ETERNUS
Disk storage systems
Server Connection Guide (FCoE)
for Linux

Driver Settings for SUSE Linux Enterprise Server on Other Brand Servers with Emulex Converged Network Adapter Cards
Preface

This document briefly explains the operations that need to be performed by the user in order to connect an ETERNUS2000 model 100 or 200, ETERNUS4000 model 300, 400, 500, or 600, or ETERNUS8000 model 700, 800, 900, 1100, 1200, 2100, or 2200 Disk storage system to a server running SUSE Linux Enterprise Server and using Emulex Converged Network Adapter cards via an FCoE interface.

This document should be used in conjunction with any other applicable user manuals, such as those for the ETERNUS2000 model 100 or 200, ETERNUS4000 model 300, 400, 500, or 600, or ETERNUS8000 model 700, 800, 900, 1100, 1200, 2100, or 2200 Disk storage system, server, OS used, Converged Network Adapter cards, drivers, etc.

Note that this manual refers the following documents.

- Server Support Matrix
- ETERNUS Disk storage systems Server Connection Guide (FCoE) for Linux

Also, note that in this document the ETERNUS2000 models 100 and 200, ETERNUS4000 models 300, 400, 500, and 600, and ETERNUS8000 models 700, 800, 900, 1100, 1200, 2100, and 2200 Disk storage systems are collectively referred to as ETERNUS Disk storage systems.

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The Contents and Structure of this Manual

This document is composed of the following three chapters.

- Chapter 1 Workflow
  This describes the workflow for installing and setting up Converged Network Adapter cards and the server.

- Chapter 2 For SUSE Linux Enterprise Server 11
  This describes how to install and set up the Converged Network Adapter cards and server when running SUSE Linux Enterprise Server 11.

- Chapter 3 For SUSE Linux Enterprise Server 10
  This describes how to install and set up the Converged Network Adapter cards and server when running SUSE Linux Enterprise Server 10.
Safe Use of this Product

Using this manual

This manual contains important information to ensure the safe use of this product. Be sure to thoroughly read and understand its contents before using the product. After reading, store this manual in a safe place for future reference.

FUJITSU has made every effort to ensure the safety of the users and other personnel, and to prevent property damage. When using this product, carefully follow the instructions described in this manual.

Acknowledgments

- Emulex is a trademark of Emulex Corp.
- Linux is a trademark or registered trademark of Linus Torvalds in the USA and other countries.
- SUSE is a registered trademark of SUSE Linux AG., a subsidiary of Novell, Inc.
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Naming Conventions

Product Names

SUSE Linux Enterprise Server series products are as described below.

<table>
<thead>
<tr>
<th>Product names</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUSE Linux Enterprise Server</td>
<td>SLES</td>
</tr>
<tr>
<td>SUSE Linux Enterprise Server 11</td>
<td>SLES11</td>
</tr>
<tr>
<td>SUSE Linux Enterprise Server 11 Service Packx</td>
<td>SLES11 SPx</td>
</tr>
<tr>
<td>SUSE Linux Enterprise Server 11 for xxx</td>
<td>SLES11 (xxx)</td>
</tr>
<tr>
<td>SUSE Linux Enterprise Server 11 Service Packx for xxx</td>
<td>SLES11 SPx (xxx)</td>
</tr>
<tr>
<td>SUSE Linux Enterprise Server 10</td>
<td>SLES10</td>
</tr>
<tr>
<td>SUSE Linux Enterprise Server 10 Service Packx</td>
<td>SLES10 SPx</td>
</tr>
<tr>
<td>SUSE Linux Enterprise Server 10 for xxx</td>
<td>SLES10 (xxx)</td>
</tr>
<tr>
<td>SUSE Linux Enterprise Server 10 Service Packx for xxx</td>
<td>SLES10 SPx (xxx)</td>
</tr>
</tbody>
</table>
Other names

- "Channel Adapter" (CA) refers to the Fibre Channel interface module used in the ETERNUS Disk storage systems to connect to the server.
- "Converged Network Adapter card" refers to the FCoE interface module normally used in the server.
- Italics are used to show variables such as values and characters that appear in command parameters and output examples.
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Chapter 1 Workflow

This manual is used when performing the setup procedure described in "Installing and Setting Up the Drivers" of the "ETERNUS Disk storage systems Server Connection Guide (FCoE) for Linux".

