: Driver attach.

VERBOSE_MASK: LOG_DRIVER (0x00000002)

DESCRIPTION: The driver is performing a attach operation.

SEVERITY LEVEL: Debug

MESSAGE: Driver attach.

ACTION: No action needed.

MSG_ID: 0110 NOTICE: Driver detach.

VERBOSE_MASK: LOG_DRIVER (0x00000002)

DESCRIPTION: The driver is performing a detach operation.

SEVERITY LEVEL: Notice

MESSAGE: Driver detach.

ACTION: No action needed.

MSG_ID: 0111 ERROR: Driver detach failed.

VERBOSE_MASK: LOG_DRIVER (0x00000002)

DESCRIPTION: The driver was unable to detach due to some issue.

SEVERITY LEVEL: Error

MESSAGE: Driver detach failed.

ACTION: Check your hardware and software configuration. If problems persist, report these errors to Emulex technical support.

MSG_ID: 0112 DEBUG: Driver detach.

VERBOSE_MASK: LOG_DRIVER (0x00000002)

DESCRIPTION: The driver is performing a detach operation.

SEVERITY LEVEL: Debug

MESSAGE: Driver detach.

ACTION: No action needed.

MSG_ID: 0120 DEBUG: Driver suspend.

VERBOSE_MASK: LOG_DRIVER (0x00000002)

DESCRIPTION: The driver is performing a suspend operation.

SEVERITY LEVEL: Debug

MESSAGE: Driver suspend.

ACTION: No action needed.

MSG_ID: 0121 ERROR: Driver suspend failed.

VERBOSE_MASK: LOG_DRIVER (0x00000002)

DESCRIPTION: The driver was unable to suspend due to some issue.

SEVERITY LEVEL: Error

MESSAGE: Driver suspend failed.

ACTION: Check your hardware and software configuration. If problems persist, report these errors to Emulex technical support.

MSG_ID: 0130 DEBUG: Driver resume.

VERBOSE_MASK: LOG_DRIVER (0x00000002)

DESCRIPTION: The driver is performing a resume operation.

SEVERITY LEVEL: Debug

MESSAGE: Driver resume.

ACTION: No action needed.

MSG_ID: 0131 ERROR: Driver resume failed.

VERBOSE_MASK: LOG_DRIVER (0x00000002)

DESCRIPTION: The driver was unable to resume due to some issue.

SEVERITY LEVEL: Error

MESSAGE: Driver resume failed.

ACTION: Check your hardware and software configuration. If problems persist, report these errors to Emulex technical support.

HBA Initialization Events

MSG_ID: 0200 NOTICE: Adapter initialization.

VERBOSE_MASK: LOG_INIT (0x00000004)

DESCRIPTION: The adapter is initializing.

SEVERITY LEVEL: Notice

MESSAGE: Adapter initialization.

ACTION: No action needed.

MSG_ID: 0201 ERROR: Adapter initialization failed.

VERBOSE_MASK: LOG_INIT (0x00000004)

DESCRIPTION: An attempt to initialize the adapter has failed.

SEVERITY LEVEL: Error

MESSAGE: Adapter initialization failed.

ACTION: Check your hardware configuration. If problems persist, report these errors to Emulex technical support.

MSG_ID: 0202 DEBUG: Adapter initialization.

VERBOSE_MASK: LOG_INIT (0x00000004)

DESCRIPTION: The adapter is initializing.

SEVERITY LEVEL: Debug

MESSAGE: Adapter initialization.

ACTION: No action needed.

MSG_ID: 0210 DEBUG: Adapter transition.

VERBOSE_MASK: LOG_INIT (0x00000004)

DESCRIPTION: The adapter is changing states.

SEVERITY LEVEL: Debug

MESSAGE: Adapter transition.

ACTION: No action needed.

MSG_ID: 0220 DEBUG: Adapter online.

VERBOSE_MASK: LOG_INIT (0x00000004)

DESCRIPTION: The adapter is online and ready to communicate.

SEVERITY LEVEL: Debug

MESSAGE: Adapter online.

ACTION: No action needed.

MSG_ID: 0230 DEBUG: Adapter offline.

VERBOSE_MASK: LOG_INIT (0x00000004)

DESCRIPTION: The adapter is offline and unable to communicate.

SEVERITY LEVEL: Debug

MESSAGE: Adapter offline.

ACTION: No action needed.

MSG_ID: 0231 WARNING: Adapter shutdown.

VERBOSE_MASK: LOG_INIT (0x00000004)

DESCRIPTION: The adapter has been shutdown and requires a reboot to reinitialize.

SEVERITY LEVEL: Warning

MESSAGE: Adapter shutdown.

ACTION: Contact Emulex technical support.

MSG_ID: 0240 ERROR: Adapter reset failed.

VERBOSE_MASK: LOG_INIT (0x00000004)

DESCRIPTION: An attempt to reset the adapter has failed.

SEVERITY LEVEL: Error

MESSAGE: Adapter reset failed.

ACTION: Check your hardware configuration. If problems persist, report these errors to Emulex technical support.

Memory Management Events

MSG_ID: 0300 DEBUG: Memory alloc.

VERBOSE_MASK: LOG_MEM (0x00000008)

DESCRIPTION: The driver allocated system memory.

SEVERITY LEVEL: Debug

MESSAGE: Memory alloc.

ACTION: No action needed.

MSG_ID: 0301 ERROR: Memory alloc failed.

VERBOSE_MASK: LOG_MEM (0x00000008)

DESCRIPTION: The driver was unable to allocate system memory. The system is low on memory resources.

SEVERITY LEVEL: Error

MESSAGE: Memory alloc failed.

ACTION: No action needed. If problems persist, report these errors to your system administrator.

MSG_ID: 0310 ERROR: Memory pool error.

VERBOSE_MASK: LOG_MEM (0x00000008)

DESCRIPTION: A problem has occurred with the memory buffer pool management.

SEVERITY LEVEL: Error

MESSAGE: Memory pool error.

ACTION: No action needed. If problems persist, report these errors to Emulex technical support.

MSG_ID: 0311 DEBUG: Memory pool alloc failed.

VERBOSE_MASK: LOG_MEM (0x00000008)

DESCRIPTION: The driver was unable to allocate memory from one of its own memory pools.

SEVERITY LEVEL: Debug

MESSAGE: Memory pool alloc failed.

ACTION: If the problem occurs frequently you may be able to configure more resources for that pool. If this does not solve these problems, report these errors to Emulex technical support.

MSG_ID: 0312 DEBUG: Memory pool detail.

VERBOSE_MASK: LOG_MEM (0x00000008)

DESCRIPTION: This message provides detailed information about memory buffer pool management.

SEVERITY LEVEL: Debug

MESSAGE: Memory pool detail.

ACTION: No action needed.

MSG_ID: 0320 NOTICE: No unsolicited buffer available.

VERBOSE_MASK: LOG_MEM (0x00000008)

DESCRIPTION: The driver's unsolicited buffer pool is exhausted. The I/O is dropped and is most likely retried by the remote device.

SEVERITY LEVEL: Notice

MESSAGE: No unsolicited buffer available.

ACTION: If the problem occurs frequently you may be able to configure more resources for that pool. If this does not solve these problems, report these errors to Emulex technical support.

MSG_ID: 0330 ERROR: Invalid access handle.

VERBOSE_MASK: LOG_MEM (0x00000008)

DESCRIPTION: The driver had an invalid access handle assigned by the system.

SEVERITY LEVEL: Error

MESSAGE: Invalid access handle.

