Emulex Drivers for Solaris

FC version 2.75h

User Manual

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Emulex Connects™
Servers, Storage and People

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Introduction

This document provides the information needed to use the Emulex® Fibre Channel (FC) out-of-box drivers for Solaris StorEdge SAN Foundation Software (SFS), which is part of the SFS (Leadville) stack. The module name for the out-of-box Emulex FC driver for Solaris SFS is ‘elxfc’.

You should be familiar with Solaris and have access to standard system information before installing or using this driver. For the FC driver, familiarity with Oracle Storage SFS and FC is essential.

Important Considerations

New in This Release

- Support for Solaris 11
- FC driver supports Solaris 11 NPIV virtual ports

Known Issues

See the product release notes for the latest information.

Driver Information (FC)

Prerequisites

One of the following operating systems must be installed:

- Solaris 10 SPARC
- Solaris 10 x64 and x86
- Solaris 11 SPARC
- Solaris 11 for x64

Compatibility

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

Installing the Drivers

Installing the Out-of-Box Drivers for Solaris 10 and 11

1. Login as root.
2. Download the platform-specific FC out-of-box driver from the Emulex website to a convenient directory. The file is a regular tar file.
3. Extract the installation image from the tar file.

   For example:

   ```
   cd <location of driver package>
   tar xvf elxfc_kit-2.66d-s10-sparc.tar.
   ```

4. Install the driver kit.

   For example:

   ```
   cd <location of driver package>
   pkgadd -d ./
   ```

5. Reboot the system.

Uninstalling the Drivers

To uninstall the out-of-box driver:

1. Login as root
2. Remove the out-of-box driver by typing:

   ```
   pkgrm <OOB_pkg_name>
   ```

   For example:

   ```
   pkgrm EMLXelxfc
   ```

3. Reboot the system.

Utilities

Emulex provides three utilities to facilitate configuring and using the Solaris drivers.

- The OneCommand™ Manager application
- The emlxadm utility (included in the FCA utility)
- The emlxdrv utility (included in the FCA utility)

Note: When you install the OneCommand Manager application, also install the Solaris FCA Utilities.

The OneCommand Manager Application

The OneCommand Manager application provides all the functions of emlxadm and a number of additional ones, allowing you to remotely manage multiple systems. It offers a choice of a graphical user interface and a scriptable command-line interface. It is a direct user interface to the FC input/output (FCIO) interface provided by the Oracle StorEdge SFS. The FCIO interface provides an Oracle common ioctl interface to the FC transport library (FCTL), which manages the FCA drivers for each FC adapter attached to the host system.

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. Refer to the *Solaris FCA Utilities User Manual* for more information.

The emlxdrv Utility

The emlxdrv utility associates the Emulex Solaris SFS out-of-box drivers and the Solaris LPFC driver to the various models of Emulex Fibre Channel adapters. The emlxdrv utility is used for binding (associating) the Emulex (Leadville Fibre Channel) out-of-box drivers and the Emulex LPFC (traditional non-Leadville Fibre Channel) driver to the various models of Emulex FC adapters. If the driver binding configuration is changed, the host system must usually be rebooted for the new configuration to take effect. Refer to the *Solaris FCA Utilities User Manual* for more information.

FC Configuration and Migration

Introduction

‘elxfc’ is the module name for the Emulex SFS FCA out-of-box driver. You can configure the Emulex SFS FCA driver properties by:

- Editing the configuration file (emlxs.conf or elxfc.conf) which is described in this section.
- Using the OneCommand Manager application. For an overview on the OneCommand Manager application, refer to page 2. For more information, refer to the *OneCommand Manager Application User Manual*.
- Using the Emulex FCA utilities (emlxadm utility and emlxdrv utility). For overviews on the emlxadm and emlxdrv utilities, refer to page 2. For more information, refer to the *Solaris FCA Utilities User Manual*.

If the Emulex LPFC driver for Solaris is already installed, you can migrate to the SFS FCA 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 Configuration File

The configuration file contains all the properties necessary to initialize the Emulex SFS FCA driver. The configurable driver properties are described in Table 1 on page 7. All adapter-specific properties have an elxfcX-prefix (where *X* is the driver instance number). For example, setting emfc0-link-speed=4 makes 4 the default link speed setting for the zero instance of the driver. Changes to the configuration file require you to unload and reload the driver.

To change driver properties:

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

Note: Refer to Table 1 on page 7 for activation requirements.

Enabling NPIV Support on Solaris 10

To enable N_Port ID Virtualization (NPIV) support in the driver:

1. Login as or su to ’root’.
2. Set enable-npiv to 1 in the configuration file.
3. The fp driver properties are updated when the EMLXemlxu is installed. Entries from 2 to 255 are added to the /kernel/drv/fp.conf file. For example:

```
name="fp" class="fibre-channel" port=0;
name="fp" class="fibre-channel" port=1;
name="fp" class="fibre-channel" port=2;
name="fp" class="fibre-channel" port=3;
name="fp" class="fibre-channel" port=4;
name="fp" class="fibre-channel" port=5;
```

```
name="fp" class="fibre-channel" port=6;
name="fp" class="fibre-channel" port=7;
name="fp" class="fibre-channel" port=8;
name="fp" class="fibre-channel" port=9;
```

The first two lines are by default. The above example adds ports 2 to 9 to support up to 10 virtual ports. The port number of each entry must be in order with no gaps in between.

4. Reboot the system.

To create, delete and list virtual ports after a system reboot, refer to the *OneCommand Manager Application User Manual*.

Enabling NPIV Support on Solaris 11

To enable NPIV support in the driver:

1. Login as or su to 'root'.
2. Set enable-npiv to 1 in the configuration 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 Express SAN Configuration and Multipathing Guide*.

NPIV Configuration Limits

The following limitations apply to NPIV:

- There is no Fibre Channel over IP (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, Oracle VM for x86 and containers. Devices configured to be seen on an Emulex FC 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, Containers, and Oracle VM Server for x86

To use NPIV with Oracle VM Server for SPARC (formerly Logical Domains), Solaris containers, or Oracle VM Server for x86 (formerly xVM) user domains:

1. Create virtual ports for the domains/containers to which you want to present dedicated storage.
2. Discover and attach the targets to the virtual ports.
3. Assign the target to the domain or container. The attachment runs through the virtual port that provides the path to the target.

Configuring Target Mode Support for Solaris 11

Target mode support is only available on FC HBAs.

To configure target mode support for Solaris 11:

1. Login as or su to 'root'.
2. Set target-mode to "1" in the configuration file. You can also set individual paths to target mode:

   `elxfcX-target-mode=1;`

   Where *X* is the specific numeric path. For example, when elxfc1 is set to target mode, all other paths will 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.

Emulex SFS FCA Driver Properties

- The configuration file contains all the properties necessary to initialize the Emulex SFS FCA driver.
- The OneCommand Manager application reflects the configuration file driver properties. Refer to the *OneCommand Manager Application User Manual* for more information about using the OneCommand Manager application with the Emulex SFS FCA driver.
- All properties are adapter-specific.

Note: If you are migrating from the LPFC driver to the out-of-box driver and if any of the default property values were changed, verify that this change will not impact the migration **before** you proceed.

The Configuration File

In the configuration file, all adapter-specific parameters have an elxfc*X*-prefix (where *X* is the driver instance number); for example, setting elxfc0-link-speed=4 makes 4 Gb/s the default link speed.