This manual provides a different chapter for each OS version. Refer to the chapter appropriate for the OS being used.

Workflow

1. Install the Emulex Converged Network Adapter Card Driver
   Install the specified Converged Network Adapter card driver. Download the proper driver from the Emulex Corp web-site if required.

   - For SLES11
     • "2.1 Installing the Converged Network Adapter Card Driver" (page 9)
   - For SLES10
     • "3.1 Installing the Converged Network Adapter Card Driver" (page 12)

2. Set Up the Driver Parameters
   Set the driver parameters by editing the configuration file.

   - For SLES11
     • "2.2 Setting the Driver Parameters" (page 9)
   - For SLES10
     • "3.2 Setting the Driver Parameters" (page 12)
Create an Initial RAM Disk
Create an initial RAM disk to match the kernel being used.

For SLES11
- "2.3 Creating an Initial RAM Disk" (page 10)

For SLES10
- "3.3 Creating an Initial RAM Disk" (page 13)

After completing all the required procedures in this manual, follow the procedures in "ETERNUS Disk storage systems Server Connection Guide (FCoE) for Linux".
All work after this point requires "root" privileges.
When using SUSE Linux Enterprise Server 11 (SLES11) supported Converged Network Adapter cards, this procedure is used for all OS architectures (e.g. x86, Intel64), Converged Network Adapter cards, and driver versions.

### 2.1 Installing the Converged Network Adapter Card Driver

Check whether the Converged Network Adapter card driver is the OS standard driver or not. If the Converged Network Adapter card requires a non-standard driver, check the driver versions using the "Server Support Matrix".

- When the Converged Network Adapter card requires a standard kernel package driver
  The standard add-on driver for the OS should be used.

- When the Converged Network Adapter card requires a non-standard driver
  Download and install the driver specified in the "Server Support Matrix" from the Emulex Corp web-site.
  Installation of applications, such as OneCommand Manager, is also required. Refer to the Emulex Converged Network Adapter card manual for details of the installation method.

### 2.2 Setting the Driver Parameters

Open the "/etc/modprobe.conf.local" file in an editor such as "vi", and add the setting values for each driver.

Note that the setting values and items vary depending on the ETERNUS Disk storage system that is used.

Example

```shell
options scsi_mod max_luns=512
options lpfc lpfc_lun_queue_depth=N lpfc_link_speed=N lpfc_topology=N
```
2.3 Creating an Initial RAM Disk

Create an initial RAM disk file to match the kernel being used.
Perform the following procedure.

**Procedure**

1. Use the following command to check which kernel is being used.
   
   ```
   # uname -r
   ```

2. Backup the existing initial RAM disk file, then create a new initial RAM disk file.
   
   - Example: For a single CPU server or a multiple CPU server
     
     ```
     # cp /boot/initrd-2.6.27.19-5-default /boot/initrd-2.6.27.19-5-default.bak
     # /sbin/mkinitrd -k vmlinuz -i /boot/initrd-2.6.27.19-5-default_new
     ```

   Confirm that an initial RAM disk file is created in /boot.

3. Set the boot loader.
   Edit "/boot/grub/menu.lst" with an editor such as "vi".
   Comment out the previous initial RAM disk file and add the new initial RAM disk file.
   
   - Example
     
     ```
     # initrd /initrd-2.6.27.19-5-default
     initrd /initrd-2.6.27.19-5-default_new
     ```

End of procedure

---

<table>
<thead>
<tr>
<th>Driver parameter</th>
<th>ETERNUS2000</th>
<th>ETERNUS4000</th>
<th>ETERNUS8000</th>
</tr>
</thead>
<tbody>
<tr>
<td>scsi_mod max_luns=</td>
<td>512</td>
<td>512</td>
<td>512</td>
</tr>
<tr>
<td>lpfc_lun_queue_depth=</td>
<td>Set &quot;8&quot; when the number of LUN is 16 or less. Set &quot;4&quot; when the number of LUN is 17 or more.</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>lpfc_link_speed=</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>lpfc_topology=</td>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

Driver parameter

- ETERNUS2000
- ETERNUS4000
- ETERNUS8000

- scsi_mod max_luns
  - ETERNUS2000: 512
  - ETERNUS4000: 512
  - ETERNUS8000: 512