ACTION: If the problem occurs frequently, report these errors to Emulex technical support.

MSG_ID: 0331 ERROR: Invalid DMA handle.

VERBOSE_MASK: LOG_MEM (0x00000008)

DESCRIPTION: The driver had an invalid dma handle assigned by the system.

SEVERITY LEVEL: Error

MESSAGE: Invalid DMA handle.

ACTION: If the problem occurs frequently, report these errors to Emulex technical support.

Service Level Interface (SLI) Events

MSG_ID: 0400 DEBUG: Vital Product Data.

VERBOSE_MASK: LOG_SLI (0x00000010)

DESCRIPTION: This message provides vendor specific information about the adapter.

SEVERITY LEVEL: Debug

MESSAGE: Vital Product Data.

ACTION: No action needed.

MSG_ID: 0410 DEBUG: Link atten.

VERBOSE_MASK: LOG_SLI (0x00000010)

DESCRIPTION: The adapter has triggered a link attention interrupt.

SEVERITY LEVEL: Debug

MESSAGE: Link atten.

ACTION: No action needed.

MSG_ID: 0411 DEBUG: State change.

VERBOSE_MASK: LOG_SLI (0x00000010)

DESCRIPTION: The adapter has changed state.

SEVERITY LEVEL: Debug

MESSAGE: State change.

ACTION: No action needed.

MSG_ID: 0412 DEBUG: Link Up atten.

VERBOSE_MASK: LOG_SLI (0x00000010)

DESCRIPTION: The adapter has triggered a link up attention interrupt.

SEVERITY LEVEL: Debug

MESSAGE: Link Up atten.

ACTION: No action needed.

MSG_ID: 0413 DEBUG: Link Down atten.

VERBOSE_MASK: LOG_SLI (0x00000010)

DESCRIPTION: The adapter has triggered a link down attention interrupt.

SEVERITY LEVEL: Debug
MESSAGE: Link Down atten.
ACTION: No action needed.

MSG_ID: 0420 ERROR: Adapter hardware error.

VERBOSE_MASK: LOG_SLI (0x00000010)
DESCRIPTION: An interrupt has occurred and the status register indicates a nonrecoverable hardware error.
SEVERITY LEVEL: Error
MESSAGE: Adapter hardware error.
ACTION: This error usually indicates a hardware problem with the adapter. Try running adapter diagnostics. If problems persist, report these errors to Emulex technical support.

MSG_ID: 0421 NOTICE: Adapter temperature.

VERBOSE_MASK: LOG_SLI (0x00000010)
DESCRIPTION: The adapter has provided general information about the adapter's temperature.
SEVERITY LEVEL: Notice
MESSAGE: Adapter temperature.
ACTION: No action needed.

MSG_ID: 0422 WARNING: Adapter temperature.

VERBOSE_MASK: LOG_SLI (0x00000010)
DESCRIPTION: The adapter's temperature is too hot.
SEVERITY LEVEL: Warning
MESSAGE: Adapter temperature.
ACTION: Check hardware ventilation. Reduce adapter usage. Shut down the host system.

MSG_ID: 0423 NOTICE: Adapter notice.

VERBOSE_MASK: LOG_SLI (0x00000010)
DESCRIPTION: The adapter has provided general information about the adapter's condition.
SEVERITY LEVEL: Notice
MESSAGE: Adapter notice.
ACTION: No action needed.

MSG_ID: 0424 WARNING: Adapter warning.

VERBOSE_MASK: LOG_SLI (0x00000010)
DESCRIPTION: An interrupt has occurred indicating a recoverable adapter error.
SEVERITY LEVEL: Warning
MESSAGE: Adapter warning.
ACTION: This error usually indicates a hardware or firmware problem with the adapter. Check and/or update firmware levels. Report these errors to Emulex technical support.

MSG_ID: 0425 ERROR: Adapter error.

VERBOSE_MASK: LOG_SLI (0x00000010)
DESCRIPTION: A recoverable adapter error has occurred.
SEVERITY LEVEL: Error
MESSAGE: Adapter error.
ACTION: This error usually indicates a hardware or firmware problem with the adapter. Check and/or update firmware levels. Report these errors to Emulex technical support.

MSG_ID: 0426 NOTICE: Adapter Async Status.

VERBOSE_MASK: LOG_SLI (0x00000010)
DESCRIPTION: The adapter has provided general information about the adapter's async status.
SEVERITY LEVEL: Notice
MESSAGE: Adapter Async Status.
ACTION: No action needed.

MSG_ID: 0430 DEBUG: Ring event.

VERBOSE_MASK: LOG_SLI (0x00000010)
DESCRIPTION: An SLI ring event has occurred.
SEVERITY LEVEL: Debug
MESSAGE: Ring event.
ACTION: No action needed.

MSG_ID: 0431 DEBUG: Ring error.

VERBOSE_MASK: LOG_SLI (0x00000010)
DESCRIPTION: An SLI ring error is being reported by the adapter.
SEVERITY LEVEL: Debug
MESSAGE: Ring error.

ACTION: No action needed.

MSG_ID: 0432 DEBUG: Ring reset.

VERBOSE_MASK: LOG_SLI (0x00000010)
DESCRIPTION: An SLI ring is being reset.
SEVERITY LEVEL: Debug
MESSAGE: Ring reset.
ACTION: No action needed.

MSG_ID: 0440 DEBUG: Adapter msg.

VERBOSE_MASK: LOG_SLI (0x00000010)
DESCRIPTION: A message was sent to the driver from the adapter.
SEVERITY LEVEL: Debug
MESSAGE: Adapter msg.
ACTION: No action needed.

MSG_ID: 0450 ERROR: IOCB invalid.

VERBOSE_MASK: LOG_SLI (0x00000010)
DESCRIPTION: An IOCB was received from the adapter with an illegal value. This error may indicate a driver or firmware problem.
SEVERITY LEVEL: Error
MESSAGE: IOCB invalid.
ACTION: No action needed. If problems persist, report these errors to Emulex technical support.

MSG_ID: 0451 DEBUG: IOCB queue full.

VERBOSE_MASK: LOG_SLI (0x00000010)
DESCRIPTION: The IOCB queue is full. This occurs during normal operation.
SEVERITY LEVEL: Debug
MESSAGE: IOCB queue full.
ACTION: No action needed.

MSG_ID: 0452 DEBUG: IOCB event.

VERBOSE_MASK: LOG_SLI (0x00000010)
DESCRIPTION: An IOCB local error event is being reported by the adapter.
SEVERITY LEVEL: Debug

MESSAGE: IOCB event.

ACTION: No action needed.

MSG_ID: 0453 DEBUG: IOCB stale.

VERBOSE_MASK: LOG_SLI (0x00000010)

DESCRIPTION: An IOCB completed after its associated packet completed.

SEVERITY LEVEL: Debug

MESSAGE: IOCB stale.

ACTION: No action needed.

MSG_ID: 0460 DEBUG: SLI detail.

VERBOSE_MASK: LOG_SLI_DETAIL (0x80000000)

DESCRIPTION: This message provides detailed information about an SLI event.

SEVERITY LEVEL: Debug

MESSAGE: SLI detail.

ACTION: No action needed.

MSG_ID: 0461 ERROR: SLI ERROR.

VERBOSE_MASK: LOG_SLI (0x00000010)

DESCRIPTION: This message provides error information about an SLI event.

SEVERITY LEVEL: Error

MESSAGE: SLI ERROR.

ACTION: No action needed.

MSG_ID: 0421 DEBUG: SLI DEBUG.