For any changes to the configuration file to take effect, you must 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 to the modload command. For example: # modload /kernel/drv/elxfc automap=0 (for 32-bit platforms) or modload /kernel/drv/sparcv9/elxfc automap=0 (for 64-bit platforms).

Table 1: FC Configuration File Parameters

Property Name	Default	Min	Max	Activation	Comments
ack0	0	0	1	Adapter reset	Uses ACK0 for class 2. If ACK0 is 1, the adapter attempts 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 driver level support for the FC ADISC login I/O recovery method. 1= Partial support. Flushes I/O's for non-FCP2 target devices at link down 0 = No support. Flushes active I/O's for all FCP target devices at link down. 2 = Full support. Holds active I/O's for all devices at link down.
assign-alpa	0x00	0x00	0xef	Link reset	This property is only valid if the 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 property differently for each adapter.
console-errors	0x00000000	0x00000000	0xFFFFFFFF	Dynamic	Verbose mask for error messages to the console.
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.
cr-count	1	1	255	Link reset	Specifies a count of I/O completions after which an interrupt response is generated. This property is disabled if cr-delay is set to 0.

Table 1: FC Configuration File Parameters (Continued)

Property Name	Default	Min	Max	Activation	Comments
cr-delay	0	0	63	Link reset	Specifies a count of milliseconds after which an interrupt response generated if cr-count has not been satisfied. This property is set to 0 to disable the Coalesce Response feature as default.
enable-auth	0	0	1	Link reset	Enables DHCHAP support in the driver. [0=Disabled, 1=Enabled]
enable-npiv	0	0	1	Adapter reset	Enables NPIV support in the driver. [0=Disabled-remove all vports first, 1=Enabled-requires SLI3+]
fct-queue-depth	0	0	4096	Reboot	Queue depth of target mode port. [0=max determined by type of HBA]
link-speed	0=Auto-Detect	0=Auto-Detect, 2=2 Gb/s, 4=4 Gb/s, 8=8 Gb/s, 16=16 Gb/s		Link reset	Sets the link speed for initializing FC connection.
linkup-delay	10	0	60	Adapter reset	Sets the driver wait period (seconds) for a link up after adapter initialization.
log-errors	0xFFFFFFFF	0x00000000	0xFFFFFFFF	Dynamic	Verbose mask for error messages to the messages file.
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.

Table 1: FC Configuration File Parameters (Continued)

Property Name	Default	Min	Max	Activation	Comments
max-xfer-size	339968	131072	1388544	Reboot	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. Memory_model/max-xfer-size Small/131072 - 339968 Medium/339969 - 688128 Large/688129 - 1388544
network-on	1	0	1	Reboot	Enables/disables IP networking support in the driver [0=Disabled, 1=Enabled].
num-iocbs	1024	128	10240	Adapter reset	The number of Input/Output Control Block (IOCB) buffers to allocate.
num-nodes	0	0	4096	Adapter reset	The number of remote FC nodes (NPorts) the driver supports. [0=no_limit, else must be >2]
pci-max-read	2048	512	4096	Adapter reset	Sets the PCI-X max memory read byte count [512, 1024, 2048 or 4096]
pm-support	0	0	1	Reboot	Enables or disables power management support in the driver. 0 = Disables power management support 1 = Enables power management support.
target-depth	512	0	2048	Link reset	Sets remote FCP target queue depth. [0=no_limit, N=Maximum active I/Os]

Table 1: FC Configuration File Parameters (Continued)

Property Name	Default	Min	Max	Activation	Comments
target-mode	0	0	1	Reboot	(Solaris 11 only) Enables or disables COMSTAR target mode support. If target mode is enabled for that port, then the SFS initiator mode is disabled for that port.
topology	0	0 =loop, then PTP 2 =PTP only 4 =loop only 6 =PTP, then loop		Link reset	Set to 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	Sets the number of unsolicited buffers the driver should allocate.

vport	(Solaris 10 only) Virtual port registration table. The enable-npiv must be set to 1. The vport table may have any number of comma delimited entries. Each entry must be of the form: "PHYS_WWPN:VPORT_WWNN:VPORT_WWPN:VPORT_ID"
	
	PHYS_WWPN = World Wide Port Name of adapter's physical port
	VPORT_WWNN = Desired World Wide Node Name of virtual port
	VPORT_WWPN = Desired World Wide Port Name of virtual port
	VPORT_ID = Desired virtual port ID (1 to max vports)
	The port IDs must start at 1 and increment by 1 with no gaps in the count. The virtual port ID 0 is reserved for the physical port.
	For example:
	`vport= "10000000c9123456:28010000c9123456:20010000c9123456:1",`
	`"10000000c9123456:28020000c9123456:20020000c9123456:2",`
	`"10000000c9123457:28010000c9123457:20010000c9123457:1",`
	`"10000000c9123457:28020000c9123457:20020000c9123457:2",`
	`"10000000c9123457:28030000c9123457:20030000c9123457:3";`
	All entries are automatically created or removed by the OneCommand Manager application.				

Table 1: FC Configuration File Parameters (Continued)

Property Name	Default	Min	Max	Activation	Comments
vport-restrict-login	1	0	1	Link reset	Sets the virtual port's behavior when discovering targets in the SAN. 1 prevents the VPort from logging into other initiator ports on the SAN. Also rejects logins 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 login to every port that it can access in the SAN and accept logins from all ports. **NOTE:** In a SAN where there are other initiators, this feature greatly reduces the driver's use of hardware resources.

Console and Log Messages

Driver 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 2 lists the types of notices, warnings and error logging levels you may set.

Table 2: 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 3 lists the types of log messages that can be logged to the system file.

Table 3: Log Message Types

LOG Message Verbose Mask	Verbose Bit	Verbose Description
LOG_MISC	0x00000001	Miscellaneous events
LOG_DRIVER	0x00000002	Driver attach and detach events

Table 3: Log Message Types (Continued)

LOG Message Verbose Mask	Verbose Bit	Verbose Description
LOG_INIT	0x00000004	HBA Initialization events
LOG_MEM	0x00000008	Memory management events
LOG_SLI	0x00000010	Service Level Interface (SLI) events
LOG_MBOX	0x00000020	Mailbox events
LOG_NODE	0x00000040	Node events
LOG_LINK	0x00000080	Link events
LOG_ELS	0x00000100	ELS events
LOG_PKT	0x00000200	General I/O packet events
LOG_FCP	0x00000400	FCP traffic events
LOG_FCT	0x00000800	FCP target mode events
LOG_IP	0x00001000	IP traffic events
LOG_SFS	0x00002000	Solaris SFS events
LOG_IOCTL	0x00004000	IOCTL events
LOG_FIRMWARE	0x00008000	Firmware download events
LOG_CT	0x00010000	CT events
LOG_FCSP	0x00020000	FCSP events
LOG_RESERVED	0x007C0000	Reserved for future use
LOG_FCT_DETAIL	0x00800000	Detailed FCT events
LOG_FCSP_DETAIL	0x01000000	Detailed FCSP events
LOG_NODE_DETAIL	0x02000000	Detailed node events
LOG_IOCTL_DETAIL	0x04000000	Detailed IOCTL events
LOG_IP_DETAIL	0x08000000	Detailed IP events
LOG_FIRMWARE_DETAIL	0x10000000	Detailed Firmware events
LOG_SFS_DETAIL	0x20000000	Detailed Solaris SFS events
LOG_MBOX_DETAIL	0x40000000	Detailed Mailbox events
LOG_SLI_DETAIL	0x80000000	Detailed HBA SLI events
LOG_ALL_MSG	0XFFFFFFFF	Detailed Node events