- lpfc_lun_queue_depth
  - Use "8" when the number of LUN is 16 or less.
  - Use "4" when the number of LUN is 17 or more.
  - ETERNUS2000: 20
  - ETERNUS4000: 20

- lpfc_link_speed
  - ETERNUS2000: 10
  - ETERNUS4000: 20

- lpfc_topology
  - ETERNUS2000: 2
2.4 Rebooting the OS

Reboot the OS. When the Converged Network Adapter card requires a non-standard driver, check the files in "/var/log/messages" and confirm that the correct version of the Converged Network Adapter card driver has been installed after restarting the OS.
All work after this point requires "root" privileges.
When using SUSE Linux Enterprise Server 10 (SLES10) supported Converged Network Adapter cards, this procedure is used for all OS architectures (e.g. x86, Intel64), Converged Network Adapter cards, and driver versions.

### 3.1 Installing the Converged Network Adapter Card Driver

Check whether the Converged Network Adapter card driver is the OS standard driver or not. If the Converged Network Adapter card requires a non-standard driver, check the driver versions using the "Server Support Matrix".

- When the Converged Network Adapter card requires a standard kernel package driver
  The standard add-on driver for the OS should be used.

- When the Converged Network Adapter card requires a non-standard driver
  Download and install the driver specified in the "Server Support Matrix" from the Emulex Corp web-site.
  Installation of applications, such as OneCommand Manager, is also required. Refer to the Emulex Converged Network Adapter card manual for details of the installation method.

### 3.2 Setting the Driver Parameters

Open the "/etc/modprobe.conf.local" file in an editor such as "vi", and add the setting values for each driver.

Note that the setting values and items vary depending on whether the ETERNUS Multipath Driver is used and the ETERNUS Disk storage system that is used.

- When the ETERNUS Multipath Driver is used

  ```
  options scsi_mod max_luns=512
  ```

- When the ETERNUS Multipath Driver is not used

  ```
  options scsi_mod max_luns=512
  options lpfc lpfc_lun_queue_depth=N lpfc_link_speed=N lpfc_topology=N
  ```
3.3 Creating an Initial RAM Disk

Create an initial RAM disk file to match the kernel being used. Perform the following procedure.

**Procedure**

1. Use the following command to check which kernel is being used.

   ```
   # uname -r
   ```

2. Backup the existing initial RAM disk file, then create a new initial RAM disk file. Image file name varies depending on whether the server has a single or multiple CPUs.
   
   - **Example: For a single CPU server**
     ```
     # cp /boot/initrd-2.6.16.46-0.12 /boot/initrd-2.6.16.46-0.12.bak
     # /sbin/mkinitrd -k vmlinuz -i /boot/initrd-2.6.16.46-0.12_new
     ```
     
   - **Example: For a multiple CPU server**
     ```
     # cp /boot/initrd-2.6.16.46-0.12-smp /boot/initrd-2.6.16.46-0.12-smp.bak
     # /sbin/mkinitrd -k vmlinuz -i /boot/initrd-2.6.16.46-0.12_new-smp
     ```

   Confirm that an initial RAM disk file is created in /boot.

---

<table>
<thead>
<tr>
<th>Driver parameter</th>
<th>When the ETERNUS Multipath Driver is used</th>
<th>When the ETERNUS Multipath Driver is not used</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ETERNUS2000 ETERNUS4000 ETERNUS8000</td>
<td>ETERNUS 2000 ETERNUS 4000 ETERNUS 8000</td>
</tr>
<tr>
<td>scsi_mod max_luns=</td>
<td>512</td>
<td>512</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Set &quot;8&quot; when the number of LUN is 16 or less. Set &quot;4&quot; when the number of LUN is 17 or more.</td>
</tr>
<tr>
<td>lpfc_lun_queue_depth=</td>
<td>No setting is required</td>
<td></td>
</tr>
<tr>
<td>lpfc_link_speed=</td>
<td>No setting is required</td>
<td></td>
</tr>
<tr>
<td>lpfc_topology=</td>
<td>No setting is required</td>
<td></td>
</tr>
</tbody>
</table>
3.4 Rebooting the OS

Reboot the OS. When the Converged Network Adapter card requires a non-standard driver, check the files in "/var/log/messages" and confirm that the correct version of the Converged Network Adapter card driver has been installed after restarting the OS.

Example:

```
# initrd /initrd-2.6.16.46-0.12
initrd /initrd-2.6.16.46-0.12_new
```
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