VERBOSE_MASK: LOG_SLI (0x00000010)

DESCRIPTION: This message provides debug information about an SLI event.

SEVERITY LEVEL: Debug

MESSAGE: SLI DEBUG

ACTION: No action needed.

Mailbox Events

MSG_ID: 0500 DEBUG: Mailbox event.

VERBOSE_MASK: LOG_MBOX (0x00000020)

DESCRIPTION: A mailbox event has occurred.

SEVERITY LEVEL: Debug

MESSAGE: Mailbox event.

ACTION: No action needed.

MSG_ID: 0501 DEBUG: Mailbox detail.

VERBOSE_MASK: LOG_MBOX_DETAIL (0x40000000)

DESCRIPTION: This message provides detailed information about a mailbox event.

SEVERITY LEVEL: Debug

MESSAGE: Mailbox detail.

ACTION: No action needed.

MSG_ID: 0510 DEBUG: Stray mailbox interrupt.

VERBOSE_MASK: LOG_MBOX (0x00000020)

DESCRIPTION: A mailbox command completion interrupt was received and the mailbox is not valid. This error may indicate a driver or firmware problem.

SEVERITY LEVEL: Debug

MESSAGE: Stray mailbox interrupt.

ACTION: No action needed. If problems persist, report these errors to Emulex technical support.

MSG_ID: 0520 DEBUG: Mailbox error.

VERBOSE_MASK: LOG_MBOX (0x00000020)

DESCRIPTION: An unsupported or illegal mailbox command was completed. This error may indicate a driver or firmware problem.

SEVERITY LEVEL: Debug

MESSAGE: Mailbox error.

ACTION: No action needed. If problems persist, report these errors to Emulex technical support.

MSG_ID: 0530 ERROR: Mailbox timeout.

VERBOSE_MASK: LOG_MBOX (0x00000020)

DESCRIPTION: The firmware did not response a mailbox command. This error may indicate a hardware or firmware problem.

SEVERITY LEVEL: Error

MESSAGE: Mailbox timeout.

ACTION: No action needed. If problems persist, report these errors to Emulex technical support.

Node Events

MSG_ID: 0600 DEBUG: Node create.

VERBOSE_MASK: LOG_NODE (0x00000040)

DESCRIPTION: A node has been created for a remote device.

SEVERITY LEVEL: Debug

MESSAGE: Node create.

ACTION: No action needed.

MSG_ID: 0601 DEBUG: Node opened.

VERBOSE_MASK: LOG_NODE_DETAIL (0x02000000)

DESCRIPTION: A node has been opened for I/O transport.

SEVERITY LEVEL: Debug

MESSAGE: Node opened.

ACTION: No action needed.

MSG_ID: 0602 NOTICE: Node create failed.

VERBOSE_MASK: LOG_NODE (0x00000040)

DESCRIPTION: A node create request for a remote device has failed.

SEVERITY LEVEL: Notice

MESSAGE: Node create failed.

ACTION: No action needed.

MSG_ID: 0603 DEBUG: Node updated.

VERBOSE_MASK: LOG_NODE (0x00000040)

DESCRIPTION: A node has been updated for a remote device.

SEVERITY LEVEL: Debug

MESSAGE: Node updated.

ACTION: No action needed.

MSG_ID: 0610 DEBUG: Node destroy.

VERBOSE_MASK: LOG_NODE (0x00000040)

DESCRIPTION: A node has been destroyed for a remote device.

SEVERITY LEVEL: Debug

MESSAGE: Node destroy.

ACTION: No action needed.

MSG_ID: 0611 DEBUG: Node closed.

VERBOSE_MASK: LOG_NODE_DETAIL (0x02000000)

DESCRIPTION: A node has been temporarily closed for I/O transport.

SEVERITY LEVEL: Debug

MESSAGE: Node closed.

ACTION: No action needed.

MSG_ID: 0612 NOTICE: Node missing.

VERBOSE_MASK: LOG_NODE (0x00000040)

DESCRIPTION: An FCP2 device node has been found missing.

SEVERITY LEVEL: Notice

MESSAGE: Node missing.

ACTION: No action needed.

MSG_ID: 0620 DEBUG: Node not found.

VERBOSE_MASK: LOG_NODE (0x00000040)

DESCRIPTION: There was an attempt to send an I/O packet to an unknown device node. The driver maintains a node table entry for every device it needs to communicate with on the FC network.

SEVERITY LEVEL: Debug

MESSAGE: Node not found.

ACTION: No action needed. If problems persist, report these errors to Emulex technical support.

MSG_ID: 0621 DEBUG: Node timeout.

VERBOSE_MASK: LOG_NODE (0x00000040)

DESCRIPTION: The node timer expired. This means the node is ready to be opened or it has been offline too long and needs to be flushed.

SEVERITY LEVEL: Debug

MESSAGE: Node timeout.

ACTION: No action needed.

Link Events

MSG_ID: 0700 DEBUG: Link event.

VERBOSE_MASK: LOG_SLI (0x00000010) or LOG_LINK (0x00000080)

DESCRIPTION: A link event has occurred.

SEVERITY LEVEL: Debug

MESSAGE: Link event.

ACTION: No action needed.

MSG_ID: 0710 NOTICE: Link down.

VERBOSE_MASK: LOG_LINK (0x00000080)

DESCRIPTION: The FC link is down to the adapter.

SEVERITY LEVEL: Notice

MESSAGE: Link down.

ACTION: Check your network connections. If problems persist, report these errors to your system administrator.

MSG_ID: 0720 NOTICE: Link up.

VERBOSE_MASK: LOG_LINK (0x00000080)

DESCRIPTION: The FC link is up.

SEVERITY LEVEL: Notice

MESSAGE: Link up.

ACTION: No action needed.

MSG_ID: 0721 NOTICE: NPIV Link up.

VERBOSE_MASK: LOG_LINK (0x00000080)

DESCRIPTION: The FC link is up for all virtual ports.

SEVERITY LEVEL: Notice

MESSAGE: NPIV Link up.

ACTION: No action needed.

MSG_ID: 0730 NOTICE: Link reset.

VERBOSE_MASK: LOG_LINK (0x00000080) or LOG_SFS (0x00002000)

DESCRIPTION: An issue has forced the FC link to be reset.

SEVERITY LEVEL: Notice

MESSAGE: Link reset.

ACTION: No action needed.

MSG_ID: 0731 ERROR: Link reset failed.

VERBOSE_MASK: LOG_LINK (0x00000080) or LOG_SFS (0x00002000)

DESCRIPTION: An attempt to reset the FC link has failed.

```
SEVERITY LEVEL: Error
MESSAGE: Link reset failed.
ACTION: No action needed. If problems persist, report these errors to
Emulex technical support.
```

ELS Events

```
MSG_ID: 0800 DEBUG: ELS sent.
```

```
VERBOSE_MASK: LOG_ELS (0x000000100)
DESCRIPTION: An ELS command is being sent.
SEVERITY LEVEL: Debug
MESSAGE: ELS sent.
ACTION: No action needed.
```

```
MSG_ID: 0801 DEBUG: ELS comp.
```

```
VERBOSE_MASK: LOG_ELS (0x000000100)
DESCRIPTION: An ELS command completed normally.
SEVERITY LEVEL: Debug
MESSAGE: ELS comp.
ACTION: No action needed.
```

```
MSG_ID: 0810 ERROR: Stray ELS completion.
```

```
VERBOSE_MASK: LOG_ELS (0x000000100)
DESCRIPTION: The ELS command completion was received without issuing a
corresponding ELS command. This error may indicate a driver or firmware
problem.
SEVERITY LEVEL: Error
MESSAGE: Stray ELS completion.
ACTION: No action needed. If problems persist, report these errors to
Emulex technical support.
```

```
MSG_ID: 0811 DEBUG: Abnormal ELS completion.
```

```
VERBOSE_MASK: LOG_ELS (0x000000100)
DESCRIPTION: The ELS command completed with a status error in the IOCB.
The FC device on the network may not be responding or the FC device is
not an FCP target. The driver automatically retries this ELS command if
needed.
SEVERITY LEVEL: Debug
MESSAGE: Abnormal ELS completion.
```


ACTION: If the command is a PLOGI or PRLI and the destination PortID is not an FCP Target, no action is needed. Otherwise, check the physical connections to the FC network and check the state of the remote PortID.