Severity Levels

Table 4: Severity Levels

Level	Message Description
DEBUG (Informational)	Message provides engineering debug information.
NOTICE (Informational)	Message provides a general purpose information.
WARNING	Message provides a general purpose warning.
ERROR	Message indicates that a driver error has occurred.
PANIC (Severe)	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]elxfc0: 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 elxfc: [ID 349649 kern.info] [5.0336]elxfc0: NOTICE: 720: Link
up. (1Gb, fabric)
```

In the above system log message:

- Jan 19 14:45:36 unidentified the date and time when the error or event occurred.
- sunv240 identifies the name of the host machine.
- <module name> identifies that the message came from the Emulex inbox or out-of-box driver.
- [ID 349649 kern.info] identifies a Solaris-specific message ID and kernel message level. This will change from one driver message to another.
- [5.0336] identifies the driver message context tag. This may change from one driver version to another.
- elxfc0 identifies the message is coming from the elxfc driver instance zero. This will change from one driver instance to another.
- NOTICE identifies the driver message severity level. This may change from one driver version to another.
- 720 identifies the driver message id. This will not change from one driver version to another.
- Link up identifies the actual error or event message. This will 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, informational.

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, informational.

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, informational.

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, informational.

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 your customer service representative.

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, informational.

MSG_ID: 0011 DEBUG: Event queued.

VERBOSE_MASK: LOG_MISC (0x00000001)
DESCRIPTION: This indicates that a driver event is being queued.
SEVERITY LEVEL: Debug
MESSAGE: Event queued.
ACTION: No action needed, informational.

MSG_ID: 0012 DEBUG: Event dequeued.

VERBOSE_MASK: LOG_MISC (0x00000001)
DESCRIPTION: This indicates that a driver event is being dequeued.
SEVERITY LEVEL: Debug
MESSAGE: Event dequeued.
ACTION: No action needed, informational.

Driver Events

MSG_ID: 0100 NOTICE: Driver attach.

VERBOSE_MASK: LOG_DRIVER (0x00000002)
DESCRIPTION: This indicates that the driver is performing an attach operation.
SEVERITY LEVEL: Notice
MESSAGE: Driver attach.
ACTION: No action needed, informational.

MSG_ID: 0101 ERROR: Driver attach failed.

VERBOSE_MASK: LOG_DRIVER (0x00000002)
DESCRIPTION: This indicates that 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 the problem persists, report this error to your customer service representative.

MSG_ID: 0102 DEBUG: Driver attach.

VERBOSE_MASK: LOG_DRIVER (0x00000002)
DESCRIPTION: This indicates that the driver is performing a attach operation.
SEVERITY LEVEL: Debug
MESSAGE: Driver attach.
ACTION: No action needed, informational.

MSG_ID: 0110 NOTICE: Driver detach.

VERBOSE_MASK: LOG_DRIVER (0x00000002)
DESCRIPTION: This indicates that the driver is performing a detach operation.
SEVERITY LEVEL: Notice
MESSAGE: Driver detach.
ACTION: No action needed, informational.

MSG_ID: 0111 ERROR: Driver detach failed.

VERBOSE_MASK: LOG_DRIVER (0x00000002)
DESCRIPTION: This indicates that 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 the problem persists, report this error to your customer service representative.

MSG_ID: 0112 DEBUG: Driver detach.

VERBOSE_MASK: LOG_DRIVER (0x00000002)
DESCRIPTION: This indicates that the driver is performing a detach operation.
SEVERITY LEVEL: Debug
MESSAGE: Driver detach.
ACTION: No action needed, informational.

MSG_ID: 0120 DEBUG: Driver suspend.

VERBOSE_MASK: LOG_DRIVER (0x00000002)
DESCRIPTION: This indicates that the driver is performing a suspend operation.
SEVERITY LEVEL: Debug
MESSAGE: Driver suspend.
ACTION: No action needed, informational.

MSG_ID: 0121 ERROR: Driver suspend failed.

VERBOSE_MASK: LOG_DRIVER (0x00000002)
DESCRIPTION: This indicates that 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 the problem persists, report this error to your customer service representative.

MSG_ID: 0130 DEBUG: Driver resume.

VERBOSE_MASK: LOG_DRIVER (0x00000002)
DESCRIPTION: This indicates that the driver is performing a resume operation.
SEVERITY LEVEL: Debug
MESSAGE: Driver resume.
ACTION: No action needed, informational.

MSG_ID: 0131 ERROR: Driver resume failed.

VERBOSE_MASK: LOG_DRIVER (0x00000002)
DESCRIPTION: This indicates that 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 the problem persists, report this error to your customer service representative.

HBA Initialization Events

MSG_ID: 0200 NOTICE: Adapter initialization.

VERBOSE_MASK: LOG_INIT (0x00000004)
DESCRIPTION: This indicates that the adapter is initializing.
SEVERITY LEVEL: Notice
MESSAGE: Adapter initialization.
ACTION: No action needed, informational.

MSG_ID: 0201 ERROR: Adapter initialization failed.

VERBOSE_MASK: LOG_INIT (0x00000004)
DESCRIPTION: This indicates that an attempt to initialize the adapter has failed.
SEVERITY LEVEL: Error
MESSAGE: Adapter initialization failed.
ACTION: Check your hardware configuration. If the problem persists, report this error to your customer service representative.

MSG_ID: 0202 DEBUG: Adapter initialization.

VERBOSE_MASK: LOG_INIT (0x00000004)
DESCRIPTION: This indicates that the adapter is initializing.
SEVERITY LEVEL: Debug
MESSAGE: Adapter initialization.
ACTION: No action needed, informational.

MSG_ID: 0210 DEBUG: Adapter transition.

VERBOSE_MASK: LOG_INIT (0x00000004)
DESCRIPTION: This indicates that the adapter is changing states.
SEVERITY LEVEL: Debug
MESSAGE: Adapter transition.
ACTION: No action needed, informational.

MSG_ID: 0220 DEBUG: Adapter online.

VERBOSE_MASK: LOG_INIT (0x00000004)
DESCRIPTION: This indicates that the adapter is online and ready to communicate.
SEVERITY LEVEL: Debug
MESSAGE: Adapter online.
ACTION: No action needed, informational.

MSG_ID: 0230 DEBUG: Adapter offline.

VERBOSE_MASK: LOG_INIT (0x00000004)
DESCRIPTION: This indicates that the adapter is offline and unable to communicate.
SEVERITY LEVEL: Debug
MESSAGE: Adapter offline.
ACTION: No action needed, informational.

MSG_ID: 0231 WARNING: Adapter shutdown.

VERBOSE_MASK: LOG_INIT (0x00000004)
DESCRIPTION: This indicates that the adapter has been shutdown and will require a reboot to reinitialize.
SEVERITY LEVEL: Warning
MESSAGE: Adapter shutdown.
ACTION: Contact your customer service representative.

MSG_ID: 0240 ERROR: Adapter reset failed.

VERBOSE_MASK: LOG_INIT (0x00000004)
DESCRIPTION: This indicates that an attempt to reset the adapter has failed.
SEVERITY LEVEL: Error
MESSAGE: Adapter reset failed.
ACTION: Check your hardware configuration. If the problem persists, report this error to your customer service representative.

Memory Management Events

MSG_ID: 0300 DEBUG: Memory alloc.

VERBOSE_MASK: LOG_MEM (0x00000008)
DESCRIPTION: This indicates that the driver allocated system memory.
SEVERITY LEVEL: Debug
MESSAGE: Memory alloc.
ACTION: No action needed, informational.

MSG_ID: 0301 ERROR: Memory alloc failed.

VERBOSE_MASK: LOG_MEM (0x00000008)
DESCRIPTION: This indicates that 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, informational. However, if the problem persists, report this error to your system administrator.

MSG_ID: 0310 ERROR: Memory pool error.

VERBOSE_MASK: LOG_MEM (0x00000008)
DESCRIPTION: This indicates that a problem has occurred with the memory buffer pool management.
SEVERITY LEVEL: Error
MESSAGE: Memory pool error.
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.

MSG_ID: 0311 DEBUG: Memory pool alloc failed.

VERBOSE_MASK: LOG_MEM (0x00000008)
DESCRIPTION: This indicates that 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 the problem, report these errors to customer service.

MSG_ID: 0312 DEBUG: Memory pool detail.

VERBOSE_MASK: LOG_MEM (0x00000008)
DESCRIPTION: This provides detailed information about memory bufferpool management.
SEVERITY LEVEL: Debug
MESSAGE: Memory pool detail.
ACTION: No action needed, informational.

MSG_ID: 0320 NOTICE: No unsolicited buffer available.

VERBOSE_MASK: LOG_MEM (0x00000008)
DESCRIPTION: This indicates that the driver's unsolicited buffer pool is exhausted. The I/O will be dropped and 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 the problem, report these errors to customer service.

MSG_ID: 0330 ERROR: Invalid access handle.

VERBOSE_MASK: LOG_MEM (0x00000008)
DESCRIPTION: This indicates that 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 customer service.

MSG_ID: 0331 ERROR: Invalid DMA handle.

VERBOSE_MASK: LOG_MEM (0x00000008)
DESCRIPTION: This indicates that 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 customer service.

Service Level Interface (SLI) Events

MSG_ID: 0400 DEBUG: Vital Product Data.

VERBOSE_MASK: LOG_SLI (0x00000010)
DESCRIPTION: This provides vendor specific information about the adapter.
SEVERITY LEVEL: Debug
MESSAGE: Vital Product Data.
ACTION: No action needed, informational.

MSG_ID: 0410 DEBUG: Link atten.

VERBOSE_MASK: LOG_SLI (0x00000010)
DESCRIPTION: This indicates that the adapter has triggered a link attention interrupt.
SEVERITY LEVEL: Debug
MESSAGE: Link atten.
ACTION: No action needed, informational.

MSG_ID: 0411 DEBUG: State change.

VERBOSE_MASK: LOG_SLI (0x00000010)
DESCRIPTION: This indicates that the adapter has changed state.
SEVERITY LEVEL: Debug
MESSAGE: State change.
ACTION: No action needed, informational.

MSG_ID: 0412 DEBUG: Link Up atten.

VERBOSE_MASK: LOG_SLI (0x00000010)
DESCRIPTION: This indicates that the adapter has triggered a link up attention interrupt.
SEVERITY LEVEL: Debug
MESSAGE: Link Up atten.
ACTION: No action needed, informational.

MSG_ID: 0413 DEBUG: Link Down atten.

VERBOSE_MASK: LOG_SLI (0x00000010)
DESCRIPTION: This indicates that the adapter has triggered a link down attention interrupt.
SEVERITY LEVEL: Debug
MESSAGE: Link Down atten.
ACTION: No action needed, informational.

MSG_ID: 0420 ERROR: Adapter hardware error.

VERBOSE_MASK: LOG_SLI (0x00000010)
DESCRIPTION: This indicates that 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. Report these errors to customer service.

MSG_ID: 0421 NOTICE: Adapter temperature.

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

MSG_ID: 0422 WARNING: Adapter temperature.

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

MSG_ID: 0423 NOTICE: Adapter notice.

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

MSG_ID: 0424 WARNING: Adapter warning.

VERBOSE_MASK: LOG_SLI (0x00000010)
DESCRIPTION: This indicates that 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 customer service.

MSG_ID: 0425 ERROR: Adapter error.

VERBOSE_MASK: LOG_SLI (0x00000010)
DESCRIPTION: This indicates that 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 customer service.

MSG_ID: 0426 NOTICE: Adapter Async Status.

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

MSG_ID: 0430 DEBUG: Ring event.

VERBOSE_MASK: LOG_SLI (0x00000010)
DESCRIPTION: This indicates that an SLI ring event has occurred.
SEVERITY LEVEL: Debug
MESSAGE: Ring event.
ACTION: No action needed, informational.

MSG_ID: 0431 DEBUG: Ring error.

VERBOSE_MASK: LOG_SLI (0x00000010)
DESCRIPTION: This indicates that an SLI ring error is being reported by the adapter.
SEVERITY LEVEL: Debug
MESSAGE: Ring error.
ACTION: No action needed, informational.

MSG_ID: 0432 DEBUG: Ring reset.

VERBOSE_MASK: LOG_SLI (0x00000010)
DESCRIPTION: This indicates that an SLI ring is being reset.
SEVERITY LEVEL: Debug
MESSAGE: Ring reset.
ACTION: No action needed, informational.

MSG_ID: 0440 DEBUG: Adapter msg.

VERBOSE_MASK: LOG_SLI (0x00000010)
DESCRIPTION: This indicates that a message was sent to the driver from the adapter.
SEVERITY LEVEL: Debug
MESSAGE: Adapter msg.
ACTION: No action needed, informational.

MSG_ID: 0450 ERROR: IOCB invalid.

VERBOSE_MASK: LOG_SLI (0x00000010)
DESCRIPTION: This indicates that an IOCB was received from the adapter with an illegal value. This error could indicate a driver or firmware problem.
SEVERITY LEVEL: Error
MESSAGE: IOCB invalid.
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.

MSG_ID: 0451 DEBUG: IOCB queue full.

VERBOSE_MASK: LOG_SLI (0x00000010)
DESCRIPTION: This indicates that the IOCB queue is full. This will occur during normal operation.
SEVERITY LEVEL: Debug
MESSAGE: IOCB queue full.
ACTION: No action needed, informational.

MSG_ID: 0452 DEBUG: IOCB event.

VERBOSE_MASK: LOG_SLI (0x00000010)