MSG_ID: 0820 DEBUG: ELS rcvd.

VERBOSE_MASK: LOG_ELS (0x00000100)

DESCRIPTION: An unsolicited ELS command was received.

SEVERITY LEVEL: Debug

MESSAGE: ELS rcvd.

ACTION: No action needed.

MSG_ID: 0821 DEBUG: Unsolicited ELS dropped.

VERBOSE_MASK: LOG_ELS (0x00000100)

DESCRIPTION: An unsolicited ELS command was received and then dropped.

SEVERITY LEVEL: Debug

MESSAGE: Unsolicited ELS dropped.

ACTION: No action needed.

MSG_ID: 0822 DEBUG: ELS reply.

VERBOSE_MASK: LOG_ELS (0x00000100)

DESCRIPTION: A reply is being sent for an unsolicited ELS command.

SEVERITY LEVEL: Debug

MESSAGE: ELS reply.

ACTION: No action needed.

MSG_ID: 0830 ERROR: Invalid ELS command found.

VERBOSE_MASK: LOG_ELS (0x00000100)

DESCRIPTION: The ELS command was found with an invalid command code.

SEVERITY LEVEL: Error

MESSAGE: Invalid ELS command found.

ACTION: No action needed. If problems persist, report these errors to Emulex technical support.

General I/O Packet Events

MSG_ID: 0900 NOTICE: Packet abort.

VERBOSE_MASK: LOG_PKT (0x00000200)

DESCRIPTION: An I/O packet is being aborted.

SEVERITY LEVEL: Notice
MESSAGE: Packet abort.
ACTION: No action needed.

MSG_ID: 0901 WARNING: Packet abort failed.

VERBOSE_MASK: LOG_PKT (0x00000200)
DESCRIPTION: An attempt to abort an I/O packet has failed.
SEVERITY LEVEL: Warning
MESSAGE: Packet abort failed.
ACTION: No action needed. If problems persist, report these errors to
Emulex technical support.

MSG_ID: 0910 DEBUG: Packet timeout.

VERBOSE_MASK: LOG_PKT (0x00000200)
DESCRIPTION: An I/O packet has timed out and is being aborted.
SEVERITY LEVEL: Debug
MESSAGE: Packet timeout.
ACTION: No action needed.

MSG_ID: 0911 DEBUG: CHANNEL watchdog.

VERBOSE_MASK: LOG_PKT (0x00000200)
DESCRIPTION: I/O(s) are getting stale waiting on a I/O channel transmit
queue.
SEVERITY LEVEL: Debug
MESSAGE: CHANNEL watchdog.
ACTION: No action needed.

MSG_ID: 0912 DEBUG: TXQ watchdog.

VERBOSE_MASK: LOG_PKT (0x00000200)
DESCRIPTION: An I/O was found missing from the transmit queue.
SEVERITY LEVEL: Debug
MESSAGE: TXQ watchdog.
ACTION: No action needed.

MSG_ID: 0920 DEBUG: Packet flush.

VERBOSE_MASK: LOG_PKT (0x00000200)
DESCRIPTION: An I/O packet is being flushed.

SEVERITY LEVEL: Debug
MESSAGE: Packet flush.
ACTION: No action needed.

MSG_ID: 0921 DEBUG: Packet flushed.

VERBOSE_MASK: LOG_PKT (0x00000200)
DESCRIPTION: An I/O packet has been flushed.
SEVERITY LEVEL: Debug
MESSAGE: Packet flushed.
ACTION: No action needed.

MSG_ID: 0922 NOTICE: Packet flush timeout.

VERBOSE_MASK: LOG_PKT (0x00000200)
DESCRIPTION: An I/O packet flush request has timed out with some I/O packets's still not completed. The driver attempts to recover by itself.
SEVERITY LEVEL: Notice
MESSAGE: Packet flush timeout.
ACTION: No action needed. If problems persist, report these errors to Emulex technical support.

MSG_ID: 0930 NOTICE: Packet transport failed.

VERBOSE_MASK: LOG_PKT (0x00000200)
DESCRIPTION: An attempt to send an I/O packet failed. The I/O packet is retried by the upper layer.
SEVERITY LEVEL: Notice
MESSAGE: Packet transport failed.
ACTION: No action needed.

MSG_ID: 0931 ERROR: Packet transport error.

VERBOSE_MASK: LOG_PKT (0x00000200)
DESCRIPTION: An error occurred while attempting to send an I/O packet. The I/O packet is likely to be failed back to the user application.
SEVERITY LEVEL: Error
MESSAGE: Packet transport error.
ACTION: No action needed. If problems persist, report these errors to Emulex technical support.

MSG_ID: 0932 DEBUG: Packet transport.

VERBOSE_MASK: LOG_PKT (0x00000200)
DESCRIPTION: This message provides additional information about a packet being sent.
SEVERITY LEVEL: Debug
MESSAGE: Packet transport.
ACTION: No action needed.

MSG_ID: 0940 DEBUG: Packet completion error.

VERBOSE_MASK: LOG_PKT (0x00000200)
DESCRIPTION: An I/O packet was completed with an error status. This can occur during normal operation.
SEVERITY LEVEL: Debug
MESSAGE: Packet completion error.
ACTION: No action needed. If problems persist, report these errors to Emulex technical support.

FCP Traffic Events

MSG_ID: 1000 DEBUG: Stray FCP completion.

VERBOSE_MASK: LOG_FCP (0x00000400)
DESCRIPTION: An FCP command completion was received without issuing a corresponding FCP Command. This error may indicate a driver or firmware problem.
SEVERITY LEVEL: Debug
MESSAGE: Stray FCP completion.
ACTION: No action needed. If problems persist, report these errors to Emulex technical support.

MSG_ID: 1001 DEBUG: FCP completion error.

VERBOSE_MASK: LOG_FCP (0x00000400)
DESCRIPTION: An FCP command completed with an error status. These errors can occur during normal operation.
SEVERITY LEVEL: Debug
MESSAGE: FCP completion error.
ACTION: No action needed.

FCT Traffic Events

MSG_ID: 1100 DEBUG: FCT detail.

VERBOSE_MASK: LOG_FCT_DETAIL (0x00800000)

DESCRIPTION: This message provides detailed information about the driver's FCT interface.

SEVERITY LEVEL: Debug

MESSAGE: FCT detail.

ACTION: No action needed.

MSG_ID: 1110 DEBUG: FCT debug.

VERBOSE_MASK: LOG_FCT (0x00000800)

DESCRIPTION: This message provides general information about the driver's FCT interface.

SEVERITY LEVEL: Debug

MESSAGE: FCT debug.

ACTION: No action needed.

MSG_ID: 1120 DEBUG: FCT error.