DESCRIPTION: This indicates that an IOCB local error event is being reported by the adapter.
SEVERITY LEVEL: Debug
MESSAGE: IOCB event.
ACTION: No action needed, informational.

MSG_ID: 0453 DEBUG: IOCB stale.

VERBOSE_MASK: LOG_SLI (0x00000010)
DESCRIPTION: This indicates that an IOCB completed after its associated packet completed.
SEVERITY LEVEL: Debug
MESSAGE: IOCB stale.
ACTION: No action needed, informational.

MSG_ID: 0460 DEBUG: SLI detail.

VERBOSE_MASK: LOG_SLI_DETAIL (0x80000000)
DESCRIPTION: This provides detailed information about an SLI event.
SEVERITY LEVEL: Debug
MESSAGE: SLI detail.
ACTION: No action needed, informational.

MSG_ID: 0461 ERROR: SLI ERROR.

VERBOSE_MASK: LOG_SLI (0x00000010)
DESCRIPTION: This error provides information about an SLI event.
SEVERITY LEVEL: Error
MESSAGE: SLI ERROR.
ACTION: No action needed, informational.

MSG_ID: 0462 DEBUG: SLI DEBUG.

VERBOSE_MASK: LOG_SLI (0x00000010)
DESCRIPTION: This provides debug information about an SLI event.
SEVERITY LEVEL: Debug
MESSAGE: SLI DEBUG.
ACTION: No action needed, informational.

Mailbox Events

MSG_ID: 0500 DEBUG: Mailbox event.

VERBOSE_MASK: LOG_MBOX (0x00000020)
DESCRIPTION: This indicates that a mailbox event has occurred.
SEVERITY LEVEL: Debug
MESSAGE: Mailbox event.
ACTION: No action needed, informational.

MSG_ID: 0501 DEBUG: Mailbox detail.

VERBOSE_MASK: LOG_MBOX_DETAIL (0x40000000)
DESCRIPTION: This provides detailed information about a mailbox event.
SEVERITY LEVEL: Debug
MESSAGE: Mailbox detail.
ACTION: No action needed, informational.

MSG_ID: 0510 DEBUG: Stray mailbox interrupt.

VERBOSE_MASK: LOG_MBOX (0x00000020)
DESCRIPTION: This indicates that a mailbox command completion interrupt was received and the mailbox is not valid. This error could indicate a driver or firmware problem.
SEVERITY LEVEL: Debug
MESSAGE: Stray mailbox interrupt.
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.

MSG_ID: 0520 DEBUG: Mailbox error.

VERBOSE_MASK: LOG_MBOX (0x00000020)
DESCRIPTION: This indicates that an unsupported or illegal mailbox command was completed. This error could indicate a driver or firmware problem.
SEVERITY LEVEL: Debug
MESSAGE: Mailbox error.
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.

MSG_ID: 0530 ERROR: Mailbox timeout.

VERBOSE_MASK: LOG_MBOX (0x00000020)
DESCRIPTION: The firmware did not response a mailbox command. This error could indicate a hardware or firmware problem.
SEVERITY LEVEL: Error
MESSAGE: Mailbox timeout.
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.

Node Events

MSG_ID: 0600 DEBUG: Node create.

VERBOSE_MASK: LOG_NODE (0x00000040)
DESCRIPTION: This indicates that a node has been created for a remote device.
SEVERITY LEVEL: Debug
MESSAGE: Node create.
ACTION: No action needed, informational.

MSG_ID: 0601 DEBUG: Node opened.

VERBOSE_MASK: LOG_NODE_DETAIL (0x02000000)
DESCRIPTION: This indicates that a node has been opened for I/O transport.
SEVERITY LEVEL: Debug
MESSAGE: Node opened.
ACTION: No action needed, informational.

MSG_ID: 0602 NOTICE: Node create failed.

VERBOSE_MASK: LOG_NODE (0x00000040)
DESCRIPTION: This indicates that a node create request for a remote device has failed.
SEVERITY LEVEL: Notice
MESSAGE: Node create failed.
ACTION: No action needed, informational.

MSG_ID: 0603 DEBUG: Node updated.

VERBOSE_MASK: LOG_NODE (0x00000040)
DESCRIPTION: This indicates that a node has been updated for a remote device.
SEVERITY LEVEL: Debug
MESSAGE: Node updated.
ACTION: No action needed, informational.

MSG_ID: 0610 DEBUG: Node destroy.

VERBOSE_MASK: LOG_NODE (0x00000040)
DESCRIPTION: This indicates that a node has been destroyed for a remote device.
SEVERITY LEVEL: Debug
MESSAGE: Node destroy.
ACTION: No action needed, informational.

MSG_ID: 0611 DEBUG: Node closed.

VERBOSE_MASK: LOG_NODE_DETAIL (0x02000000)
DESCRIPTION: This indicates that a node has been temporarily closed for I/O transport.
SEVERITY LEVEL: Debug
MESSAGE: Node closed.
ACTION: No action needed, informational.

MSG_ID: 0612 NOTICE: Node missing.

VERBOSE_MASK: LOG_NODE (0x00000040)
DESCRIPTION: This indicates that a FCP2 device node has been found missing.
SEVERITY LEVEL: Notice
MESSAGE: Node missing.
ACTION: No action needed, informational.

MSG_ID: 0620 DEBUG: Node not found.

VERBOSE_MASK: LOG_NODE (0x00000040)
DESCRIPTION: This indicates that there was an attempt to send an I/O pkt 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, informational. However, if the problem persists, report this error to your customer service representative.

MSG_ID: 0621 DEBUG: Node timeout.

VERBOSE_MASK: LOG_NODE (0x00000040)
DESCRIPTION: This indicates that the node timer expired; 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, informational.

Link Events

MSG_ID: 0700 DEBUG: Link event.

VERBOSE_MASK: LOG_SLI (0x00000010) or LOG_LINK (0x00000080)
DESCRIPTION: This indicates that a link event has occurred.
SEVERITY LEVEL: Debug
MESSAGE: Link event.
ACTION: No action needed, informational.

MSG_ID: 0710 NOTICE: Link down.

VERBOSE_MASK: LOG_LINK (0x00000080)
DESCRIPTION: This indicates that the Fibre Channel link is down to the adapter.
SEVERITY LEVEL: Notice
MESSAGE: Link down.
ACTION: Check your network connections. If the problem persists, report this error to your system administrator.

MSG_ID: 0720 NOTICE: Link up.

VERBOSE_MASK: LOG_LINK (0x00000080)
DESCRIPTION: This indicates that the Fibre Channel link is up.
SEVERITY LEVEL: Notice
MESSAGE: Link up.
ACTION: No action needed, informational.

MSG_ID: 0721 NOTICE: NPIV Link up.

VERBOSE_MASK: LOG_LINK (0x00000080)
DESCRIPTION: This indicates that the Fibre Channel link is up for all virtual ports.
SEVERITY LEVEL: Notice
MESSAGE: NPIV Link up.
ACTION: No action needed, informational.

MSG_ID: 0730 NOTICE: Link reset.

VERBOSE_MASK: LOG_LINK (0x00000080) or LOG_SFS (0x00002000)
DESCRIPTION: This indicates that an issue has forced the Fibre Channel link to be reset.
SEVERITY LEVEL: Notice
MESSAGE: Link reset.
ACTION: No action needed, informational.

MSG_ID: 0731 ERROR: Link reset failed.

VERBOSE_MASK: LOG_LINK (0x00000080) or LOG_SFS (0x00002000)
DESCRIPTION: This indicates that an attempt to reset the Fibre Channel link has failed.
SEVERITY LEVEL: Error
MESSAGE: Link reset failed.
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.

ELS Events

MSG_ID: 0800 DEBUG: ELS sent.

VERBOSE_MASK: LOG_ELS (0x00000100)