VERBOSE_MASK: LOG_FCT (0x00000800)

DESCRIPTION: A general error has occurred in the driver's FCT interface.

SEVERITY LEVEL: Debug

MESSAGE: FCT error.

ACTION: No action needed. If problems persist, report these errors to Emulex technical support.

MSG_ID: 1130 DEBUG: FCT API.

VERBOSE_MASK:

DESCRIPTION: This message provides an API trace with the driver's FCT interface.

SEVERITY LEVEL: Debug

MESSAGE: FCT API.

ACTION: No action needed.

IP Traffic Events

MSG_ID: 1200 DEBUG: IP detail.

VERBOSE_MASK: LOG_IP_DETAIL (0x08000000)

DESCRIPTION: This message provides detailed information about the driver's IP interface.

SEVERITY LEVEL: Debug

MESSAGE: IP detail.

ACTION: No action needed.

MSG_ID: 1210 ERROR: Stray IP completion.

VERBOSE_MASK: LOG_IP (0x00001000)

DESCRIPTION: An IP sequence completion was received without issuing a corresponding IP sequence. This error may indicate a driver or firmware problem.

SEVERITY LEVEL: Error

MESSAGE: Stray IP completion.

ACTION: No action needed. If problems persist, report these errors to Emulex technical support.

MSG_ID: 1211 DEBUG: Abnormal IP completion.

VERBOSE_MASK: LOG_IP (0x00001000)

DESCRIPTION: An IP sequence completed with a status error in the IOCB. The FC device on the network may not be responding.

SEVERITY LEVEL: Debug

MESSAGE: Abnormal IP completion.

ACTION: No action needed. If problems persist, report these errors to your system administrator.

MSG_ID: 1220 DEBUG: Unsolicited IP dropped.

VERBOSE_MASK: LOG_IP (0x00001000)

DESCRIPTION: An unsolicited IP sequence was received, but was dropped for some reason.

SEVERITY LEVEL: Debug

MESSAGE: Unsolicited IP dropped.

ACTION: No action needed.

MSG_ID: 1221 DEBUG: IP recvd.

VERBOSE_MASK: LOG_IP (0x00001000)

DESCRIPTION: An unsolicited IP sequence was received.

SEVERITY LEVEL: Debug

MESSAGE: IP recvd.

ACTION: No action needed.

MSG_ID: 1230 ERROR: Invalid IP sequence found.

VERBOSE_MASK: LOG_IP (0x00001000)

DESCRIPTION: An IP sequence was found with an invalid code.

SEVERITY LEVEL: Error

MESSAGE: Invalid IP sequence found.

ACTION: No action needed. If problems persist, report these errors to Emulex technical support.

Solaris SFS Events

MSG_ID: 1300 DEBUG: SFS.

VERBOSE_MASK: LOG_SFS (0x00002000)

DESCRIPTION: This message provides general information about the driver's SFS interface.

SEVERITY LEVEL: Debug

MESSAGE: SFS.

ACTION: No action needed.

MSG_ID: 1301 DEBUG: SFS detail.

VERBOSE_MASK: LOG_SFS_DETAIL (0x20000000)

DESCRIPTION: This message provides detailed information about the driver's SFS interface.

SEVERITY LEVEL: Debug

MESSAGE: SFS detail.

ACTION: No action needed.

MSG_ID: 1310 WARNING: Diagnostic error.

VERBOSE_MASK: LOG_SFS (0x00002000)

DESCRIPTION: A diagnostic request did not complete because of some issue.

SEVERITY LEVEL: Warning

MESSAGE: Diagnostic error.

ACTION: No action needed. If problems persist, report these errors to Emulex technical support.

MSG_ID: 1311 DEBUG: ECHO diagnostic completed.

VERBOSE_MASK: LOG_SFS (0x00002000)

DESCRIPTION: An ECHO diagnostic has completed.

SEVERITY LEVEL: Debug

MESSAGE: ECHO diagnostic completed.

ACTION: No action needed.

MSG_ID: 1312 WARNING: ECHO diagnostic failed.

VERBOSE_MASK: LOG_SFS (0x00002000)
DESCRIPTION: An ECHO diagnostic has failed to return a positive result.
This may indicate a connectivity problem with your FC network.
SEVERITY LEVEL: Warning
MESSAGE: ECHO diagnostic failed.
ACTION: Check your network connections. If problems persist, report
these errors to your system administrator.

MSG_ID: 1313 DEBUG: BIU diagnostic completed.

VERBOSE_MASK: LOG_SFS (0x00002000)
DESCRIPTION: A BIU diagnostic has completed.
SEVERITY LEVEL: Debug
MESSAGE: BIU diagnostic completed.
ACTION: No action needed.

MSG_ID: 1314 ERROR: BIU diagnostic failed.

VERBOSE_MASK: LOG_SFS (0x00002000)
DESCRIPTION: A BIU diagnostic has failed to return a positive result.
This is usually caused by an adapter hardware problem.
SEVERITY LEVEL: Error
MESSAGE: BIU diagnostic failed.
ACTION: Contact Emulex technical support.

MSG_ID: 1315 DEBUG: POST diagnostic completed.

VERBOSE_MASK: LOG_SFS (0x00002000)
DESCRIPTION: A POST diagnostic has completed.
SEVERITY LEVEL: Debug
MESSAGE: POST diagnostic completed.
ACTION: No action needed.

MSG_ID: 1316 ERROR: POST diagnostic failed.

VERBOSE_MASK: LOG_SFS (0x00002000)
DESCRIPTION: A POST diagnostic has failed to return a positive result.
This is usually caused by an adapter hardware problem.
SEVERITY LEVEL: Error
MESSAGE: POST diagnostic failed.
ACTION: Contact Emulex technical support.

IOCTL Events

MSG_ID: 1400 DEBUG: IOCTL.

VERBOSE_MASK: LOG_IOCTL (0x00004000)

DESCRIPTION: This message provides general information about the driver's IOCTL interface.

SEVERITY LEVEL: Debug

MESSAGE: IOCTL.

ACTION: No action needed.

MSG_ID: 1401 DEBUG: IOCTL detail.

VERBOSE_MASK: LOG_IOCTL_DETAIL (0x04000000)

DESCRIPTION: This message provides detailed information about the driver's IOCTL interface.

SEVERITY LEVEL: Debug

MESSAGE: IOCTL detail.

ACTION: No action needed.

MSG_ID: 1410 DEBUG: DFC

VERBOSE_MASK: LOG_IOCTL (0x00004000)

DESCRIPTION: This message provides general information about the driver's DFC interface.

SEVERITY LEVEL: Debug

MESSAGE: DFC.

ACTION: No action needed.

MSG_ID: 1411 DEBUG: DFC detail.

VERBOSE_MASK: LOG_IOCTL_DETAIL (0x04000000)

DESCRIPTION: This message provides detailed information about the driver's DFC interface.

SEVERITY LEVEL: Debug

MESSAGE: DFC detail.

ACTION: No action needed.

MSG_ID: 1420 DEBUG: DFC Error.

VERBOSE_MASK: LOG_IOCTL (0x00004000)

DESCRIPTION: An error was found while processing a DFC request.

SEVERITY LEVEL: Debug

MESSAGE: DFC error.
ACTION: No action needed.

Firmware Download Events

MSG_ID: 1500 DEBUG: Firmware image.

VERBOSE_MASK: LOG_FIRMWARE (0x00008000)
DESCRIPTION: This message provides general information about the
firmware image.
SEVERITY LEVEL: Debug
MESSAGE: Firmware image.
ACTION: No action needed.