DESCRIPTION: This indicates that an ELS command is being sent.
SEVERITY LEVEL: Debug
MESSAGE: ELS sent.
ACTION: No action needed, informational.

MSG_ID: 0801 DEBUG: ELS comp.

VERBOSE_MASK: LOG_ELS (0x00000100)
DESCRIPTION: This indicates that an ELS command completed normally.
SEVERITY LEVEL: Debug
MESSAGE: ELS comp.
ACTION: No action needed, informational.

MSG_ID: 0810 ERROR: Stray ELS completion.

VERBOSE_MASK: LOG_ELS (0x00000100)
DESCRIPTION: This indicates that an ELS command completion was received without issuing a corresponding ELS command. This error could indicate a driver or firmware problem.
SEVERITY LEVEL: Error
MESSAGE: Stray ELS completion.
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.

MSG_ID: 0811 DEBUG: Abnormal ELS completion.

VERBOSE_MASK: LOG_ELS (0x00000100)
DESCRIPTION: This indicates that an ELS command completed with a status error in the IOCB. It could mean the Fibre Channel device on the network is not responding or the Fibre Channel device is not an FCP target. The driver will automatically
SEVERITY LEVEL: Debug
MESSAGE: Abnormal ELS completion.
ACTION: retry this ELS command if needed. If the command is a PLOGI or PRLI, and the destination PortID is not an FCP Target, no action is needed. Otherwise, check physical connections to Fibre Channel network and the state the remote PortID is in.

MSG_ID: 0820 DEBUG: ELS rcvd.

VERBOSE_MASK: LOG_ELS (0x00000100)
DESCRIPTION: This indicates that an unsolicited ELS command was received.
SEVERITY LEVEL: Debug
MESSAGE: ELS rcvd.
ACTION: No action needed, informational.

MSG_ID: 0821 DEBUG: Unsolicited ELS dropped.

VERBOSE_MASK: LOG_ELS (0x00000100)
DESCRIPTION: This indicates that an unsolicited ELS command was received and then dropped for some reason.
SEVERITY LEVEL: Debug
MESSAGE: Unsolicited ELS dropped.
ACTION: No action needed, informational.

MSG_ID: 0822 DEBUG: ELS reply.

VERBOSE_MASK: LOG_ELS (0x00000100)
DESCRIPTION: This indicates that a reply is being sent for an unsolicited ELS command.
SEVERITY LEVEL: Debug
MESSAGE: ELS reply.
ACTION: No action needed, informational.

MSG_ID: 0830 ERROR: Invalid ELS command found.

VERBOSE_MASK: LOG_ELS (0x00000100)
DESCRIPTION: This indicates that an ELS command was found with an invalid command code.
SEVERITY LEVEL: Error
MESSAGE: Invalid ELS command found.
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.

General I/O Packet Events

MSG_ID: 0900 NOTICE: Packet abort.

VERBOSE_MASK: LOG_PKT (0x00000200)
DESCRIPTION: This indicates that an I/O packet is being aborted.
SEVERITY LEVEL: Notice
MESSAGE: Packet abort.
ACTION: No action needed, informational.

MSG_ID: 0901 WARNING: Packet abort failed.

VERBOSE_MASK: LOG_PKT (0x00000200)
DESCRIPTION: This indicates that an attempt to abort an I/O packet has failed.
SEVERITY LEVEL: Warning
MESSAGE: Packet abort failed.
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.

MSG_ID: 0910 DEBUG: Packet timeout.

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

MSG_ID: 0911 DEBUG: CHANNEL watchdog.

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

MSG_ID: 0912 DEBUG: TXQ watchdog.

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

MSG_ID: 0920 DEBUG: Packet flush.

VERBOSE_MASK: LOG_PKT (0x00000200)
DESCRIPTION: This indicates that an I/O packet is being flushed.
SEVERITY LEVEL: Debug
MESSAGE: Packet flush.
ACTION: No action needed, informational.

MSG_ID: 0921 DEBUG: Packet flushed.

VERBOSE_MASK: LOG_PKT (0x00000200)
DESCRIPTION: This indicates that an I/O packet has been flushed.
SEVERITY LEVEL: Debug
MESSAGE: Packet flushed.
ACTION: No action needed, informational.

MSG_ID: 0922 NOTICE: Packet flush timeout.

VERBOSE_MASK: LOG_PKT (0x00000200)
DESCRIPTION: This indicates that an I/O packet flush request has timed out with some I/O packets's still not completed. The driver will attempt to recover by itself.
SEVERITY LEVEL: Notice
MESSAGE: Packet flush timeout.
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.

MSG_ID: 0930 NOTICE: Packet transport failed.

VERBOSE_MASK: LOG_PKT (0x00000200)
DESCRIPTION: This indicates that an attempt to send an I/O packet failed. The I/O packet will be retried by the upper layer.
SEVERITY LEVEL: Notice
MESSAGE: Packet transport failed.
ACTION: No action needed, informational.

MSG_ID: 0931 ERROR: Packet transport error.

VERBOSE_MASK: LOG_PKT (0x00000200)
DESCRIPTION: This indicates that an error occurred while attempting to send an I/O packet. The I/O packet will likely be failed back to the user application.
SEVERITY LEVEL: Error
MESSAGE: Packet transport error.
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.

MSG_ID: 0932 DEBUG: Packet transport.

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

MSG_ID: 0940 DEBUG: Packet completion error.

VERBOSE_MASK: LOG_PKT (0x00000200)
DESCRIPTION: This indicates that 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, informational. However, if the problem persists, report this error to your customer service representative.

FCP Traffic Events

MSG_ID: 1000 DEBUG: Stray FCP completion.

VERBOSE_MASK: LOG_FCP (0x00000400)
DESCRIPTION: This indicates that an FCP command completion was received without issuing a corresponding FCP command. This error could indicate a driver or firmware problem.
SEVERITY LEVEL: Debug
MESSAGE: Stray FCP completion.
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.

MSG_ID: 1001 DEBUG: FCP completion error.

VERBOSE_MASK: LOG_FCP (0x00000400)
DESCRIPTION: This indicates that 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, informational.

FCT Traffic Events

MSG_ID: 1100 DEBUG: FCT detail.

VERBOSE_MASK: LOG_FCT_DETAIL (0x00800000)
DESCRIPTION: This provides detailed information about the driver's FCT interface.
SEVERITY LEVEL: Debug
MESSAGE: FCT detail.
ACTION: No action needed, informational.

MSG_ID: 1110 DEBUG: FCT debug.

VERBOSE_MASK: LOG_FCT (0x00000800)
DESCRIPTION: This provides general information about the driver's FCT interface.
SEVERITY LEVEL: Debug
MESSAGE: FCT debug.
ACTION: No action needed, informational.

MSG_ID: 1120 DEBUG: FCT error.

VERBOSE_MASK: LOG_FCT (0x00000800)
DESCRIPTION: This indicates that a general error has occurred in the driver's FCT interface.
SEVERITY LEVEL: Debug
MESSAGE: FCT error.
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.

MSG_ID: 1130 DEBUG: FCT API.

VERBOSE_MASK:
DESCRIPTION: This provides an API trace with the driver's FCT interface.
SEVERITY LEVEL: Debug
MESSAGE: FCT API.
ACTION: No action needed, informational.

IP Traffic Events

MSG_ID: 1200 DEBUG: IP detail.

VERBOSE_MASK: LOG_IP_DETAIL (0x08000000)
DESCRIPTION: This provides detailed information about the driver's IP interface.
SEVERITY LEVEL: Debug
MESSAGE: IP detail.
ACTION: No action needed, informational.

MSG_ID: 1210 ERROR: Stray IP completion.

VERBOSE_MASK: LOG_IP (0x00001000)
DESCRIPTION: This indicates that an IP sequence completion was received without issuing a corresponding IP sequence. This error could indicate a driver or firmware problem.
SEVERITY LEVEL: Error
MESSAGE: Stray IP completion.
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.

MSG_ID: 1211 DEBUG: Abnormal IP completion.

VERBOSE_MASK: LOG_IP (0x00001000)
DESCRIPTION: This indicates that an IP sequence completed with a status error in the IOCB. It could mean the Fibre Channel device on the network is not responding.
SEVERITY LEVEL: Debug
MESSAGE: Abnormal IP completion.
ACTION: No action needed, informational. However, if the problem persists, report this error to your system administrator.

MSG_ID: 1220 DEBUG: Unsolicited IP dropped.

VERBOSE_MASK: LOG_IP (0x00001000)
DESCRIPTION: This indicates that an unsolicited IP sequence was received, but was dropped for some reason.
SEVERITY LEVEL: Debug
MESSAGE: Unsolicited IP dropped.
ACTION: No action needed, informational.

MSG_ID: 1221 DEBUG: IP recvd.

VERBOSE_MASK: LOG_IP (0x00001000)
DESCRIPTION: This indicates that an unsolicited IP sequence was received.
SEVERITY LEVEL: Debug
MESSAGE: IP recvd.
ACTION: No action needed, informational.

MSG_ID: 1230 ERROR: Invalid IP sequence found.

VERBOSE_MASK: LOG_IP (0x00001000)
DESCRIPTION: This indicates that an IP sequence was found with an invalid code.
SEVERITY LEVEL: Error
MESSAGE: Invalid IP sequence found.
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.

Solaris SFS Events

MSG_ID: 1300 DEBUG: SFS.

VERBOSE_MASK: LOG_SFS (0x00002000)
DESCRIPTION: This provides general information about the driver's SFS interface.
SEVERITY LEVEL: Debug
MESSAGE: SFS.
ACTION: No action needed, informational.

MSG_ID: 1301 DEBUG: SFS detail.

VERBOSE_MASK: LOG_SFS_DETAIL (0x20000000)
DESCRIPTION: This provides detailed information about the driver's SFS interface.
SEVERITY LEVEL: Debug
MESSAGE: SFS detail.
ACTION: No action needed, informational.

MSG_ID: 1310 WARNING: Diagnostic error.

VERBOSE_MASK: LOG_SFS (0x00002000)
DESCRIPTION: This indicates that a diagnostic request did not complete because of some issue.
SEVERITY LEVEL: Warning
MESSAGE: Diagnostic error.
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.

MSG_ID: 1311 DEBUG: ECHO diagnostic completed.

VERBOSE_MASK: LOG_SFS (0x00002000)
DESCRIPTION: This indicates that an ECHO diagnostic has completed.
SEVERITY LEVEL: Debug
MESSAGE: ECHO diagnostic completed.
ACTION: No action needed, informational.

MSG_ID: 1312 WARNING: ECHO diagnostic failed.

VERBOSE_MASK: LOG_SFS (0x00002000)
DESCRIPTION: This indicates that an ECHO diagnostic has failed to return a positive result. This could indicate a connectivity problem with your FC network.
SEVERITY LEVEL: Warning
MESSAGE: ECHO diagnostic failed.
ACTION: Check your network connections. If the problem persists, report this error to your system administrator.

MSG_ID: 1313 DEBUG: BIU diagnostic completed.

VERBOSE_MASK: LOG_SFS (0x00002000)
DESCRIPTION: This indicates that a BIU diagnostic has completed.
SEVERITY LEVEL: Debug
MESSAGE: BIU diagnostic completed.
ACTION: No action needed, informational.

MSG_ID: 1314 ERROR: BIU diagnostic failed.

VERBOSE_MASK: LOG_SFS (0x00002000)
DESCRIPTION: This indicates that a BIU diagnostic has failed to return a positive result. This usually caused by an adapter hardware problem.
SEVERITY LEVEL: Error
MESSAGE: BIU diagnostic failed.
ACTION: Contact your customer service representative.

MSG_ID: 1315 DEBUG: POST diagnostic completed.

VERBOSE_MASK: LOG_SFS (0x00002000)
DESCRIPTION: This indicates that a POST diagnostic has completed.
SEVERITY LEVEL: Debug
MESSAGE: POST diagnostic completed.
ACTION: No action needed, informational.

MSG_ID: 1316 ERROR: POST diagnostic failed.

VERBOSE_MASK: LOG_SFS (0x00002000)
DESCRIPTION: This indicates that 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 your customer service representative.

IOCTL Events

MSG_ID: 1400 DEBUG: IOCTL.

VERBOSE_MASK: LOG_IOCTL (0x00004000)
DESCRIPTION: This provides general information about the driver's IOCTL interface.
SEVERITY LEVEL: Debug
MESSAGE: IOCTL.
ACTION: No action needed, informational.

MSG_ID: 1401 DEBUG: IOCTL detail.

VERBOSE_MASK: LOG_IOCTL_DETAIL (0x04000000)
DESCRIPTION: This provides detailed information about the driver's IOCTL interface.
SEVERITY LEVEL: Debug
MESSAGE: IOCTL detail.
ACTION: No action needed, informational.

MSG_ID: 1410 DEBUG: DFC

VERBOSE_MASK: LOG_IOCTL (0x00004000)
DESCRIPTION: This provides general information about the driver's DFC interface.
SEVERITY LEVEL: Debug
MESSAGE: DFC
ACTION: No action needed, informational.

MSG_ID: 1411 DEBUG: DFC detail.

VERBOSE_MASK: LOG_IOCTL_DETAIL (0x04000000)
DESCRIPTION: This provides detailed information about the driver's DFC interface.
SEVERITY LEVEL: Debug
MESSAGE: DFC detail.
ACTION: No action needed, informational.

MSG_ID: 1420 DEBUG: DFC Error.

VERBOSE_MASK: LOG_IOCTL (0x00004000)
DESCRIPTION: This indicates that an error was found while processing a DFC request.
SEVERITY LEVEL: Debug
MESSAGE: DFC Error.
ACTION: No action needed, informational.

Firmware Download Events

MSG_ID: 1500 DEBUG: Firmware image.

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

MSG_ID: 1501 DEBUG: Firmware detail.

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

MSG_ID: 1502 NOTICE: Firmware Library

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

MSG_ID: 1510 ERROR: Bad firmware image.

VERBOSE_MASK: LOG_FIRMWARE (0x00008000)
DESCRIPTION: This indicates that a bad firmware image was provided to the download function.
SEVERITY LEVEL: Error
MESSAGE: Bad firmware image.
ACTION: Obtain the proper image file. If the problem persists, report this error to your customer service representative.

MSG_ID: 1511 ERROR: Firmware image not compatible.

VERBOSE_MASK: LOG_FIRMWARE (0x00008000)