MSG_ID: 1501 DEBUG: Firmware detail.

VERBOSE_MASK: LOG_FIRMWARE_DETAIL (0x10000000)
DESCRIPTION: This message provides detailed information about the
firmware image.
SEVERITY LEVEL: Debug
MESSAGE: Firmware detail.
ACTION: No action needed.

MSG_ID: 1502 NOTICE: Firmware Library

VERBOSE_MASK: LOG_DRIVER (0x00000002)
DESCRIPTION: This message shows the versions of firmware contained in
the driver's library.
SEVERITY LEVEL: Notice
MESSAGE: Firmware library.
ACTION: No action needed.

MSG_ID: 1510 ERROR: Bad firmware image.

VERBOSE_MASK: LOG_FIRMWARE (0x00008000)
DESCRIPTION: A bad firmware image was provided to the download
function.
SEVERITY LEVEL: Error
MESSAGE: Bad firmware image.
ACTION: Obtain the proper image file. If problems persist, report these
errors to Emulex technical support.

MSG_ID: 1511 ERROR: Firmware image not compatible.

VERBOSE_MASK: LOG_FIRMWARE (0x00008000)
DESCRIPTION: The firmware image provided was not compatible with the existing hardware.
SEVERITY LEVEL: Error
MESSAGE: Firmware image not compatible.
ACTION: Obtain the proper image file. If problems persist, report these errors to Emulex technical support.

MSG_ID: 1520 NOTICE: Firmware download.

VERBOSE_MASK: LOG_FIRMWARE (0x00008000)
DESCRIPTION: An attempt to download a firmware image has occurred.
SEVERITY LEVEL: Notice
MESSAGE: Firmware download.
ACTION: No action needed.

MSG_ID: 1521 NOTICE: Firmware download complete.

VERBOSE_MASK: LOG_FIRMWARE (0x00008000)
DESCRIPTION: An attempt to download a firmware image was successful.
SEVERITY LEVEL: Notice
MESSAGE: Firmware download complete.
ACTION: No action needed.

MSG_ID: 1522 ERROR: Firmware download failed.

VERBOSE_MASK: LOG_FIRMWARE (0x00008000)
DESCRIPTION: An attempt to download a firmware image failed.
SEVERITY LEVEL: Error
MESSAGE: Firmware download failed.
ACTION: Check your hardware configuration. If problems persist, report these errors to Emulex technical support.

MSG_ID: 1523 WARNING: Firmware updated.

VERBOSE_MASK: LOG_FIRMWARE (0x00008000)
DESCRIPTION: New firmware has been updated on the adapter.
SEVERITY LEVEL: Warning
MESSAGE: Firmware updated.
ACTION: A reboot or adapter power cycle is required to activate the new firmware.

MSG_ID: 1530 DEBUG: Firmware dump.

VERBOSE_MASK: LOG_FIRMWARE (0x00008000)
DESCRIPTION: A firmware core dump has occurred.
SEVERITY LEVEL: Debug
MESSAGE: Firmware dump.
ACTION: Check your hardware configuration. If problems persist, report these errors to Emulex technical support.

MSG_ID: 1540 WARNING: Firmware update required.

VERBOSE_MASK: LOG_FIRMWARE (0x00008000)
DESCRIPTION: A firmware update is required on the adapter.
SEVERITY LEVEL: Warning
MESSAGE: Firmware update required.
ACTION: To trigger an automatic firmware download, you must perform a manual adapter reset or link reset once the host environment is stable.

Caution: Do not power cycle or reboot the system during the download operation.

Common Transport Events

MSG_ID: 1600 DEBUG: CT sent.

VERBOSE_MASK: LOG_CT (0x00010000)
DESCRIPTION: A CT command is being sent.
SEVERITY LEVEL: Debug
MESSAGE: CT sent.
ACTION: No action needed.

MSG_ID: 1601 DEBUG: CT comp.

VERBOSE_MASK: LOG_CT (0x00010000)
DESCRIPTION: A CT command completed normally.
SEVERITY LEVEL: Debug
MESSAGE: CT comp.
ACTION: No action needed.

MSG_ID: 1610 ERROR: Stray CT completion.

VERBOSE_MASK: LOG_CT (0x00010000)
DESCRIPTION: A CT command completion was received without issuing a corresponding CT command. This error may indicate a driver or firmware problem.
SEVERITY LEVEL: Error

MESSAGE: Stray CT completion.

ACTION: No action needed. If problems persist, report these errors to Emulex technical support.

MSG_ID: 1611 DEBUG: Abnormal CT completion.

VERBOSE_MASK: LOG_CT (0x00010000)

DESCRIPTION: A CT command completed with a status error in the IOCB. The FC device on the network may not be responding. The driver automatically retries this CT command if needed.

SEVERITY LEVEL: Debug

MESSAGE: Abnormal CT completion.

ACTION: Check the physical connections to the FC network and the state of the remote PortID.

MSG_ID: 1620 DEBUG: CT rcvd.

VERBOSE_MASK: LOG_CT (0x00010000)

DESCRIPTION: An unsolicited CT command was received.

SEVERITY LEVEL: Debug

MESSAGE: CT rcvd.

ACTION: No action needed.

MSG_ID: 1621 DEBUG: Unsolicited CT dropped.

VERBOSE_MASK: LOG_CT (0x00010000)

DESCRIPTION: An unsolicited CT command was received and then dropped for some reason.

SEVERITY LEVEL: Debug

MESSAGE: Unsolicited CT dropped.

ACTION: No action needed.

MSG_ID: 1622 DEBUG: CT reply.

VERBOSE_MASK: LOG_CT (0x00010000)

DESCRIPTION: A reply is being sent for an unsolicited CT command.

SEVERITY LEVEL: Debug

MESSAGE: CT reply.

ACTION: No action needed.

MSG_ID: 1630 ERROR: Invalid CT command found.

VERBOSE_MASK: LOG_CT (0x00010000)

DESCRIPTION: A CT command was found with an invalid command code.
SEVERITY LEVEL: Error
MESSAGE: Invalid CT command found.
ACTION: No action needed. If problems persist, report these errors to Emulex technical support.

FCSP (Fibre Channel Security Protocol) Events

MSG_ID: 1700 DEBUG: FCSP

VERBOSE_MASK: LOG_FCSP (0x00020000)
DESCRIPTION: This message provides general information about the driver's FCSP interface.
SEVERITY LEVEL: Debug
MESSAGE: FCSP.
ACTION: No action needed.

MSG_ID: 1701 DEBUG: FCSP detail.

VERBOSE_MASK: LOG_FCSP_DETAIL (0x01000000)
DESCRIPTION: This message provides detailed information about the driver's FCSP interface.
SEVERITY LEVEL: Debug
MESSAGE: FCSP detail.
ACTION: No action needed.

MSG_ID: 1702 DEBUG: FCSP error.

VERBOSE_MASK: LOG_FCSP (0x00020000)
DESCRIPTION: An error was found while processing a DFC request.
SEVERITY LEVEL: Debug
MESSAGE: FCSP error.
ACTION: No action needed.

MSG_ID: 1705 DEBUG: FCSP state.

VERBOSE_MASK: LOG_FCSP (0x00020000)
DESCRIPTION: An authentication state is changing.
SEVERITY LEVEL: Debug
MESSAGE: FCSP state.
ACTION: No action needed.

MSG_ID: 1706 DEBUG: FCSP event

VERBOSE_MASK: LOG_FCSP (0x00020000)
DESCRIPTION: An authentication event has occurred.
SEVERITY LEVEL: Debug
MESSAGE: FCSP event.
ACTION: No action needed.

MSG_ID: 1707 DEBUG: FCSP status.

VERBOSE_MASK: LOG_FCSP (0x00020000)
DESCRIPTION: An authentication status is being updated.
SEVERITY LEVEL: Debug
MESSAGE: FCSP status.
ACTION: No action needed.

MSG_ID: 1710 DEBUG: FCSP start.

VERBOSE_MASK: LOG_FCSP (0x00020000)
DESCRIPTION: Authentication is being started to a specific node.
SEVERITY LEVEL: Debug
MESSAGE: FCSP start.
ACTION: No action needed.

MSG_ID: 1720 DEBUG: FCSP comp.

VERBOSE_MASK: LOG_FCSP (0x00020000)
DESCRIPTION: Authentication is being stopped or completed to a specific node.
SEVERITY LEVEL: Debug
MESSAGE: FCSP comp.
ACTION: No action needed.

FCF (Fibre Channel Fabric) Events

MSG_ID: 1800 DEBUG: FCF

VERBOSE_MASK:
DESCRIPTION: This message provides general information about the driver's FCF interface.
SEVERITY LEVEL: Debug
MESSAGE: FCF.
ACTION: No action needed.
MSG_ID: 1801 DEBUG: FCF detail.

VERBOSE_MASK:
DESCRIPTION: This message provides detailed information about the driver's FCF interface.
SEVERITY LEVEL: Debug
MESSAGE: FCF detail.
ACTION: No action needed.

MSG_ID: 1810 DEBUG: FCF error.

VERBOSE_MASK:
DESCRIPTION: An error was found while processing an FCF request.
SEVERITY LEVEL: Debug
MESSAGE: FCF error.
ACTION: No action needed.

MSG_ID: 1820 DEBUG: FCF state.

VERBOSE_MASK:
DESCRIPTION: An FCF object state is changing.
SEVERITY LEVEL: Debug
MESSAGE: FCF state.
ACTION: No action needed.

MSG_ID: 1820 DEBUG: FCF event.

VERBOSE_MASK:
DESCRIPTION: An FCF event has occurred.
SEVERITY LEVEL: Debug
MESSAGE: FCF event.
ACTION: No action needed.

9. oce Logs

The logs are generated based on the MOD_MASK and Severity listed in the following tables. See “Configuring the NIC Driver” on page 31 for information on setting log levels.

MOD_MASK:

MOD_CONFIG	0x0001	Messages in the device configuration path are logged.
MOD_TX	0x0002	Messages in the transmit data path are logged.
MOD_RX	0x0004	Messages in the receive data path are logged.
MOD_ISR	0x0008	Messages in the interrupt path are logged.

SEVERITY

CE_CONT	0	Continuation
CE_NOTE	1	Information
CE_WARN	2	Warning
CE_PANIC	3	Causes the OS to panic
CE_IGNORE	4	No action

Table 9-1 Log Messages for the NIC Driver

Module	Severity	Message	Recommended Action
MOD_CONFIG	Warning	Ring buffer allocation failed < code >	Configure the server with more memory
MOD_CONFIG	Warning	mcast ADD/DEL failed	Check for the faulty hardware using “fmadm faulty”. If the hardware is faulty, acquit the hardware using “fmadm acquit <dev_path>” and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit.
MOD_CONFIG	Warning	Could not retrieve num_bars	Reset the adapter.
MOD_CONFIG	Warning	Could not get size of bar	Reset the adapter.
MOD_CONFIG	Warning	Could not map bar	Reset the adapter.
MOD_CONFIG	Warning	soft_reset bit asserted[1]. Reset failed	Check for the faulty hardware using “fmadm faulty”. If the hardware is faulty, acquit the hardware using “fmadm acquit <dev_path>” and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit.

Table 9-1 Log Messages for the NIC Driver (Continued)

Module	Severity	Message	Recommended Action
MOD_CONFIG	Warning	POST ERROR	Check for the faulty hardware using “fmadm faulty”. If the hardware is faulty, acquit the hardware using “fmadm acquit <dev_path>” and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit.
MOD_CONFIG	Warning	HW POST1 FAILED	Check for the faulty hardware using “fmadm faulty”. If the hardware is faulty, acquit the hardware using “fmadm acquit <dev_path>” and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit.
MOD_CONFIG	Warning	Failed to allocate bmbx	Re-load the driver.
MOD_CONFIG	Warning	FUNCTION RESET FAILED	Check for the faulty hardware using “fmadm faulty”. If the hardware is faulty, acquit the hardware using “fmadm acquit <dev_path>” and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit.
MOD_CONFIG	Warning	Mailbox initialization failed with <ret code>	Check for the faulty hardware using “fmadm faulty”. If the hardware is faulty, acquit the hardware using “fmadm acquit <dev_path>” and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit.
MOD_CONFIG	Warning	Firmware version read failed with <ret code>	Check for the faulty hardware using “fmadm faulty”. If the hardware is faulty, acquit the hardware using “fmadm acquit <dev_path>” and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit.
MOD_CONFIG	Warning	Firmware configuration read failed with <ret code>	Check for the faulty hardware using “fmadm faulty”. If the hardware is faulty, acquit the hardware using “fmadm acquit <dev_path>” and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit.

Table 9-1 Log Messages for the NIC Driver (Continued)

Module	Severity	Message	Recommended Action
MOD_CONFIG	Warning	MAC address read failed with <ret code>	Check for the faulty hardware using “fmadm faulty”. If the hardware is faulty, acquit the hardware using “fmadm acquit <dev_path>” and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit.
MOD_CONFIG	Warning	Interface creation failed for group instance	Check for the faulty hardware using “fmadm faulty”. If the hardware is faulty, acquit the hardware using “fmadm acquit <dev_path>” and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit.
MOD_CONFIG	Warning	Config vlan failed	Check for the faulty hardware using “fmadm faulty”. If the hardware is faulty, acquit the hardware using “fmadm acquit <dev_path>” and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit.
MOD_CONFIG	Warning	Failed to Setup handlers	Re-load the driver.
MOD_CONFIG	Warning	Hardware UE Detected	Check for the faulty hardware using “fmadm faulty”. If the hardware is faulty, acquit the hardware using “fmadm acquit <dev_path>” and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit.
MOD_CONFIG	Warning	Failed to retrieve intr types	Unload and then re-load the driver.
MOD_CONFIG	Warning	MSIX not supported	The system continues to work with INTX.
MOD_CONFIG	Warning	Could not get supported intrs	Re-load the driver.
MOD_CONFIG	Warning	Alloc intr failed	Re-load the driver.
MOD_CONFIG	Warning	Unable to get intr priority	Re-load the driver.
MOD_CONFIG	Warning	Failed to add interrupt handler	Re-load the driver.
MOD_CONFIG	Warning	Interrupts block enable failed	Re-load the driver.