DESCRIPTION: This indicates that 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 the problem persists, report this error to your customer service representative.

MSG_ID: 1520 NOTICE: Firmware download.

VERBOSE_MASK: LOG_FIRMWARE (0x00008000)
DESCRIPTION: This indicates that an attempt to download a firmware image has occurred.
SEVERITY LEVEL: Notice
MESSAGE: Firmware download.
ACTION: No action needed, informational.

MSG_ID: 1521 NOTICE: Firmware download complete.

VERBOSE_MASK: LOG_FIRMWARE (0x00008000)
DESCRIPTION: This indicates that an attempt to download a firmware image was successful.
SEVERITY LEVEL: Notice
MESSAGE: Firmware download complete.
ACTION: No action needed, informational.

MSG_ID: 1522 ERROR: Firmware download failed.

VERBOSE_MASK: LOG_FIRMWARE (0x00008000)
DESCRIPTION: This indicates that an attempt to download a firmware image was failed.
SEVERITY LEVEL: Error
MESSAGE: Firmware download failed.
ACTION: Check your hardware configuration. If the problem persists, report this error to your customer service representative.

MSG_ID: 1523 WARNING: Firmware updated.

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

MSG_ID: 1530 DEBUG: Firmware dump.

VERBOSE_MASK: LOG_FIRMWARE (0x00008000)
DESCRIPTION: This indicates that a firmware core dump has occurred.
SEVERITY LEVEL: Debug
MESSAGE: Firmware dump.
ACTION: Check your hardware configuration. If the problem persists, report this error to your customer service representative.

MSG_ID: 1540 WARNING: Firmware update required.

VERBOSE_MASK: LOG_FIRMWARE (0x00008000)
DESCRIPTION: This indicates that a firmware update is required on the adapter.
SEVERITY LEVEL: Warning
MESSAGE: Firmware update required.
ACTION: The user must perform a manual adapter reset or link reset once the host environment is stable to trigger an automatic firmware download. 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: This indicates that a CT command is being sent.
SEVERITY LEVEL: Debug
MESSAGE: CT sent.
ACTION: No action needed, informational.

MSG_ID: 1601 DEBUG: CT comp.

VERBOSE_MASK: LOG_CT (0x00010000)
DESCRIPTION: This indicates that a CT command completed normally.
SEVERITY LEVEL: Debug
MESSAGE: CT comp.
ACTION: No action needed, informational.

MSG_ID: 1610 ERROR: Stray CT completion.

VERBOSE_MASK: LOG_CT (0x00010000)
DESCRIPTION: This indicates that a CT command completion was received without issuing a corresponding CT command. This error could indicate a driver or firmware problem.
SEVERITY LEVEL: Error
MESSAGE: Stray CT completion.
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.

MSG_ID: 1611 DEBUG: Abnormal CT completion.

VERBOSE_MASK: LOG_CT (0x00010000)
DESCRIPTION: This indicates that a CT command completed with a status error in the IOCB. It could mean the Fibre Channel device on the network is not responding. The driver will automatically retry this CT command if needed.
SEVERITY LEVEL: Debug
MESSAGE: Abnormal CT completion.
ACTION: Check physical connections to Fibre Channel network and the state the remote PortID is in.

MSG_ID: 1620 DEBUG: CT rcvd.

VERBOSE_MASK: LOG_CT (0x00010000)
DESCRIPTION: This indicates that an unsolicited CT command was received.
SEVERITY LEVEL: Debug
MESSAGE: CT rcvd.
ACTION: No action needed, informational.
MSG_ID: 1621 DEBUG: Unsolicited CT dropped.

VERBOSE_MASK: LOG_CT (0x00010000)
DESCRIPTION: This indicates that an unsolicited CT command was received and then dropped for some reason.
SEVERITY LEVEL: Debug
MESSAGE: Unsolicited CT dropped.
ACTION: No action needed, informational.

MSG_ID: 1622 DEBUG: CT reply.

VERBOSE_MASK: LOG_CT (0x00010000)
DESCRIPTION: This indicates that a reply is being sent for an unsolicited CT command.
SEVERITY LEVEL: Debug
MESSAGE: CT reply.
ACTION: No action needed, informational.

MSG_ID: 1630 ERROR: Invalid CT command found.

VERBOSE_MASK: LOG_CT (0x00010000)
DESCRIPTION: This indicates that a CT command was found with an invalid command code.
SEVERITY LEVEL: Error
MESSAGE: Invalid CT command found.
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.

Fibre Channel Security Protocol (FCSP) Events

MSG_ID: 1700 DEBUG: FCSP

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

MSG_ID: 1701 DEBUG: FCSP detail.

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

MSG_ID: 1702 DEBUG: FCSP error.

VERBOSE_MASK: LOG_FCSP (0x00020000)
DESCRIPTION: This indicates that an error was found while processing a DFC request.
SEVERITY LEVEL: Debug
MESSAGE: FCSP error.
ACTION: No action needed, informational.

MSG_ID: 1705 DEBUG: FCSP state.

VERBOSE_MASK: LOG_FCSP (0x00020000)
DESCRIPTION: This indicates that an authentication state is changing.
SEVERITY LEVEL: Debug
MESSAGE: FCSP state.
ACTION: No action needed, informational.

MSG_ID: 1706 DEBUG: FCSP event

VERBOSE_MASK: LOG_FCSP (0x00020000)
DESCRIPTION: This indicates that an authentication event has occurred.
SEVERITY LEVEL: Debug
MESSAGE: FCSP event
ACTION: No action needed, informational.

MSG_ID: 1707 DEBUG: FCSP status.

VERBOSE_MASK: LOG_FCSP (0x00020000)
DESCRIPTION: This indicates that an authentication status is being updated.
SEVERITY LEVEL: Debug
MESSAGE: FCSP status.
ACTION: No action needed, informational.

MSG_ID: 1710 DEBUG: FCSP start.

VERBOSE_MASK: LOG_FCSP (0x00020000)
DESCRIPTION: This indicates that authentication is being started to a specific node.
SEVERITY LEVEL: Debug
MESSAGE: FCSP start.
ACTION: No action needed, informational.

MSG_ID: 1720 DEBUG: FCSP comp.

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

Fibre Channel Fabric (FCF) Events

MSG_ID: 1800 DEBUG: FCF

VERBOSE_MASK:
DESCRIPTION: This provides general information about the driver's FCF interface.
SEVERITY LEVEL: Debug
MESSAGE: FCF
ACTION: No action needed, informational.

MSG_ID: 1801 DEBUG: FCF detail.

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

MSG_ID: 1810 DEBUG: FCF error.

VERBOSE_MASK:
DESCRIPTION: This indicates that an error was found while processing an FCF request.
SEVERITY LEVEL: Debug
MESSAGE: FCF error.
ACTION: No action needed, informational.

MSG_ID: 1820 DEBUG: FCF state.

VERBOSE_MASK:
DESCRIPTION: This indicates that an FCF object state is changing.
SEVERITY LEVEL: Debug
MESSAGE: FCF state.
ACTION: No action needed, informational.

MSG_ID: 1830 DEBUG: FCF event.

VERBOSE_MASK:
DESCRIPTION: This indicates that an FCF event has occurred.
SEVERITY LEVEL: Debug
MESSAGE: FCF event.
ACTION: No action needed, informational.