Table 9-1 Log Messages for the NIC Driver (Continued)

Module	Severity	Message	Recommended Action
MOD_CONFIG	Warning	Failed to enable, ret <ret code>, interrupt <int num> type <int type >, cnt <num_vectors>	Re-load the driver.
MOD_CONFIG	Warning	Interrupt block disable failed	Reset the adapter.
MOD_CONFIG	Warning	Failed to disable the interrupts	Reset the adapter.
MOD_CONFIG	Warning	mod_install failed rval	Reset the adapter.
MOD_CONFIG	Warning	Map PCI config failed with <ret_code>	Reset the adapter.
MOD_CONFIG	Warning	Device Unknown	The device is not supported by the driver.
MOD_CONFIG	Warning	PCI initialization failed	Reset the adapter.
MOD_CONFIG	Warning	HW initialization failed with ret_code	Check for the faulty hardware using “fmadm faulty”. If the hardware is faulty, acquit the hardware using “fmadm acquit <dev_path>” and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit.
MOD_CONFIG	Warning	Interrupt setup failed with <ret_code>	Re-load the driver.
MOD_CONFIG	Warning	Failed to init rings	Low system resources. Reboot the system to see if the problem resolves itself. If possible add more memory.
MOD_CONFIG	Warning	Failed to setup adapter	Check for the faulty hardware using “fmadm faulty”. If the hardware is faulty, acquit the hardware using “fmadm acquit <dev_path>” and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit.
MOD_CONFIG	Warning	kstat setup Failed with <ret_code>	Re-load the driver.
MOD_CONFIG	Warning	MAC allocation Failed	Unload and then re-load the driver.
MOD_CONFIG	Warning	MAC registration failed	Unload and then re-load the driver.

Table 9-1 Log Messages for the NIC Driver (Continued)

Module	Severity	Message	Recommended Action
MOD_CONFIG	Warning	Detach failed: <num_buffers> pending buffers in rq=<rq_id>	Reset the adapter.
MOD_CONFIG	Warning	Failed to query fw config	Check for the faulty hardware using “fmadm faulty”. If the hardware is faulty, acquit the hardware using “fmadm acquit <dev_path>” and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit.
MOD_CONFIG	Warning	Failed to get stats	Check for the faulty hardware using “fmadm faulty”. If the hardware is faulty, acquit the hardware using “fmadm acquit <dev_path>” and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit.
MOD_CONFIG	Warning	EQ ring alloc failed	Low System resources. Repeat the operation that generated the log. If the error log is generated again, reboot the system.
MOD_CONFIG	Warning	EQ create failed	Check for the faulty hardware using “fmadm faulty”. If the hardware is faulty, acquit the hardware using “fmadm acquit <dev_path>” and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit.
MOD_CONFIG	Warning	CQ allocation failed	Low System resources. Repeat the operation that generated the log. If the error log is generated again, reboot the system.
MOD_CONFIG	Warning	CQ ring alloc failed	Low System resources. Repeat the operation that generated the log. If the error log is generated again, reboot the system.
MOD_CONFIG	Warning	CQ create failed	Check for the faulty hardware using “fmadm faulty”. If the hardware is faulty, acquit the hardware using “fmadm acquit <dev_path>” and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit.

Table 9-1 Log Messages for the NIC Driver (Continued)

Module	Severity	Message	Recommended Action
MOD_CONFIG	Warning	MQ ring alloc failed	Low System resources. Repeat the operation that generated the log. If the error log is generated again, reboot the system.
MOD_CONFIG	Warning	MQ create failed	Check for the faulty hardware using “fmadm faulty”. If the hardware is faulty, acquit the hardware using “fmadm acquit <dev_path>” and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit.
MOD_CONFIG	Warning	Invalid qlength. Must be [256, 2000]	Set correct queue length using dladm.
MOD_CONFIG	Warning	WQ allocation failed	Low System resources. Repeat the operation that generated the log. If the error log is generated again, reboot the system.
MOD_CONFIG	Warning	WQ Buffer Pool create failed	Low System resources. Repeat the operation that generated the log. If the error log is generated again, reboot the system.
MOD_CONFIG	Warning	WQ MAP Handles Pool create failed	Low System resources. Repeat the operation that generated the log. If the error log is generated again, reboot the system.
MOD_CONFIG	Warning	WQ Packet Desc Pool create failed	Low System resources. Repeat the operation that generated the log. If the error log is generated again, reboot the system.
MOD_CONFIG	Warning	Failed to create WQ ring	Low System resources. Repeat the operation that generated the log. If the error log is generated again, reboot the system.
MOD_CONFIG	Warning	WCCQ create failed	Check for the faulty hardware using “fmadm faulty”. If the hardware is faulty, acquit the hardware using “fmadm acquit <dev_path>” and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit.

Table 9-1 Log Messages for the NIC Driver (Continued)

Module	Severity	Message	Recommended Action
MOD_CONFIG	Warning	WQ create failed	Check for the faulty hardware using “fmadm faulty”. If the hardware is faulty, acquit the hardware using “fmadm acquit <dev_path>” and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit.
MOD_CONFIG	Warning	RQ allocation failed	Low System resources. Repeat the operation that generated the log. If the error log is generated again, reboot the system.
MOD_CONFIG	Warning	RQ bdesc alloc failed	Low System resources. Repeat the operation that generated the log. If the error log is generated again, reboot the system.
MOD_CONFIG	Warning	RQ shadow ring alloc failed	Low System resources. Repeat the operation that generated the log. If the error log is generated again, reboot the system.
MOD_CONFIG	Warning	RQ ring create failed	Low System resources. Repeat the operation that generated the log. If the error log is generated again, reboot the system.
MOD_CONFIG	Warning	RQ create failed	Check for the faulty hardware using “fmadm faulty”. If the hardware is faulty, acquit the hardware using “fmadm acquit <dev_path>” and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit.
MOD_CONFIG	Warning	Failed to del q	Check for the faulty hardware using “fmadm faulty”. If the hardware is faulty, acquit the hardware using “fmadm acquit <dev_path>” and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit.
MOD_CONFIG	Warning	Failed to set EQ delay	Check for the faulty hardware using “fmadm faulty”. If the hardware is faulty, acquit the hardware using “fmadm acquit <dev_path>” and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit.

Table 9-1 Log Messages for the NIC Driver (Continued)

Module	Severity	Message	Recommended Action
MOD_CONFIG	Warning	Failed to Configure RSS	Check for the faulty hardware using “fmadm faulty”. If the hardware is faulty, acquit the hardware using “fmadm acquit <dev_path>” and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit.
MOD_CONFIG	Warning	MAC addition failed	Re-load the driver.
MOD_CONFIG	Warning	Could not find the MAC <mac_addr>	Provide the correct MAC address.
MOD_CONFIG	Warning	Failed to delete MAC <mac_addr>	Check for the faulty hardware using “fmadm faulty”. If the hardware is faulty, acquit the hardware using “fmadm acquit <dev_path>” and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit.
MOD_CONFIG	Warning	oce_instance_setup: max adapters exceeded	The driver supports a maximum of 16 adapters.
MOD_CONFIG	Warning	oce_instance_clear: illegal adapter/dev<Bus:Device:Function>	The driver continues to work. No action is necessary.
MOD_RX	Warning	oce_rx:no frags?	The system cannot receive data because driver is low on resources. Reload the driver. If the same error recurs, reset the adapter.
MOD_CONFIG	Warning	kstat creation failed	Re-load the driver.
MOD_CONFIG	Warning	Could not allocate stats_dbuf	Low System resources. Repeat the operation that generated the log. If the error log is generated again, reboot the system.
MOD_TX	Warning	wqb pool empty	The system cannot transmit data because driver is low on resources. Check for a process generating heavy traffic.
MOD_TX	Warning	wqm pool empty	The system cannot transmit data because driver is low on resources. Check for a process generating heavy traffic.

Table 9-1 Log Messages for the NIC Driver (Continued)

Module	Severity	Message	Recommended Action
MOD_TX	Warning	MAP FAILED	Low System resources. Repeat the operation that generated the log. If the error log is generated again, reboot the system.